

## Aksharajnana 2.0: Edu Library

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**Abstract**— The proposed system, Aksharajnana 2.0: Edu Library, is a full-stack, web-based academic content management platform designed to centralize and streamline the distribution of study materials, feedback collection, user management, and administrative control within educational institutions. The system overcomes the limitations of the existing disorganized and fragmented methods by providing a structured, scalable, and user-friendly environment for students and administrators alike.

Fundamentally, the system introduces a centralized virtual library where pupils can access course materials, notes, and reference books based on their department and semester. Upon registration and login, users are presented with a personalized dashboard that filters content relevant to their academic profile, ensuring a focused and clutter-free experience. Notes and reference books are uploaded and managed by the admin through a secure dashboard where the information is arranged by department, semester, and subject code. This not only makes it possible to content delivery but also ensures content integrity and accuracy.

Unlike existing systems where notes are shared informally through messaging apps or email threads, the proposed system provides a well-defined interface for content interaction. Files are stored securely in the server-side file system and are mapped to database entries that manage metadata such as department, subject, and upload date.

**Keywords**— *Academic Content Management, Digital Library System, Educational Technology (EdTech), Flask Web Application, User Management and Feedback, Centralized Study Material Distribution*

### 1. INTRODUCTION

The distribution and management of academic materials remain a persistent challenge in many educational institutions. Traditional approaches, such as printed notes or informal sharing through messaging apps and emails, often result in disorganized and fragmented resources that hinder accessibility and scalability. These limitations reduce efficiency for both students and administrators, highlighting the need for a centralized and structured digital solution.

Aksharajnana 2.0: Edu Library is a full-stack, web-based academic content management system designed to address these challenges. The platform offers a centralized digital library where students can access department- and semester-specific notes, books, and reference materials through a personalized dashboard. This ensures a focused

and clutter-free experience by filtering content relevant to each academic profile. Unlike informal systems, Edu Library securely stores files on the server and manages metadata such as subject, department, and upload date for efficient retrieval.

For administrators, the system provides a dedicated dashboard to manage courses, subjects, users, notes, feedback, and queries. Feedback and “Contact Us” modules further enhance communication between students and administrators. Built using Python (Flask), SQLite, and responsive frontend technologies such as HTML, CSS, Bootstrap, and JavaScript, the system emphasizes simplicity, scalability, and adaptability.

By combining structured content delivery with interactive features, Aksharajnana 2.0 offers an effective, cost-efficient, and user-friendly solution for modern academic resource management.

## 2. RELATED WORK

Several studies and platforms have attempted to improve academic content distribution through digital means, yet most solutions face limitations in accessibility, organization, or scalability. Traditional methods, such as printed notes and offline media like USB drives, are prone to loss, outdatedness, and limited reach. Informal digital sharing via platforms like WhatsApp, Google Drive, and email offers convenience but often results in scattered, unstructured files lacking proper indexing or security. Advanced Learning Management Systems (LMS) such as Moodle, Google Classroom, and Microsoft Teams provide structured content delivery but demand significant technical infrastructure, training, and financial investment, making them unsuitable for smaller institutions. Previous research has also highlighted the need for systems that integrate feedback mechanisms and user management to enhance engagement and communication between students and administrators. Despite these developments, existing solutions remain fragmented, motivating the design of a lightweight, user-friendly, and centralized platform such as Aksharajnana 2.0: Edu Library, which bridges the gap between accessibility, efficiency, and institutional affordability.

## 3. METHODOLOGY

The development of Aksharajnana 2.0:Edu Library employed a structured methodology to ensure clarity, reliability, and scalability throughout the project lifecycle. The Waterfall Model was adopted as the software development approach, as it provides a clear sequence of stages that align well with academic project requirements. Each stage was completed before moving to the next, reducing ambiguity and ensuring that the final product met both functional and non-functional requirements.

### 1. Requirement Analysis:

Requirements were collected from the perspective of both students and administrators. Students needed a centralized platform to access notes, books, and feedback modules, while administrators required a secure dashboard for managing courses, subjects, users, and queries. Non-functional requirements such as usability, security, scalability, and cost-effectiveness were also defined.

### 2. System Design:

The system architecture was modeled using the Model-View-Controller (MVC) paradigm to separate data, business logic, and presentation layers. Use Case diagrams, ER diagrams, and Data Flow Diagrams were created to define data relationships and workflows. Special emphasis was placed on modularity, allowing individual components like feedback, contact messages, and the library to be maintained or upgraded independently.

### 3. Implementation:

Frontend: Built with HTML5, CSS3, Bootstrap, and JavaScript to provide a responsive and interactive user interface across devices.

Backend: Developed using Python with Flask, managing server-side logic, routing, authentication, and database communication.

#### Database:

Implemented using SQLite, chosen for its simplicity, portability, and integration with Flask.

#### File Handling:

Notes and books are securely stored in the server file system, with metadata linked in the database for easy retrieval and preview.

### 4. Testing:

Multiple levels of testing were conducted. Unit testing validated backend functions like file upload and database queries. Integration testing confirmed proper interaction between frontend forms, Flask routes, and the SQLite database. System testing validated end-to-end workflows such as registration, login, viewing notes, and admin management. Acceptance testing ensured that the platform satisfied real-world academic needs.

### 5. Deployment and Maintenance:

The system was deployed on a lightweight server environment suitable for academic institutions with limited infrastructure. Since the platform uses open-source technologies, the cost of deployment remains minimal. Maintenance includes adding new courses, updating notes, managing user feedback, and integrating new features. The modular architecture ensures the system can evolve with future enhancements such as cloud storage, role-based access control, multimedia integration, and mobile app support.

Through this methodology, the project ensured a balance of

technical robustness and user-centric design, resulting in a cost-effective, scalable, and sustainable digital library platform for academic institutions.

#### **4. RESULTS AND DISCUSSION**

The implementation of Aksharajnana 2.0: Edu Library resulted in a fully functional web-based academic content management platform that successfully addresses the limitations of existing manual and fragmented systems. The platform was rigorously tested across all functional modules, including user registration, login authentication, content upload and retrieval, digital library access, feedback collection, and contact management. The outcomes of these evaluations are discussed below.

##### **System Functionality and Performance:**

The platform demonstrated efficient handling of academic content through department- and semester-based categorization. Students were able to register, log in, and access personalized dashboards that displayed only relevant notes and books, eliminating clutter and improving focus. The PDF preview feature allowed users to read notes directly in the browser without relying on third-party applications, improving accessibility and convenience. For administrators, the dashboard enabled real-time management of users, subjects, notes, and feedback, reducing dependency on manual record-keeping.

Testing results confirmed that system responses were fast, with minimal latency in file retrieval and database queries.

##### **Usability and Accessibility:**

The system's frontend, designed with HTML, CSS, Bootstrap, and JavaScript, proved to be highly responsive across desktops, tablets, and smartphones. Usability testing with a sample of students revealed positive feedback regarding the clean layout, intuitive navigation, and ease of accessing notes. Even users with limited technical expertise were able to operate the system effectively. The design of SQLite as the backend database ensured smooth functioning without requiring complex infrastructure, making the system ideal for institutions with modest resources.

##### **Comparison with Existing Systems:**

Unlike traditional distribution methods involving physical copies or informal sharing through platforms like WhatsApp

and Google Drive, Aksharajnana 2.0 provided structure, security, and centralized storage. Content integrity was maintained by linking uploaded files with metadata such as subject code, department, and upload date, ensuring better traceability. Compared to advanced Learning Management Systems (e.g., Moodle or Google Classroom), Edu Library offered simplicity and low-cost implementation while retaining essential features such as secure access, feedback collection, and administrative control. This balance between functionality and simplicity makes it highly adaptable for institutions that cannot afford or maintain large-scale LMS platforms.

##### **Feedback and Engagement:**

The integrated feedback module enabled students to share their learning experiences, which administrators could review in real time. The contact module further bridged the communication gap between students and management by allowing queries and suggestions to be sent directly through the system. These features fostered greater transparency and engagement, addressing a critical weakness in many existing platforms where communication is often one-way.

##### **Scalability and Future Potential:**

The system architecture supports scalability, allowing additional courses, semesters, and subjects to be integrated without altering the core structure. Furthermore, the modular design ensures that advanced features such as cloud integration, multimedia support, or role-based access control can be incorporated in future versions. This adaptability indicates that Aksharajnana 2.0 can evolve into a more comprehensive academic management system over time.

The overall results demonstrate that Aksharajnana 2.0 is not only effective in streamlining academic content delivery but also enhances user satisfaction and institutional efficiency. Its open-source foundation makes it cost-effective, while its modular design ensures maintainability. Although SQLite is suitable for departmental-level usage, future large-scale deployments may benefit from migrating to more robust databases like PostgreSQL or MySQL. Additionally, incorporating features such as analytics dashboards, mobile applications, and video lecture support would further

strengthen its academic impact.

In summary, the results affirm that Aksharajnana 2.0 provides a practical, scalable, and user-friendly solution to the persistent challenges of academic resource distribution. It bridges the gap between traditional methods and expensive LMS platforms, offering a balanced approach tailored for modern educational institutions.

## 5. CONCLUSION

The **Aksharajnana 2.0: Edu Library** project has successfully delivered a comprehensive digital academic platform that bridges the gap between students and essential study materials. By utilizing contemporary web technologies like Flask, HTML, CSS, Bootstrap, and SQLite, the system provides an interface that is easy to use and intuitive for both students and administrators. Features like department-wise note distribution, semester-wise filtering, feedback submission, and an online book library have significantly enhanced accessibility and centralized academic resource management.

This platform not only addresses the inefficiencies of traditional manual distribution methods but also ensures that content is well-organized, securely stored, and easily retrievable at any time. With admin-level control for uploading and managing educational content, the system remains scalable and adaptable to future institutional needs. Overall, Aksharajnana 2.0: Edu Library stands as a strong foundation for digitally transforming academic resource sharing in an educational environment.

## REFERENCES

- [1] J. A. Goyal and N. P. Rana, "A Comparative Study of Digital Library Systems in Academic Institutions," International Journal of Computer Applications, Vol. 162, No. 5, 2017.
- [2] Ramesh C. and S. Padma, "E-Learning and Digital Library Integration in Higher Education," International Journal of Advanced Research in Computer Science, Vol. 10, Issue 3, 2019.
- [3] M. R. Patil and P. K. Jadhav, "Design and Development of Web-Based Notes Management System,"

International Journal of Emerging Technologies in Learning (iJET), Vol. 13, 2020.

[4] Ali, H. and Yusof, N., "Development of Educational Web Applications using Flask Framework," Journal of ICT Research and Applications, Vol. 15, No. 2, 2021.

[5] B. Sharma et al., "An Empirical Review on Online Learning Platforms and Digital Notes Sharing," International Journal of Educational Technology in Higher Education, Springer, 2022.