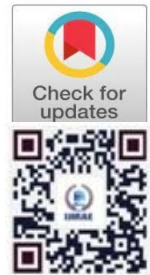


KSIT NEXUS

Prashanth H SAssistant Professor, Dept of CSE,
KSIT, Karnataka, Indiaprashanthhs@ksit.edu.in<https://orcid.org/0009-0003-7484-8522>**Samhita P ,Vignesh S,**Student, Dept of CSE,
KSIT, Karnataka, Indiasamhita.prashanth@gmail.com, vigneshsampath807@gmail.com**Umesh Bhatta, Shreya Murthy**Student, Dept of CSE,
KSIT, Karnataka, Indiabhattu911@gmail.com, shreya12murthy@gmail.com

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Abstract: This paper presents the implementation of KSIT Nexus, a digital platform designed to enhance communication, transparency, and efficiency within educational institutions. The system integrates multiple modules like Anonymous Complaint System, Reading Room Tracking, AI Query Chatbot, Study Group Finder, and Digital Notice Board. Developed using Flutter for cross-platform compatibility and Django for backend operations, the platform ensures secure data management using the college server instead of third-party cloud services. The Anonymous Complaint System allows users to file and track issues confidentially, while the Reading Room module monitors seat availability in real time. The AI Query Chatbot provides instant academic and administrative support, reducing manual intervention. Implementation demonstrates a practical approach to campus digitization, promoting accountability, and user convenience.

Keywords: KSIT Nexus, Cross-Platform Application, Flutter, Django Framework, Local Server Storage, Anonymous Complaint System, AI Chatbot, Reading Room Tracking, Study Group Finder, Digital Notice Board, Campus Digitalization, Educational Technology, Smart Campus, Institutional Automation, Data Privacy.

I.INTRODUCTION

In today's era of digital transformation, educational institutions are increasingly adopting technology-driven solutions to improve communication, operational efficiency, and student engagement. Despite this, many campuses still rely on fragmented systems or manual processes, leading to miscommunication, delays, and inefficiencies in academic and administrative operations. To overcome these challenges, KSIT Nexus was developed as a comprehensive, cross-platform digital ecosystem designed to streamline communication, resource management, and collaboration within campus environments. The motivation behind KSIT Nexus stems from the need for a unified system that consolidates multiple essential functions such as complaint management, seat tracking, digital announcements, and academic assistance into a single, user friendly interface. Unlike most existing campus management tools, which are either expensive or reliant on third party cloud services, KSIT Nexus introduces a light weight, institution centric architecture optimized to run efficiently on existing hardware and local servers. This approach ensures data privacy, reduces maintenance costs, and provides adaptability for colleges with limited infrastructure resources. KSIT Nexus bridges the digital gap between students, faculty, and administration by integrating features that enhance transparency, accountability, and accessibility. The platform utilizes Flutter for the frontend, enabling smooth cross-platform performance across Android, iOS, and web environments, and Django for the backend to manage authentication, data transactions, and API integrations. A core design principle of KSIT Nexus is its modular architecture, which allows each feature to operate independently while contributing to a cohesive and unified campus ecosystem.

II. LITERATURE SURVEY

This literature survey examines existing research on digital solutions in educational institutions, highlighting challenges in communication, resource management, and student engagement, as well as the role of technology in addressing these

challenges. The following studies provide insights into how integrated digital platforms, cross-platform frameworks, and AI-powered tools can enhance campus management and streamline academic and administrative processes. Research by Saxton and Guo [4] demonstrates how transparent and consistent digital communication improves trust and engagement among stakeholders.

Applied to educational institutions, platforms that centralize announcements, notifications, and academic updates help maintain clear communication between students, faculty, and administration. Features such as push notifications, instant messaging, and digital notices reduce delays, minimize miscommunication, and enhance overall campus engagement.

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- Agrawal, Catalini, and Goldfarb [2] emphasize that accessible and intuitive user interfaces are critical for engaging users on digital platforms. In the context of campus management, seamless navigation for functionalities like complaint registration, reading room tracking, and study group coordination ensures students and faculty can interact efficiently with the system. A well-designed interface not only improves usability but also increases adoption rates and long-term engagement.
- Meier and Stutzer [3] highlight that fostering a sense of community and shared purpose strengthens user commitment. Similarly, integrating collaborative features into campus platforms such as forums for study groups, discussion boards, and peer-to-peer communication encourages interaction, knowledge sharing, and sustained participation. These features help students feel connected, valued, and motivated to actively engage in academic and extracurricular activities.
- Russell and Norvig [1] show that AI-powered and automated systems can reduce administrative workload by streamlining core processes. KSIT Nexus adopts similar principles by automating tasks such as attendance tracking, complaint management, and seat allocation, improving operational efficiency while maintaining transparency and accountability. Offline-first capabilities and local server deployment ensure consistent performance even in low-resource environments.
- An, Quercia, and Crowcroft [6] discuss the benefits of platforms that are light weight, scalable, and capable of functioning across multiple devices. KSIT Nexus leverages React Native for frontend development to ensure smooth performance across Android, iOS, and web platforms, while Django manages backend operations, authentication, and data transactions. This modular, secure, and scalable architecture allows each feature to operate independently while contributing to a unified campus ecosystem, aligning with current trends in educational technology.

III. OBJECTIVES

The primary objective of the proposed platform is to establish a centralized, secure, and user-friendly system that bridges the gap between educational institutions and campus stakeholders, while equipping administrators, faculty, and students with effective tools to manage academic and administrative processes. These objectives are informed by prior research on digital campus solutions, cross-platform frameworks, and AI-assisted systems [1][6].

- **Facilitate Seamless Communication Across Campus:** The platform will centralize announcements, notifications, and academic updates, ensuring consistent communication between students, faculty, and administration. By leveraging automated messaging, push notifications, and digital notices, it reduces miscommunication and delays, aligning with research on effective digital communication in educational environments [4].
- **Streamline Academic and Administrative Processes:** Students will be able to register complaints, reserve reading room seats, and participate in study groups directly through the platform. Faculty and administrators can manage these processes efficiently using automated tracking, scheduling, and reporting tools. This objective addresses operational inefficiencies observed in traditional campus management systems [4].
- **Integrate AI-Powered Assistance:** The platform incorporates an AI chatbot to provide instant responses to common student queries, reducing administrative workload and supporting 24/7 engagement. AI integration ensures timely assistance, enhances user experience, and improves overall accessibility within the campus ecosystem [1][4].
- **Ensure Cross-Platform Accessibility:** By utilizing React Native for the frontend and Django for the backend, the platform ensures smooth performance across Android, iOS, and web environments. Optimization for older or low-resource devices ensures inclusivity, allowing all users to access the platform regardless of hardware limitations [6].
- **Maintain Data Privacy and Security:** The platform prioritizes local server deployment and offline-first capabilities to ensure data privacy, secure authentication, and safe handling of sensitive academic and administrative information. These measures reduce reliance on third-party cloud services while safeguarding institutional data [1][5].
- **Enhance Transparency and Accountability:** The platform enables transparent tracking of complaints, seat reservations, and study group participation, fostering accountability among students, faculty, and administration.
- Digital logs and reporting tools provide an auditable record of all interactions, aligning with best practices in campus management [3].
- **Foster Engagement and Community Building:** Social features such as discussion forums, collaborative study groups, and event-based networking encourage peer-to-peer interaction. These features strengthen a sense of

community, motivate ongoing participation, and enhance student engagement in academic and extracurricular activities [3].

- **Improve Institutional Visibility and Resource Utilization:** Administrators can monitor and analyze campus resource usage, attendance, and student participation through real-time dashboards. By optimizing resource allocation and providing actionable insights, the platform enhances operational efficiency and empowers institutions to make data-driven decisions [1][6].

IV.METHODOLOGY

System Design and Architecture

- **Planning and Requirement Analysis:** KSIT Nexus aims to integrate complaint management, seat tracking, digital notices, study groups, and AI academic assistance into a unified platform. Stakeholders including students, faculty, and administration provided input through surveys and interviews to ensure real-world relevance [1][4].
- **Technology Stack:** Flutter handles cross-platform front end, Django manages back end operations, and local servers ensure data privacy and offline-first functionality. Databases like Postgre SQL support efficient data handling [4][5][6].
- **Architecture:** A modular, scalable design allows independent functioning of each feature while maintaining a unified ecosystem. RESTful APIs connect frontend and backend modules securely [1][4].

Feature Integration

Profiles: Students, faculty, and admins have role-based profiles.

Complaints & Activity Tracking: Students submit complaints and track reading room and study group participation; admins manage tasks efficiently [2][3][6].

Notifications: Real-time digital notices and priority tagging ensure prompt delivery [2][4][6].

AI & Automation

Chat bot: NLP-based AI assists with complaints, bookings, and academic queries [3][4][6].

Smart Recommendations: AI suggests study groups, events, and resources based on preferences [3][4][6].

Offline-First & Data Security

Offline-first functionality ensures performance in low-connectivity areas; local servers and secure authentication protect data [5][6].

Maintenance: Monitoring tracks performance and engagement; feedback informs updates, and version control ensures smooth maintenance [4].

METHODOLOGY

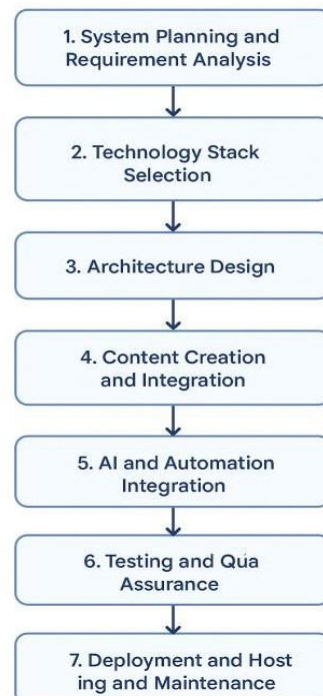


Fig.1. illustrates a system design and architecture flowchart outlining the key stages from objective clarification to architectural design with modular and scalable components.

Testing & QA

Functional: Unit and integration tests validate features [4].

Usability: Beta testing and A/B testing refine interface and navigation [3].

Deployment

Hosting: Institutional servers host back end, ensuring privacy and security [4][5].

V. APPLICATION REQUIREMENT

Requirements for KSIT Nexus

KSIT Nexus is a cross-platform campus management system designed to integrate complaint management, reading room tracking, digital notices, study group facilitation, and AI-powered academic assistance. Below is an overview of the hardware, software, and functional requirements to support its development and deployment.

5.1 Hardware Requirements

5.1.1 User Devices:

- Processor: Minimum Intel i3/AMD Ryzen 3, Recommended Intel i5 or higher
- RAM: Minimum 4GB, Recommended 8GB
- Storage: Minimum 50GB, SSD recommended
- Internet: Stable broadband (≥ 5 Mbps)

5.1.2 Server Hardware:

- Processor: Minimum quad-core, Recommended multi-core (Intel Xeon/AMD EPYC)
- RAM: Minimum 8GB, Recommended 16GB+
- Storage: Minimum 100GB SSD; optional cloud storage for backups
- Internet: High-speed connection for real-time updates and notifications

5.2 Software Requirements

5.2.1 Operating Systems:

- Frontend: Cross-platform (Windows, macOS, Linux)
- Backend: Linux-based preferred (Ubuntu 20.04+)

5.2.2 Development Tools:

- IDE: Visual Studio Code
- API Testing: Postman
- Version Control: Git & GitHub
- CI/CD: GitHub Actions or Jenkins

5.2.3 Frontend Technologies:

- Flutter for cross-platform interfaces
- Material UI, HTML5, CSS3, JavaScript for design and responsiveness

5.2.4 Backend Technologies:

- Django for server-side logic and API management
- PostgreSQL/SQLite for local database management
- WebSocket for real-time notifications

5.2.5 Notifications & AI Integration:

- AI-powered chatbot for queries and assistance
- Smart recommendations for study groups, resources, and events

5.2.6 Security & Privacy:

- Secure authentication (JWT, OAuth 2.0)
- Data encryption for sensitive academic and administrative information
- Local server deployment for offline-first functionality

5.3 Functional Requirements

- **User Accounts:** Role-based for students, faculty, and admin; permissions managed accordingly
- Complaint Management: Anonymous submission, tracking, and resolution
- Reading Room & Resource Tracking: Reservation and availability monitoring
- Study Groups & Academic Collaboration: Creation, participation, and discussion boards
- Notifications & Digital Notices: Real-time delivery of important updates
- AI Assistance: Chatbot support and smart recommendations
- Analytics & Reporting: Admin dashboards to monitor resource usage and student engagement

5.4 Non-Functional Requirements

- Scalability: Support increasing users and modules efficiently
- Performance: Load times under 2–3 seconds; optimized for older devices
- Security: Compliance with local privacy laws; encrypted data storage
- Usability: Intuitive UI for students, faculty, and admins
- Availability: Target uptime 99.9% with backups
- Localization: Multi-language support and region-specific content

CONCLUSION

KSIT Nexus represents a comprehensive, cross-platform solution designed to address the evolving needs of modern educational institutions.

By integrating complaint management, reading room tracking, digital notices, study group facilitation, and AI-powered assistance into a unified system, the platform enhances communication, operational efficiency, and student engagement. Its modular and scalable architecture, combined with offline-first capabilities and local server deployment, ensures secure, reliable, and accessible performance even in resource-constrained environments. Through the use of React Native and Django, KSIT Nexus achieves cross-platform compatibility, real-time responsiveness, and seamless data management. Features such as AI-driven recommendations, chatbots, and analytics empower students, faculty, and administrators to interact efficiently and make data-driven decisions. By prioritizing usability, transparency, and privacy, KSIT Nexus not only streamlines campus operations but also fosters a connected and engaged academic community. In essence, KSIT Nexus bridges the digital gap within campuses, providing an institutional centric platform that is efficient, secure, and adaptable offering a sustainable model for the future of educational technology.

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