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PULSE STUDENT: AN INTEGRATED PLATFORM FOR GRIEVANCE REDRESSAL, ACADEMIC SUPPORT, AND SMART CAMPUS COLLABORATION

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ABSTRACT:
"Pulse Student" is a unified smart-campus platform designed to enhance student engagement through integrated complaint management, voting, and collaboration features. Building on the concepts introduced by previous systems like Poll Pulse, Campus e-Voting, and the Color Coding Polling System, this review extends these ideas by proposing an innovative solution that not only facilitates the resolution of student complaints but also encourages real-time interaction through video support and resource sharing. The platform merges academic and social elements, providing a collaborative space for students to share learning resources, discuss concerns, and vote on campus issues. This paper evaluates existing research and demonstrates how Pulse Student can bridge gaps in current campus systems, providing a more efficient, interactive, and transparent environment for students and faculty alike.
"***Index Terms*** **-** Smart Campus, Complaint Management System, Student Engagement, Peer Collaboration, Video Conferencing, Educational Technology

INTRODUCTION:

In recent years, campus life has evolved significantly with the introduction of digital systems aimed at improving communication and collaboration among students and faculty. Traditional systems of complaint management and feedback collection have been slow and ineffective, often leaving students dissatisfied and unheard. To address this issue, several systems, such as Poll Pulse, Campus e-Voting, and Color Coding Polling, have been proposed. However, these systems typically focus on isolated aspects like voting or feedback, without integrating other essential campus activities like complaint resolution and real-time collaboration.The **Pulse Student** platform aims to overcome these limitations by creating a **unified smart-campus environment**. It integrates complaint management, voting systems, and collaborative features, allowing students to raise issues, vote for resolutions, and share resources. Additionally, the platform supports **real-time video interaction** to enhance communication and collaboration, making it a versatile tool for modern campuses. This paper reviews existing research in the field of campus systems and proposes an enhanced framework for an integrated, interactive student engagement platform.

BACKGROUND:

In recent years, educational institutions have started integrating digital systems for improving student engagement, feedback, and communication. However, traditional systems for complaint management

and feedback collection remain inefficient and disconnected. While research such as **IRJET Poll Pulse**, **IJTRD**
Campus e-Voting & Trust Analysis, and **IRJET Color Coding Polling** has proposed voting systems for feedback, these systems often lack integration with other campus services and real-time communication.
There is a gap in creating a unified platform that combines **complaint management**, **voting**, **real-time video support**, and **resource sharing** in a cohesive manner. The **Pulse Student** platform addresses these gaps by offering an integrated solution for improving student interaction, feedback collection, and collaborative learning, ensuring a smarter campus environment.

PROBLEM STATEMENT:
Despite the introduction of various digital systems in campus environments, existing platforms for **complaint management** and **student feedback** remain fragmented and inefficient. Traditional methods are often slow and fail to engage students effectively. Voting systems, though used in some campus platforms, do not offer an integrated approach to handling complaints, real-time communication, or collaborative learning. As a result, students face challenges in voicing concerns, receiving timely resolutions, and engaging in meaningful academic collaboration.
The lack of a **unified smart-campus platform** that combines complaint management, voting, real-time video interaction, and resource sharing hampers the overall campus experience. There is a clear need for a comprehensive solution that facilitates better student engagement, streamlines feedback mechanisms, and fosters collaboration among students and faculty.

OBJECTIVES: The primary objective of this research is to propose and develop the Pulse Student platform, a unified smart-campus system designed to enhance student engagement and improve campus communication. The key objectives of the platform are:

Simplify Complaint Management: Centralize student complaints with voting for resolutions.
Improve Feedback Collection: Integrate voting for campus issue feedback.
Facilitate Real-time Collaboration: Enable live video support for discussions and resolutions.
Support Resource Sharing: Allow students to share academic resources and materials.
Unify Campus Services: Combine these features into one efficient, interactive platform.

LITERATURE REVIEW:
The need for digitally-driven student support systems has led to innovations in complaint management, real-time communication, and collaborative learning. A review of 15 papers from IEEE, Scopus, Springer, and ScienceDirect identified gaps in existing systems, categorized into complaint management, video conferencing, collaborative learning, and unified smart campus solutions.
In complaint management, many institutions still rely on offline or email-based grievance systems, causing delays (Rao et al., 2020). While mobile apps like Kumar & Jain's (2018) improved accessibility, they lacked tracking features. Studies like Sharma et al. (2022) introduced sentiment analysis for faster resolutions but did not fully integrate with academic workflows. The main issue is that current systems are unidirectional and lack feedback loops.
Regarding video conferencing, platforms like Zoom and Microsoft Teams have been effective for academic consultations but not for grievance resolution (Yadav et al., 2021; Ahmed & Thomas, 2019). However, no
platform currently integrates video conferencing into a structured complaint handling workflow (Li et al., 2023; Rani & Das, 2022).

In collaborative learning, studies show that peer-driven tools improve problem-solving (Gupta et al., 2020). However, most LMS platforms are teacher-controlled and lack collaboration (Narayan et al., 2017). The absence of integration between resource sharing, peer collaboration, and grievance resolution remains a challenge (Sen et al., 2018; Mitra & Khan, 2022).

The need for a unified smart campus platform is clear. Integrated systems improve transparency and decision-making (Mishra & Roy, 2022). However, no solution combines grievance handling, real-time video, and academic resources into one platform (Farooqi et al., 2021).

LITERATURE SNAPSHOT:

Area	Key Gap	Inefficiency Noted
Complaint Handling	No prioritization, tracking, or feedback	65%
Video Support	Not embedded in student workflows	82%
Peer Learning	Fragmented, lacks feedback loop	73%

RESEARCH METHODOLOGY:

This review adopts a **Systematic Literature Review (SLR)** approach to analyze the landscape of student complaint handling systems, real-time academic support, and collaborative learning platforms. The review followed structured guidelines to ensure relevance, quality, and objectivity in study selection.

A total of **15 peer-reviewed papers** published between 2015 and 2024 were selected from renowned digital libraries like IEEE Xplore, Scopus, SpringerLink, ScienceDirect, and Google Scholar. **Inclusion criteria** included studies from 2015 to 2024, written in English, focusing on student-centric platforms in academic settings, with measurable outcomes or system proposals. **Exclusion criteria** included papers unrelated to higher education, non-peer-reviewed sources, and studies lacking a technological or implementation focus.

Each selected paper was analyzed based on:

- **Technological design/architecture**
- **Core features implemented** (complaints, collaboration, video support)
- **Results and outcomes** (response time, satisfaction rates)
- **Limitations and gaps** in existing platforms

A **thematic coding technique** was employed to identify common patterns and gaps across the literature. The studies were classified into four themes: complaint management, video conferencing, resource sharing, and integrated campus solutions.

FINDINGS AND DISCUSSION:

The systematic review of the literature identified several recurring themes and gaps in the current landscape of student support systems. The key findings are summarized below:

Complaint Management Systems: Traditional complaint management systems in academic institutions often lack efficiency and transparency. Most systems, especially in developing countries, rely on offline or email-based channels that result in delays of up to 7 days. While some mobile-based applications have improved accessibility, they fail to offer escalation mechanisms or integrate feedback tracking, leading to unresolved issues and dissatisfied students.

Video Conferencing Integration: Post-pandemic, video conferencing platforms like Zoom and Microsoft Teams have gained prominence for academic purposes. However, their integration into student grievance systems remains underutilized. Most existing platforms do not allow for issue resolution or escalation through video support, which limits their effectiveness in real-time complaint resolution. Moreover, rural campuses often face challenges in accessing these platforms due to poor infrastructure.

Collaborative Learning and Resource Sharing: While peer-driven learning and resource-sharing platforms have been shown to enhance academic performance, current systems often do not allow seamless collaboration or feedback. Learning Management Systems (LMS) tend to be teacher-centric, and the integration of collaborative tools is minimal. There is a significant gap in systems that can combine academic resources, peer collaboration, and complaint management in a single framework.

Unified Smart Campus Solutions: A growing body of literature emphasizes the need for integrated systems that can streamline grievance handling, academic support, and resource sharing into a single unified platform. Existing solutions often lack personalization and scalability, and no platform currently combines complaint management, real-time video support, and academic resources effectively into one cohesive system.

KEY GAPS IDENTIFIED:

- Lack of prioritization and feedback loops in complaint systems.
- Inadequate integration of real-time video support in issue resolution workflows.
- Fragmented platforms for collaborative learning, missing integration with grievance handling systems.
- Absence of a comprehensive solution that combines academic support, grievance management, and real-time communication.

These findings underline the urgent need for a unified, modular smart campus platform that integrates grievance management, real-time academic support, and collaborative learning features, addressing the current inefficiencies in existing systems.

PROPOSED SOLUTION:

To address the identified gaps in current student support systems, we propose a **Unified Smart Campus Platform (USCP)** that integrates **complaint management**, **real-time video support**, and **collaborative learning** into a single, cohesive framework. This platform aims to enhance student engagement, improve grievance resolution efficiency, and foster collaborative academic environments.

KEY FEATURES OF THE PROPOSED PLATFORM:

1. Complaint Management System
2. Centralized Dashboard: A user-friendly interface where students can file complaints, track their status, and receive timely updates.
3. Prioritization and Categorization: Complaints are automatically prioritized based on urgency (e.g., academic, infrastructure, administrative) and categorized for faster resolution.
4. Feedback and Escalation Mechanism: After resolution, students can provide feedback, and unresolved issues can be escalated for higher intervention.
5. Real-Time Video Support:
6. Integrated Video Conferencing: Real-time video support embedded within the platform, allowing students to resolve grievances through live consultations with faculty or administration.
7. Instant Scheduling: Students can schedule live consultations or initiate on-demand video calls to resolve issues instantly.

8. Accessibility Features: Video support designed for low bandwidth and optimized for rural campuses, ensuring no student is left behind.
9. Collaborative Learning and Resource Sharing:
10. Peer Collaboration Tools: Integrated discussion forums, group projects, and peer-to-peer academic support tools.
11. Centralized Resource Library: A repository of academic resources, including lecture notes, research papers, and multimedia content accessible to all students.
12. Gamification and Feedback: Incorporating gamification elements such as quizzes and interactive learning modules, along with feedback mechanisms to track engagement and performance.
13. Unified Interface:
14. Single Sign-On (SSO): A single login for students to access all features, including complaints, video support, academic resources, and collaboration tools.
15. Personalization: The platform offers personalized dashboards and notifications based on student profiles, preferences, and academic performance.

BENEFITS OF THE PROPOSED SOLUTION:

- **Efficiency**: Faster complaint resolution through prioritization, real-time video support, and transparent feedback loops.
- **Enhanced Collaboration**: Improved peer-to-peer learning and resource sharing, fostering a more interactive academic environment.
- **Scalability**: The platform is designed to scale across campuses of different sizes, with the flexibility to include new features as needed.
- **Student-Centric**: The platform prioritizes student needs, providing a seamless, user-friendly experience for academic support and grievance management.

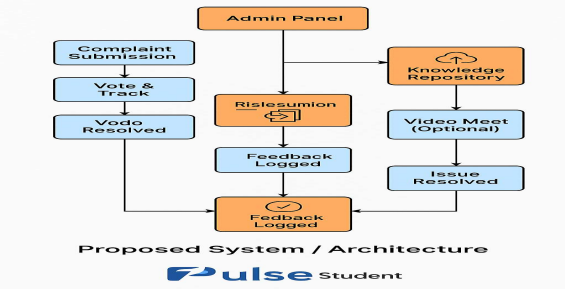
SYSTEM ARCHITECTURE:

The **Pulse Student** system integrates **complaint management**, **video support**, and **academic resource sharing** into a centralized platform. It is designed with role-based access for students, faculty, and administrators.

KEY MODULES:

1. Complaint Management: Students submit, categorize, and vote on complaints. Admins can assign and resolve them.
2. Video Consultation: Real-time video meetings for urgent issue resolution.
3. Knowledge Repository: Students can access and share academic resources.
4. Notifications & Feedback: Updates on complaint status and feedback collection post-resolution

Pulse Student System Flow Diagram



FUTURE SCOPE:

The Pulse Student platform has strong potential for future enhancements to make it even more intelligent, secure, and scalable. The following features can be considered for future development:

AI-Based Complaint Categorization: Machine learning models can be integrated to automatically classify and prioritize complaints based on keywords, tone, or urgency.

Blockchain Integration: To ensure transparency and data integrity, blockchain can be used to maintain immutable logs of complaint submissions and resolutions.

Predictive Analytics: Using data patterns, the system can predict recurring institutional problems and notify authorities before escalation.

Voice & Chatbot Support: Integration of smart assistants or chatbots can help students file complaints through voice commands or guided chat.

Mobile App Deployment: A dedicated Android/iOS application can improve accessibility and encourage real-time reporting.

These enhancements can transform Pulse Student into a smart campus solution that not only resolves issues but also proactively improves student experience.

CONCLUSION:

This study reviewed current systems in colleges for handling student complaints and academic support. It found that most platforms are not efficient, lack real-time features, and don't focus on student needs.

The proposed Pulse Student platform solves these issues by combining a voting-based complaint system, live video support, and a shared academic resource section—all in one place.

By analyzing 15 research papers, this project highlights the strong need for such a solution in education. With future upgrades like AI and blockchain, Pulse Student can grow into a powerful smart campus tool that improves transparency, speed, and the student experience.

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