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Original Article

# Library Automation Systems Migrations: Enhancing Service Quality and Efficiency in Engineering Colleges in Pune region

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***Abstract***

*The automation of libraries has gradually become a necessary aspect of the way libraries operate in modern colleges, particularly in engineering institutes. The amount of information flowing into and out of these colleges daily is very high; therefore, they require systems that can handle this information quickly without causing confusion. This study is a close examination of the transformation process of old systems to new integrated systems in colleges that use older library management systems. This demonstrates why this change is required and identifies widespread problems. The issues that arise during switching also cover various library software products, both commercial and open-source, such as SLIM, AutoLib, Koha, and Evergreen. The change actually took place on the ground in a variety of engineering colleges in Maharashtra. Based on these cases, this paper identifies some of the simplistic things that would facilitate migration effortlessly, such as planning, maintaining clean data, properly training the staff, and being ready to lend a hand once issues arise. These aspects are easier to manage when libraries can easily offer their resources to students and staff. Digital change has generally taken up software migration as a significant aspect of change at any institution. It is the process of transferring applications, databases, and other digital content to another system. Old systems cannot last forever because of the ever-improving technology.*

***Keywords:*** *Library automation, LMS Migration, ILS, Open-source software, Propriety Software, Engineering colleges, system integration, Library management Software.*

## Introduction

Automation of library systems in learning institutions has undergone massive changes over the past decades. Libraries are no longer archives of books and journals, but living systems that provide access to a broad array of scholarly resources and services. Engineering colleges, which are highly reliant on technological learning and research, require a robust and scalable framework that can effectively process large amounts of educational information, material, and digital resources.

The traditional Library Management System (LMS), specifically software available as proprietary software, will barely be able to support the increasing demands of contemporary educational environments. With outdated systems that are inefficient, there is a great desire for most libraries to change to new and more flexible systems. Even though this migration is potentially huge with its high functionality and user experience, it contains many challenges related to data compatibility, system integration, personalization of the staff, and cost-effectiveness of the procedure.

In this paper, we discuss the migration process in Integrated Library Systems (ILS) in engineering colleges. We discuss the key reasons for migration, issues that libraries must grapple with as the process is carried out, and available technological solutions. The paper will also discuss how these migrations have impacted the effectiveness and availability of library services and the best suitable practice to make the transition successful and smooth. The primary solution to such a problem is to integrate library management systems (ILMS), which have enhanced the effectiveness of operations and user experience, in addition to handling data.



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An ILMS can ease the process of working in libraries and service provision when it is used to automate processes such as cataloguing, acquisitions, circulation, and integration of digital resources. ILMS application in engineering colleges where availability of up-to-date technical information is key, implementation of ILMS is not only a technological modernization, but also a competitive and successful institutional strategy in terms of academic competitiveness. However, the implementation of ILMS in the area of Pune faces a number of issues, one of which is the limitation of finances, the varying level of infrastructure, and the opposition of the library staff, all of which contribute to ineffective implementation.

**Literature Review**

**Kamble, P. S., & Patil, A. P. (2024)** In their research paper, Library automation in academic institutions," migrating to a modern Integrated Library System ILS provides numerous benefits for academic institutions, particularly engineering colleges. Offers enhanced search functionality, improved cataloguing, and better resource management tools.

**Ossendrijver, Rick and other (2022)** in their research paper namely "Towards Automated Library Migrations with Error Prone and Refaster" library migrations in software development in maintaining codebase relevance, addressing library obsolescence, and ensuring compatibility with new technologies.

**Harisanty, D., Shafira, E., & Isbandy, S. H.** (2020) in their paper namely "Library automation system in Library University of Sebelas Maret Indonesia: Migration from UNSLA to SLiMS" library particularly in handling growing user needs and managing increasingly complex data. A study at the University of Sebelas Maret (UNS) Library highlighted the challenges and benefits encountered during this migration.

**Asid, B. A. (2020).** Present in his research paper namely, "Library automation system of academic libraries: A multicultural paradigm" integration of automated systems helps libraries manage an ever-growing volume of resources and meet the increasing demands of users. In Zamboanga, academic libraries have adopted automation to improve their services. It is from cataloguing and circulation to providing access to digital resources, transformation from traditional methods to automated systems not only reduces the workload of librarians but also supports a more efficient, user-friendly environment for students and staff.

**Wickes, A. (2018)** In his paper present, "Why not custom KBART? Converging trends in automation and migration, the rapid evolution of library automation systems has reshaped how academic institutions manage their collections and provide services to users. The meaning of the Knowledge Base and Related Tools KBART within libraries. This article discusses the increasing need for customized KBART files that reflect institutional holdings, driven by evolving library purchasing models, such as demand-driven acquisition and title-by-title purchasing.

**Singh, V. (2017)** Present paper "Open-source integrated library systems: A case study of Koha and Evergreen" Open-source LMS such as Koha and Evergreen has become the preferred choice among academic institutions. This includes engineering colleges owing to their **cost-effectiveness** and **flexibility**. These systems offer significant advantages over proprietary systems, particularly for libraries with budget constraints. OSS eliminates costly licensing fees and makes it easier for libraries to allocate resources to other areas such as staff training, system customization, and ongoing maintenance. Moreover, the flexibility of open-source systems allows libraries to tailor their LMS to meet specific needs, from cataloguing technical standards to supporting complex research workflows. As universities and colleges increasingly adopt open-source solutions, they also benefit from large communities.

**Breeding, M. (2016)** present his paper "The evolution of library automation" library shift manual cataloguing systems to fully automated Library Management Systems LMS, represents a significant transformation in how libraries operate. In the early stages, libraries employed card catalogues and paper-based systems, which became increasingly inefficient as academic needs grew. The introduction of integrated library systems ILS allowed libraries to streamline their operations, automating cataloguing, circulation, and user management tasks.

**Jost, R. M. (2009).** The present research paper "Integrated library system challenges and implications for migration' completed migration to a new **LMS** depends not only on technical expertise but also on the active involvement of **library staff**. According to the author, staff involvement during migration helps ensure that the new system meets the specific needs of the library, users, and staff. Staff members need to be trained on the functionalities, new systems, and handling of day-to-day library operations using the new LMS.

**Definition of Library Automation:**

According to the Encyclopedia of Library and Information Sciences, "Library Automation is the use of automatic and semiautomatic data processing machines to perform traditional library activities such as acquisitions, cataloguing, and circulation. These activities are not necessarily performed in traditional ways; the activities themselves are those traditionally associated with libraries; library automation may thus be distinguished from related fields such as information retrieval, automatic indexing and abstracting, and automatic textual analysis". Also, "automation is the technology concerned with the design and development of process and system that minimize the necessity of human intervention in operation" (Kent, 1977).

**Defenestration of Migration:**

The term "defenestration," which literally means the act of throwing someone or something out of a window, is not a standard term used in the context of library software migration, which refers to the process of transitioning data and operations from one system to another.

**Challenges in Library Automation System Migration**

The migration from legacy systems to modern ILS can be a daunting task. Several challenges are encountered, including, but not limited to,

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1. **Data Compatibility**: Legacy systems often use proprietary data formats that may not be directly compatible with new systems. Data migration requires careful mapping and conversion to ensure there is no loss of bibliographic or patron data during the transition.
2. **System Integration**: New systems must integrate seamlessly with the existing infrastructure, such as digital repositories, resource-sharing networks, and authentication services. Disruption in integration can lead to downtime or accessibility issues.
3. **Staff Resistance and Training**: Library staff accustomed to old systems may resist the transition to a new system. Staff training is essential to ensure that they can use the new system efficiently and make full use of its features.
4. **Cost**: While open-source systems have low upfront costs, the migration process itself can incur significant expenses in terms of time, labor, and technical support. Ongoing maintenance and updates can also add to overall costs.

**Benefits of Migration**

**Despite the challenges, migrating to a new ILS offers substantial benefits:**

- **Enhanced Efficiency**: Automation increases operational efficiency, enabling libraries to handle a growing number of users and resources without additional staff.
- **Cost Savings**: Open-source systems significantly reduce licensing fees and software maintenance costs.
- **Improved User Experience**: Modern systems offer more intuitive user interfaces, which improve the user experience for both students and faculty.
- **Scalability**: Newer systems are better suited to handling large volumes of data, which is especially important in engineering colleges that require robust solutions for managing large academic resources.

**Research Objectives**

1. **Investigate the Driving Factors behind LMS Migration in Engineering Colleges**

- **Technological Advancements**: Mmigration is driven by the need for scalable integrated systems that are capable of managing digital resources and technical content.
- **Cost Efficiency**: Engineering colleges are adopting open-source systems such as Koha and Evergreen for their cost-effectiveness compared with proprietary systems.
- **Improved User Experience**: The need to provide students and faculty with better access to resources, enhanced search functionalities, and remote access to library materials.

2. **Analyze the Challenges in LMS Migration**

- **Data Migration**: Addressing the complexities of transferring legacy data to modern systems without loss or corruption.
- **System Integration**: Ensuring new LMS integrate seamlessly with existing institutional systems (e.g., student information systems and learning management systems).
- **Staff Training**: Overcoming resistance and ensuring that staff are properly trained to use the new system effectively.

3. **Provide Recommendations for Successful LMS Migration**

- **Comprehensive Planning**: Ensuring a detailed migration roadmap with proper data mapping and **contingency plans** to address potential issues.
- **Stakeholder Engagement**: Engaging library staff, IT personnel, and faculty early in the migration process for better adoption and smoother implementation.
- **Post-Migration Optimization**: Establishing **evaluation frameworks** and continuous improvement processes to ensure that the system meets the evolving needs of the institution.

**Research Objectives and Methodology**

**The objectives of this study are:**

1. To investigate the driving factors behind the migration of LMS in engineering colleges.
2. To identify and analyze the challenges faced during the migration process.
3. To offer recommendations for ensuring the success of LMS migration.

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**Methodology**:

This study adopts a mixed-methods approach, combining qualitative case studies of engineering colleges that have migrated to newer ILS with a survey of library professionals to assess their experiences and challenges during migration. Qualitative case studies provide detailed insights into the process and outcomes of migration, while survey data help quantify the challenges and benefits perceived by staff members at the time of migration.

1. **Initial Planning and Needs Assessment**

The first step in the migration process was to clearly define the needs of the library and identify the reasons for migration. Library staff, IT professionals, and stakeholders should come together to assess the shortcomings of the current system and establish goals for new software. This involves asking critical questions such as:

- What are the specific challenges with the current system?
- What new features or capabilities are needed?
- What budget is available for the migration?

At this stage, the library should also decide whether to migrate to a commercial proprietary system or open-source software such as Koha or Evergreen. This decision depends on factors such as cost, customization, and specific needs of the library's patrons.

2. **Choosing the Right Software**

Once the requirements and objectives are clear, the next step is to evaluate and select the most suitable library management software. The factors to consider during the selection process include the following.

- **Cost**: For instance, open-source software offers a more affordable option than commercial systems, although there may still be costs for installation, customization, and ongoing support.
- **Features**: The new LMS should meet the specific requirements of the library, such as the ability to handle large volumes of data, integration with existing campus systems, and offer user-friendly interfaces for patrons.
- **Scalability**: It is important to choose software that can meet the library's needs over time, especially in institutions such as universities or research centers with expanding resource databases.
- **Support and Training**: Consider the level of support offered by the software provider and the ease of staff training in the new system.

3. **Data Migration**

After selecting the software, the next phase involves migrating the library's existing data to the new system. This is often the most critical and challenging part of the process. The migration team must carefully plan how to transfer bibliographic records, patron information, transaction history, and other data from the old system to the new system.

During this stage:

- **Data Mapping**: Existing data must be mapped from the old system to the new system format. This includes ensuring that all fields, such as author names, book titles, and borrower details, are translated accurately.
- **Data Cleansing**: Any redundant, outdated, or incomplete data should be cleaned or purged to ensure that the new system contains only accurate and high-quality information.
- **Testing**: It is vital to test the migration process by running smaller data sets before transferring everything fully. Testing ensures that the data appear correctly in the new system and functions, as expected.

4. **Customization and Integration**

Once the data are transferred, the new system must be customized to meet the specific needs of the library. This may involve setting up user roles, configuring cataloging workflows, and customizing user interfaces to ensure that the system is intuitive for both the library staff and patrons.

Additionally, the new LMS should be integrated with other existing systems such as campus management system, learning management system (LMS), or e-resource platforms. These integrations allow seamless communication between systems and provide a unified experience for library users.

5. **Staff Training**

A crucial part of the migration process is to ensure that library staff are fully trained on how to use the new system. Proper training helps to prevent operational disruptions and ensures that the staff can use the new software to its full potential. Training programs should be comprehensive and include the following.

- Hands-on sessions for cataloguing, circulation, and report generation.
- Troubleshooting workshops to address common issues that may arise during daily use.
- Ongoing support after migration to ensure staff confidence and competence in the long-term.

6. **Evaluation and Continuous Improvement**

After migration, libraries should evaluate the performance of the new LMS and assess whether it meets the initial goals set out during the planning phase. This evaluation should focus on the following aspects.

- User satisfaction and ease of access to library resources.

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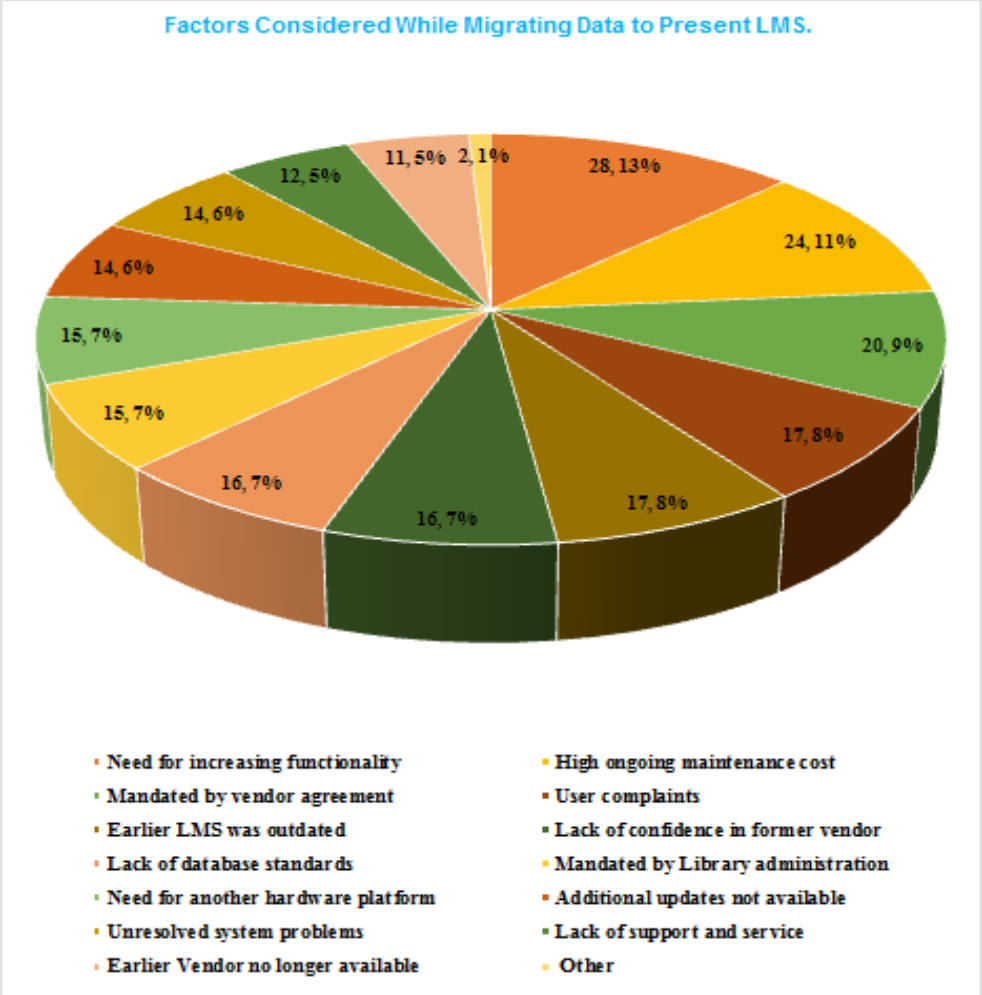
- System stability and performance.
- The ability of staff to manage daily operations effectively.

Based on this evaluation, the library may need to adjust workflows or request further customization. Ongoing system updates, training, and support are key to maintaining optimal performance. In conclusion, the migration of library management software is a challenging yet rewarding process that can significantly improve the efficiency of library operations and enhance user experience. With careful planning, thoughtful selection of the LMS, and thorough post-migration support, libraries can ensure smooth transition and reap the full benefits of modern library technology.

**Factors were considered while migrating to present ILMS**

| Sr. No. | Factors considered while migrating data to present LMS. | Response | Percentage |
|---|---|---|---|
| 1 | Need for increasing functionality | 28 | |
| 2 | High ongoing maintenance cost | 24 | |
| 3 | Mandated by vendor agreement | 20 | |
| 4 | User complaints | 17 | |
| 5 | Earlier LMS was outdated | 17 | |
| 6 | Lack of confidence in former vendor | 16 | |
| 7 | Lack of database standards | 16 | |
| 8 | Mandated by Library administration | 15 | |
| 9 | Need for another hardware platform | 15 | |
| 10 | Additional updates not available | 14 | |
| 11 | Unresolved system problems | 14 | |
| 12 | Lack of support and service | 12 | |
| 13 | Earlier Vendor no longer available | 11 | |
| 14 | Other | 2 | |
| | **Total** | **221** | |



**Conclusion**

Migrating to a modern ILS is more than just an operational upgrade for engineering colleges, but a vital step towards creating a more effective, accessible, and user-friendly academic environment. By adopting a modern library system, engineering colleges can ensure that students and faculty have quick and easy access to a wealth of resources, from digital content to specialized research materials. Migration allows for more organized and efficient management of resources, better integration with other systems, and an overall improved user experience. For engineering colleges, moving to a modern ILS is crucial for staying competitive in today's academic and research landscapes.

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**Conflicts of interest**

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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