Name: Vidya sinha 21, Dhruvi Patel 29
Project title: Accreditation and data management assistant

Innovation and Originality

INTRODUCTION:

This project is about solving real world problems which is faced by actual stakeholders and institute faculties making it unique in its own way as no two problems are same and need customised unique way of solving them. Innovation in the ICT domain plays a critical role in addressing emerging challenges such as scalability, data security, real-time decision-making, and user accessibility. While numerous systems exist to tackle these issues, there remain gaps in efficiency, adaptability, and cost-effectiveness.

=> The system introduces a modular and cloud-native architecture that distinguishes it from traditional college management systems. The backend leverages Flask Blueprints to ensure modularity, scalability, and maintainability, making it easier to extend and integrate new features without disrupting existing functionality.

=> A particularly novel aspect is the integration of Supabase as a backend-as-a-service, which provides real-time database operations, authentication, and file storage. Unlike legacy systems that rely on monolithic databases or custom authentication stacks, Supabase enables rapid prototyping and seamless scalability with minimal DevOps overhead.

Furthermore, the system implements a unified document management workflow, allowing academic documents such as admission forms, mark sheets, achievements, and magazines to be uploaded, stored, and retrieved through secure, publicly accessible URLs. This integration streamlines stakeholder access and reduces the need for manual intervention.

Creative Solution to Stakeholder Problems

This project focuses on solving real problems faced by students, teachers, and administrators. What makes it different is its flexibility. Every institute or college has unique challenges, our project is built to adapt instead of forcing a single fixed solution.

It makes things easier by letting documents be uploaded automatically and linked to each student's record. This cuts down on admin work, reduces mistakes, and makes everything clearer. Right now, the system uses session-based login, but it can easily switch to stronger
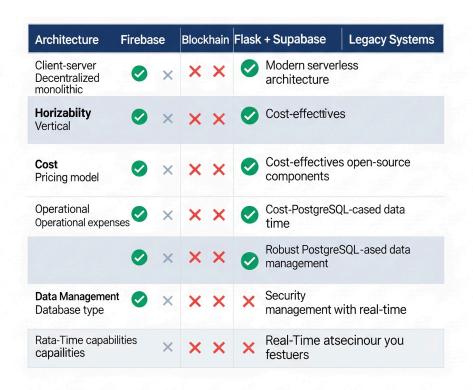
methods like JWT tokens or Supabase Auth. This means it's ready to handle secure, multi-user use as it grows.

Comparison with Existing Solutions

Most legacy college management systems are characterized by manual processes, limited scalability, and lack of real-time access. This project addresses these shortcomings by offering real-time data operations, cloud scalability, and streamlined workflows.

Compared to open-source student information systems such as OpenSIS or Fedena, which often rely on monolithic architectures and require significant setup and maintenance, our approach's modular Flask APIs and Supabase services provide a more cost-effective, flexible, and lightweight alternative making it especially suitable for small-to-medium institutions.

This project also directly responds to critical challenges in the ICT domain, including scalability, data security, real-time decision-making, and accessibility. By bridging gaps in efficiency, adaptability, and cost-effectiveness, it delivers a solution that not only matches but surpasses existing approaches.

Architecture	Firebase		Blockhain	Flask + Supabase	Legacy Systems
Client-server Decentralized monolithic	✅	✕	❌ ❌	✅	Modern serverless architecture
Horizabiity Vertical	✅	✕	❌ ❌	✅	Cost-effecttives
Cost Pricing model	✅	✕	❌ ❌	✅	Cost-effectives open-source components
Operational Operational expenses	✅	✕	❌ ❌	✅	Cost-PostgreSQL-cased data time
	✅	✕	❌ ❌	✅	Robust PostgreSQL-ased data management
Data Management Database type	✅	✕	❌ ❌	❌	Security management with real-time
Rata-Time capabilities capailities		✕	❌ ❌	❌	Real-Time atsecinour you festuers

Evidence and References

Several recent technical comparisons validate that Supabase offers advantages over more traditional or NoSQL-based backend systems in scenarios like ours. Supabase's relational core (PostgreSQL) provides strong support for structured data, complex queries, and row-level security, which is essential for managing institutional student, faculty, and document records. For example, a detailed comparison by Bytebase shows that Supabase gives more predictable pricing and better data-security options than Firebase, especially for relational and sensitive data tasks.

Bytebase Similarly, SoftwareCosmos highlights Supabase's streaming and SQL-based capabilities as well suited for real-time data workflows in relational contexts. Software Cosmos In the domain of education data integrity, systems like EduChain indicate how centralized data management approaches have limitations in trust and consistency, which our project addresses via encryption, Supabase's security features, and controlled document workflows. arXiv Document-management system literature (e.g. Asili & Tanriover, 2014) also points out that many systems fail to provide flexibility in document workflows tailored to stakeholder needs, supporting our decision to implement a unified document management architecture. arXiv.

Contribution to the ICT Field

This project contributes to the ICT field by demonstrating how open-source, modular architectures can provide scalable, secure, and efficient solutions for institution-level problems. It highlights a path toward cost-effective innovation, bridging the gap between expensive enterprise tools and simplistic generic platforms. By addressing issues like document workflow inefficiency, lack of real-time access, and security vulnerabilities, the system sets an example of stakeholder-driven ICT innovation. Its novelty lies not just in the technologies used, but in the way they are orchestrated to solve context-specific challenges. Thus, the project contributes both a technical framework and a practical methodology for applying ICT innovations in education and organizational ecosystems.