"Impact of the Implementation of Computerization in Academic Libraries on Daily Operations: Problems, Benefits, and Solutions"

Mr. Sunilkumar Mansaramji Padole, Librarian, Rajiv Gandhi Mahavidyalaya, Sadak Arjuni Dist Gondia, Maharashtra
sunilpadole08@gmail.com

Abstract

The information explosion of the twenty-first century and the rapid development of digital technology have made library automation not merely a necessity but an indispensable process. The swift advancement of information technology has brought about fundamental changes in the traditional concepts of library management. In today's knowledge-based society, library automation has become essential. This study examines the impact of the implementation of library automation on the daily operations of academic libraries. It presents an in-depth, analytical, and critical review of the technical, financial, human, and administrative challenges arising from automation, the benefits derived from it, and the useful and sustainable solutions to address these challenges. The research reveals that with proper planning and the support of trained human resources, library automation can make library services more efficient, transparent, and user-centered.

Keywords: Academic Library Automation, Daily Operations, Technical Challenges, User Services, Sustainable Solutions.

1. Introduction

In the field of Library and Information Science, the use and spread of computers in the early stages did not take place to the extent it should have. For many years, experts in this field spent time merely discussing the terminology related to library automation rather than implementing it in practice. The lack of quality software required for library automation, librarians' insufficient knowledge of computers and related skills, and institutional neglect toward library modernization have been the major reasons behind the slow progress in this area. Even today, the situation is not significantly different. As a result, library automation did not spread with the intensity it ideally should have.

In recent times, the evaluation of educational institutions under NAAC (National Assessment and Accreditation Council), the assessment of professional educational institutions, and the consequent realization of the need for library automation have provided some momentum to this process. Even if driven by NAAC pressure, institutions have begun to pay attention to library modernization. Over the past five years, colleges and university libraries have started preparing proposals for library automation. Under these circumstances, the need for library automation is now being strongly felt.

2. Concept of Library Automation

Library automation in academic libraries refers to performing traditional and manual library operations with the help of computers and software. It is not merely a technical process, but an effective tool for enhancing the efficiency of library services.

2.1. Accessioning

This is the first step in library automation. After a new book is acquired by the library, instead of recording its details manually in the accession register, the information is entered into library software.

2.2. Classification and Cataloguing

Assigning specific classification numbers to books according to their subject (e.g., DDC – Dewey Decimal Classification) and entering their bibliographic details is known as cataloguing.

Through automation, book data is entered using international standards such as MARC 21.

2.3. Circulation System (Issue–Return of Books)

This is the most important part of daily library operations. The issue and return of books are now carried out using barcode or RFID technology.

2.4. Member Registration

Information related to students, faculty members, and staff is stored in this module. Each member is assigned a unique ID. Details such as photograph, address, and history of

issued books are available at a single location.

2.5. OPAC (Online Public Access Catalogue)

OPAC is a digital tool used for searching library resources. Students can search for the availability and location of books in the library through library computers or via the internet on their mobile devices.

2.6. Digital Library and E-Resources

The next stage of automation involves providing access to digital resources along with printed books.

These include e-books, e-journals, scanned collections of previous years' question papers, and theses.

3. Responsible Factors in Academic Library Automation

For the successful implementation of academic library automation, the following responsible factors play a vital role. Library automation is a collective responsibility and can be effectively implemented only through coordination among librarians, administration, technical experts, and users.

3.1) Librarian

The librarian is the chief coordinator of the entire automation process.

At first glance, library automation appears to be a highly technical and complex process. From the perspective of automation and software logic, daily library operations are indeed intricate. However, computer experts and programmers are capable of handling this complexity efficiently through their technical skills. Although the librarian may not be directly involved in software programming, the responsibility of ensuring that the system is developed according to library requirements lies with the librarian.

Software Selection and Implementation

With the librarian's active involvement, institutional encouragement for software development, and a positive mindset, it becomes possible to develop and implement library software. Many institutions have successfully developed in-house software and achieved effective library automation. During in-house software development, libraries face several technical challenges, requiring strong cooperation among librarians, library staff, and IT experts. Software development progresses through various stages such as system study, analysis, design, development, implementation, modification, and evaluation. While implementing automation using these stages, strict adherence to timelines is essential.

Training of Staff and Users

It is essential for librarians to acquire and continuously update their knowledge of automation. Librarians must be well-versed in automation processes, stages, scope, methods, as well as computer hardware, software, and automation management systems. Training of library staff and users is a crucial and responsible factor for the successful automation of academic libraries.

Monitoring of Service Quality

Monitoring service quality is a critical responsibility in library automation. Although automation makes services faster and more convenient, continuous monitoring is required to ensure that services remain efficient, accurate, and user-oriented.

3.2) Library Staff

Library staff are the direct operators of the automation process.

Data Entry and Classification

Accurate entry of books, periodicals, and other information resources; classification using DDC/UDC; assigning subject headings; and cataloguing according to MARC 21 and AACR2/RDA standards make information retrieval easier and more reliable.

Circulation and Cataloguing Operations

Efficient handling of issue–return, renewal, and reservation transactions; use of barcode/RFID systems; and maintaining updated catalogues for OPAC enhance service speed and transparency.

Technical Assistance to Users

Providing guidance for using OPAC and e-resources, resolving login, search, and download issues increases users' confidence and satisfaction.

3.3) Institutional Management / Administration

Institutional management serves as the strategic and financial backbone of library automation.

Financial Provision

Adequate funding for hardware, software, networking, annual maintenance contracts (AMC), upgrades, and training is essential. Without sufficient funds, automation remains incomplete.

Formulation of Policies and Rules

Clear IT and Library Automation policies, along with data security and usage policies, bring discipline and consistency to operations.

Necessary Infrastructure

Computers, internet connectivity, uninterrupted power supply (UPS), appropriate library space, and a conducive environment are basic requirements for effective service delivery.

3.4) Information Technology (IT) Experts

IT experts form the technical backbone of library automation.

Hardware and Software Maintenance

Regular system checks, preventive maintenance, and timely repairs ensure uninterrupted functioning of the system.

Network and Server Management

Maintaining LAN/Wi-Fi connectivity, monitoring server uptime and speed enables continuous access to e-resources.

Data Security and Backup

Regular data backups and cybersecurity measures prevent data loss and protect information.

3.5) Software Developers / Vendors

Software developers or vendors play a crucial role in academic library automation. Technical support is the backbone of successfully implementing an Integrated Library Management System (ILMS).

a) Technical Support

After software implementation, technical support is essential to resolve operational issues faced by staff.

- **Training:** Comprehensive training for librarians and staff on software usage.
- **On-site and Remote Support:** Providing assistance either by visiting the library or through remote tools such as AnyDesk.
- **User Manuals:** Supplying user guides to facilitate smooth operations.

b) Update Services

Due to rapid technological changes, software upgrades are necessary.

- **New Features:** Adding features according to evolving academic needs (e.g., mobile apps, e-book integration).
- **Security Updates:** Providing timely security patches to protect against hacking and viruses.
- **Bug Fixing:** Resolving technical errors encountered during software usage.

c) Troubleshooting

This includes resolving technical problems encountered in daily operations.

- **Database Errors:** Addressing issues such as data not being saved or displayed incorrectly.
- **Hardware Compatibility:** Solving connectivity issues related to barcode scanners, RFID readers, or printers.
- **Backup and Recovery:** Ensuring active backup mechanisms to prevent data loss during system crashes.

3.6) Users (Students, Faculty Members, Researchers)

The success of an academic library does not depend solely on technology; it largely depends on how effectively users utilize the system. In library automation, students, faculty members, and researchers are the key stakeholders.

a) Proper Use of the System

Automated libraries provide facilities such as OPAC (Online Public Access Catalogue) and self-service kiosks. Proper use of these facilities is the responsibility of users.

- **Searching Skills:** Users should be proficient in searching for books accurately using the author's name, book title, or relevant keywords.
- **Account Management:** Logging into their library accounts to check issued books, due dates, and fines.
- **Digital Literacy:** Acquiring basic technical knowledge to use automated systems effectively.

b) Providing Feedback

To improve any system according to user needs, feedback is essential.

- **Reporting Errors:** Informing librarians about problems encountered while using the software (e.g., data not displaying, incorrect search results).
- **Demand for Facilities:** Researchers and faculty members suggesting new e-resources or additional software features relevant to their subjects.
- **Regular Surveys:** Participating in online surveys conducted by the library to express opinions on service quality.

c) Disciplined Use of E-Resources

E-journals, e-books, and databases are expensive resources; therefore, disciplined use is mandatory.

- **Copyright and Intellectual Property:** Avoiding commercial use of downloaded material and not sharing it on social media without permission.
- **Use of Remote Access:** Preventing misuse of user IDs and passwords provided by the library and not sharing them with others.
- **Care of Resources:** Using computers, internet facilities, and other equipment in e-libraries or computer labs responsibly.

3.7) Government and Funding Agencies

In the process of academic library automation, the role of the government and funding agencies is foundational and directive. Without financial support and regulatory frameworks, achieving automation is difficult.

a) Financial Assistance and Schemes

Library automation is a cost-intensive process. Required funding is made available through the following means:

- **Infrastructure Grants:** Government grants for purchasing computer systems, servers, internet broadband, scanners, and RFID systems.
- **Software Procurement:** Financial support for purchasing specific software (e.g., SOUL) or implementing open-source software such as Koha.
- **Journals and E-Resources:** Through schemes like *e-ShodhSindhu*, colleges are provided access to expensive e-journals and databases at subsidized rates or free of cost.
- **Staff Training:** Grants for organizing workshops and technical training programs for library staff.

b) Standards and Guidelines

The objective is not merely automation but ensuring that it is systematic and aligned with global standards.

- **Data Standards:** Government guidelines require library data to comply with international standards such as MARC 21, Z39.50, or Dublin Core to facilitate future data sharing.
- **NAAC Criteria:** Automation, use of e-resources, and automated services in libraries receive significant weightage in NAAC assessments, making automation essential for institutions.

3.8. Policies and Standards

To ensure smooth information exchange and avoid future difficulties in data transfer, libraries must adhere to specific rules and standards during automation.

a) Compliance with National and International Standards

Library data (e.g., book records, author names) must follow standardized formats.

- **MARC 21 (Machine-Readable Cataloging):** The most important international standard, enabling bibliographic data to be understood by library software worldwide.
- **Dublin Core:** Used for describing digital resources and e-resources.
- **Z39.50 Protocol:** An international standard that facilitates searching and transferring data

between different library systems.

- **ISBN/ISSN:** Global identifiers for books and serials that ensure accuracy and consistency in library records.

b) Rules and Guidelines for Automation

Libraries must follow internal policies as well as government-issued guidelines.

- **Data Entry Rules:** Clear rules for entering author names (e.g., surname first or given name first) to avoid retrieval problems.
- **Security Policy:** Defined rules regarding data access, modification rights, and password management.
- **Backup Policy:** Mandatory daily or weekly data backups to prevent data loss.
- **Access and Privacy:** Policies to ensure the security and confidentiality of users' personal information (students and faculty).

4. Objectives of the Study

The main objective of this research is to examine the changes that occur and their impact when academic libraries shift from traditional systems to computerized systems.

4.1. To study the difficulties encountered in daily library operations due to library automation

Introducing technology alone does not automatically simplify work; in the initial stages, several technical and psychological challenges arise. Under this objective, the study focuses on technical difficulties, staff-related problems, data entry errors, and financial constraints.

4.2. To analyse the benefits obtained through automation

Library automation transforms the overall functioning and image of the library. A detailed analysis of these benefits is carried out with reference to time-saving, accuracy, advanced services, and generation of statistical reports.

4.3. To suggest solutions to overcome the difficulties

Based on the study, suggesting practical solutions such as training programs, alternative arrangements, use of open-source software, and user orientation programs to overcome identified shortcomings is a key outcome of this research.

5. Research Methodology

The descriptive research method has been adopted for this study. Data has been collected through the review of various libraries, research articles, books, and information available on the internet.

6. Difficulties in Daily Operations Due to Library Automation

Although academic library automation is an advanced process, its implementation involves several practical challenges.

6.1 Technical Difficulties

Since automated systems are technology-dependent, any technical failure can bring the entire library operation to a halt.

- **Lack of Power Supply:** In rural or semi-urban areas, frequent load shedding causes computers to shut down. In the absence of battery backup or generators, long queues form for issue–return services.
- **Internet Connectivity Issues:** Modern ILMS software is often cloud-based. Slow internet speed or connection failure makes it impossible to search for books through OPAC.
- **Software Malfunctions or Update Issues:** Software bugs or sudden updates can interrupt on going work. Sometimes, new updates are not compatible with existing data.

6.2 Financial Difficulties

Due to limited library budgets, bearing the cost of automation becomes challenging.

- **High Cost of Computers and Software:** Quality servers, client computers, barcode scanners, and licensed software often cost several lakhs of rupees.
- **Maintenance and Repair Expenses:** Annual Maintenance Charges (AMC) for software and funds required for hardware repairs often lead to administrative difficulties.

6.3 Human Resource Difficulties

No matter how advanced the technology, competent human resources are essential for its effective implementation.

- **Lack of Trained Staff:** Many senior staff members lack basic computer knowledge. Due

to insufficient technical training, they hesitate to use software.

- **Resistance to Change:** A mind set favouring traditional methods persists. Fears that automation will increase workload or threaten job security cause resistance among staff.

6.4 Data Security Issues

Digital information is always exposed to potential risks.

- **Risk of Data Theft (Hacking/Data Theft):** Personal data of students and staff, as well as valuable library data, may be at risk of hacking. Cyber-attacks can disrupt the entire system.
- **Possibility of Data Loss Without Backup:** In the absence of regular backups, hardware crashes can result in permanent loss of years of records and effort.

7. Advantages of Library Automation

Automation of academic libraries is not merely the use of technology; it is a revolution that enhances the overall efficiency of library operations. Through automation, the library no longer remains just a "storehouse of books" but emerges as a "knowledge centre." As a result, the technical workload of library staff is reduced, allowing them to devote more time to academic activities such as user guidance and reference services.

7.1 Time Saving

Time is the most valuable resource in a library. Automation saves time for both staff and users.

- **Faster Issue–Return Process:** With barcode or RFID technology, book transactions are completed within seconds, significantly reducing long queues at the circulation counter.
- **Quick and Easy Information Retrieval:** In the traditional card catalogue system, searching for a book could take 10–15 minutes, whereas now a simple keyword search on a computer instantly provides shelf location and call number.

7.2 Accuracy and Efficiency

Automation minimizes errors caused by human intervention.

- **Reduction in Record Errors:** Once accurate data is entered into the system, it is reused consistently for all transactions, eliminating spelling mistakes and calculation errors common in manual processes.
- **Transparency in Operations:** Since every transaction is recorded digitally, transparency is ensured in book stock, fine collection, and membership records. This increases trust between library administration and users.

7.3 Improvement in Reader Services

User satisfaction is the primary objective of any library, and automation helps achieve this goal.

- **OPAC (Online Public Access Catalogue):** This facility enables users to check the availability of books in the library from anywhere using a mobile phone or computer.
- **E-books and E-journals:** Automation allows libraries to go beyond printed materials and provide access to digital information resources (e-resources).

7.4 Ease of Management

Automation provides significant support to librarians in administrative decision-making.

- **Easy Availability of Reports:** Various reports required for NAAC evaluation or annual inspections can be generated with a single click.
- **Inventory Control:** Annual stock verification of books becomes much simpler and more efficient.

8. Solutions to Overcome Challenges

To address the technical, financial, and human challenges encountered during the process of academic library automation, it is essential to implement well-planned remedial measures. In research on library automation, it is not only important to initiate automation but also to sustain it successfully. The following measures have proven effective:

8.1 Regular Training Programs for Staff

Human resources play a major role in the success of automation. Training is essential to remove fear and hesitation among staff.

- **Skill Development:** Staff should be trained not only in software usage but also in basic hardware maintenance and internet applications.

- **Mental Preparedness:** Staff confidence should be enhanced by emphasizing that technology is meant to reduce workload, not increase it.
- **Organization of Workshops:** Staff should be encouraged to participate in workshops organized by INFLIBNET or at the university level to stay updated with recent developments.

8.2 Selection of Appropriate Software

Choosing the wrong software can create major issues related to data transfer and maintenance in the future.

- **Standards-Based Selection:** Software should be compatible with international standards such as MARC 21 and Z39.50.
- **Need-Based Selection:** Considering the size of the library, number of books, and available budget, suitable software such as SOUL, Koha, or Libman should be selected.
- **User-Friendly Interface:** The software interface should be simple so that staff with limited technical knowledge can use it easily.

8.3 Regular Data Backup

Data security is the best safeguard against losses caused by technical failures or cyber-attacks.

- **Multi-Level Backup:** Data should not be stored on a single system; it should be backed up on external drives as well as cloud storage platforms (e.g., Google Drive, Microsoft Azure).
- **Automated Backup:** Software should be configured to perform automatic backups at scheduled times, reducing the risk of loss due to human error.

8.4 Securing Government and Institutional Financial Support

Financial constraints are a major obstacle to automation; therefore, planned efforts are required to overcome them.

- **Submission of Proposals:** Detailed proposals highlighting the benefits of automation should be submitted to UGC, state government bodies, or management committees to obtain special funding.
- **CSR Funds:** Efforts should be made to acquire computers, scanners, or e-resources for libraries through Corporate Social Responsibility (CSR) funds from large companies.
- **Provision in Annual Budget:** Permanent allocation should be made in the institution's annual budget for software renewal and internet expenses.

By implementing these measures, library automation will not remain merely a theoretical or paper-based initiative but will evolve into a truly user-friendly system. This will enhance the quality of the library and help institutions achieve higher grades in evaluations such as NAAC.

9. Conclusion

Library automation has made daily operations simpler, faster, and more effective. Although there are technical, financial, and human challenges, these can be overcome through proper planning, training, and adequate resources. Therefore, automation is indispensable for modern libraries and plays a vital role in the dissemination of knowledge.

Automation has transformed the role of the librarian from a mere custodian of books into an "information manager." Initial technical and financial challenges can be effectively addressed through systematic planning, regular staff training, and the use of updated software systems.

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