A Comparative Analysis of Functional Modules in SOUL and Koha: A Study

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ABSTRACT:

Library management involves organizing and managing all library functions to ensure efficient operations and user satisfaction by providing the required materials and documents. To enhance user services, libraries are transitioning from manual to electronic systems, a process known as library automation. This study conducts a comparative analysis of the functional modules of two popular library management systems: SOUL and Koha. It evaluates key modules, including acquisition, cataloguing, circulation, serial control, OPAC, and administration, to highlight their features and differences. The findings of this study help libraries make informed decisions in selecting the most suitable software for automating their operations. The study concludes that while both SOUL and Koha offer comprehensive functional modules, Koha stands out as a more user-friendly option due to its flexibility.

1. Introduction:

Libraries are integral to every educational institution, serving as a cornerstone for knowledge dissemination and lifelong learning. Beyond academic settings, libraries significantly influence societal growth by encouraging individuals to enhance their knowledge and apply it in daily life. In recent years, the rapid advancements in Information and Communication Technology (ICT) and widespread adoption of computers have revolutionized library and information science. These technological developments have emerged as a boon for library professionals, simplifying housekeeping tasks, reducing workloads, saving time, and streamlining library services for greater efficiency and effectiveness.

The advent of ICT has transformed the conventional perception of libraries, particularly in the areas of collection development, organization, and user services. Today, libraries are not just repositories of books but dynamic service centres offering swift access to information in various formats. As users increasingly demand relevant information with minimal delays, the concept of library automation has gained prominence. Automation facilitates the digitization of library processes, enabling the provision of seamless, user-centric services. This shift underscores the need for robust library management systems that can efficiently handle modern library operations while meeting the evolving expectations of users.

2. Objectives:

The primary aim of this study is to explore and evaluate the functional capabilities of SOUL and Koha, two prominent library management software systems, and provide a comprehensive comparison between them. The study seeks to assist library professionals in selecting the most suitable software for their automated library operations. The study focuses on the following objectives.

- To understand the features, architecture, and operational framework of SOUL and Koha.
- To conduct a critical comparative analysis of the key functional modules, including acquisition, cataloguing, circulation, serial control, OPAC, and administration, in both software systems.
- To evaluate the user-friendliness, flexibility, and ease of use of SOUL and Koha based on their interfaces, customization options, and overall performance.
- To identify the strengths and limitations of each software and provide recommendations for optimal use in various library environments.

This comprehensive approach aims to offer insights that can guide libraries in making informed decisions about adopting efficient and user-centric library management systems.

3. Review of the Literature:

Aute and Ghumare (2014): The study titled *"Library Management Software: LibSys7 and Koha"* compares LibSys and Koha. LibSys is highlighted as a high-quality, efficient software recognized for its strong responsiveness, while Koha is noted for its effectiveness in library automation, especially due to its open-source and cost-free nature.

Chauhan (2010): In the article *"Open-Source Software for Library Management: A Study,"* the author explores open-source software in the context of academic libraries in Nepal. The study examines the potential for implementing digital library projects and discusses various open-source solutions along with their deployment processes.

Husain and Ansari (2007): The research *"Library Automation Software Packages in India: A Study of the Cataloguing Modules of Alice for Windows, LibSys and Virtua"* analyzes the cataloguing modules of three

software systems. The findings reveal that while each package has unique strengths, they also exhibit distinct limitations.

Lakpathi (2017), in his work titled "Status of Library Automation in India," examines the current state of library automation in the country and identifies the challenges faced by library professionals in using various library management software. He emphasizes the urgent need for enhancing the knowledge and skills of library professionals to improve the efficiency of automated systems. This review underscores the diversity in library management software and their varying suitability for specific library environments.

4. Library Automation:

Automation refers to the process of performing tasks automatically with the use of machines and technology, reducing manual effort and minimizing redundancy in work processes. It enhances productivity, improves efficiency, and facilitates resource sharing. In the context of libraries, automation involves the application of Information and Communication Technology (ICT) to manage library operations and services. Library automation enables libraries to stay aligned with the latest technological advancements, making them more dynamic, reliable, and efficient while reducing the workload of library staff. Automated systems offer high accuracy and speed in managing various functions. Library automation encompasses the management of key library activities, including cataloguing, circulation, acquisitions, serial control, and the Online Public Access Catalogue (OPAC), as well as the organization of other library resources with the help of computers, software, and internet connectivity. Automation streamlines processes, enhances access to resources, and improves the overall user experience.

Library automation software can be broadly categorized into two types:

- **Commercial Software**: Proprietary software Solutions offered by vendors, often requiring licensing fees for use and maintenance.
- **Open-Source Software**: Freely available software that allows customization and modification to suit specific needs.

In this study, SOUL represents commercial software, while Koha exemplifies open-source software. Both types of systems offer distinct features and capabilities, each suited to different library environments and operational requirements.

4.1. SOUL (Software for University Libraries)

The Information and Library Network (INFLIBNET) developed an integrated library management software known as SOUL (Software for Univeristy Libraries) for library automation. Despite its name, SOUL is not limited to university libraries; it is versatile and suitable for libraries of all types and sizes, including college and school libraries. This user-friendly software employs a client-server architecture, making it accessible and efficient for library management.

The first version of SOUL, SOUL 1.0, was launched under the CALIBER 2000 initiative. It was designed with a database based on MS-SQL and is compatible with MS SQL Server 7.0 or higher. The most recent version, SOUL 2.0, was released in 2008, with a redesigned database optimized for the latest versions of MS-SQL, MySQL, or any other widely used relational database management system (RDBMS). This software continues to evolve, offering enhanced features and functionality to meet the growing demands of modern library automation.
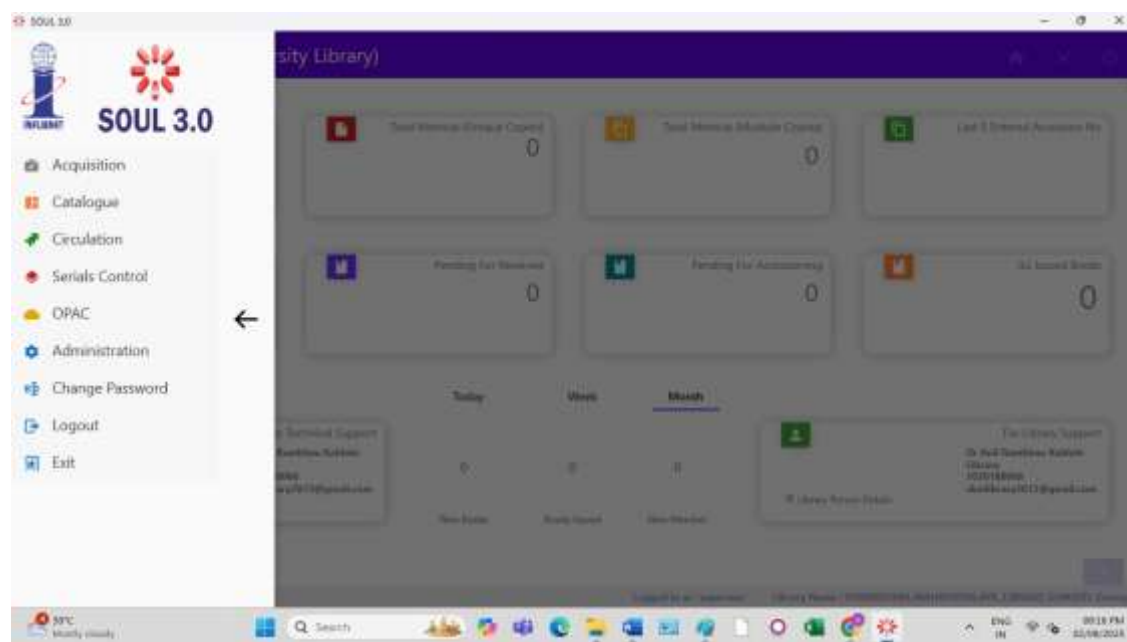
4.2. Koha

Koha is an open-source integrated library management system that was developed by Katipo Communications Limited, based in New Zealand. The software was originally created in 1999 for the Horowhenua Library Trust in New Zealand, with the first live installation taking place in January 2000. Since its release, Koha has been made available under the GNU General Public License, making it free to use, modify, and distribute.

Koha is built on a SQL database, with MySQL being the preferred backend database. The system stores cataloguing data in the MARC (Machine-Readable Cataloguing) format, which is widely used in libraries for organizing and managing bibliographic data. Additionally, Koha supports the Z39.50 protocol, a standard for searching and retrieving bibliographic information from remote databases.

The system is primarily programmed in Perl, a powerful and versatile programming language known for its ability to handle complex data manipulation tasks. Koha continues to evolve, and the latest stable release as of now is version 17.05, which includes various enhancements and new features to improve the software's functionality, usability, and performance for libraries worldwide.

4.3 Technical Comparison of SOUL and Koha

Sr No	Particulars	SOUL	KOHA
1	Version	**3.0**	**16.11**
2	Operating systems	**Windows** (Windows 7, 8, 10) **Linux** (Ubuntu, CentOS, Red Hat, etc.) **macOS** (with additional configuration)	**Linux** (Ubuntu, CentOS, Debian, Red Hat, etc.) **Windows** (with some configuration) **macOS** (for development and testing purposes)
3	Programming language	SOUL 3.0 is primarily developed using Java for core functionality, with SQL for database management. HTML, CSS, and JavaScript are used for the web-based user interface.	Koha is primarily developed using Perl for its core functionality, with SQL for database management (typically MySQL or MariaDB). HTML, CSS, and JavaScript are used for the web-based user interface.
4	Toolkit	SOUL 3.0 uses the **Swing** toolkit for its graphical user interface (GUI).	Koha uses the **Perl toolkit** for backend development and **Mason** for templating. The frontend is built with **HTML**, **CSS**, and **JavaScript**.
5	Application server	SOUL 3.0 uses the **Apache Tomcat** application server for running its web-based applications.	Koha uses the **Apache HTTP Server** along with **Plack** or **Fast CGI** for handling its web-based applications.
6	Web server	SOUL 3.0 uses the **Apache Tomcat** web server.	Koha uses the **Apache HTTP Server** as its web server.
7	Database server	SOUL 3.0 uses **MS-SQL Server** as its database server.	Koha uses **MySQL** or **MariaDB** as its database server.
8	Client	SOUL 3.0 uses a **client-server** system, where the client is typically	Koha uses a **web-based client system**, which allows access through standard

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		a **Windows-based application** that interacts with the server over the network.	web browsers like **Chrome**, **Firefox**, and **Internet Explorer**.
9	Interface	SOUL 3.0 uses a **Graphical User Interface (GUI)** based on **Swing** for its desktop application and a **web-based interface** for online access (OPAC).	Koha uses a **web-based interface** for both administrative functions and the OPAC (Online Public Access Catalogue). The interface is built using **HTML**, **CSS**, and **JavaScript**.

Table 1: Technical Comparison of SOUL and Koha

5. Data Analysis:

Koha and SOUL both provide a range of features; however, some functionalities may be available in one system but not in the other, even within the same module. This study aims to highlight and analyze the key differences between the two systems.

5.1. Acquisition Module:

Sr. No.	Feature	KOHA		SOUL	
		Yes	**No**	**Yes**	**No**
1	Purchase suggestion from the user	✓	✗	✓	✗
2	Duplication check	✓	✗	✓	✗
3	Approval process from library committee	✗	✓	✓	✗
4	Purchase order	✓	✗	✓	✗
5	Vender/supplier information	✓	✗	✗	✓
6	Acquisition work process	✓	✗	✓	✗
7	Payment details of purchase order	✓	✗	✓	✗
8	Multiple currencies and conversion rates	✓	✗	✓	✗
9	Report generation	✓	✗	✓	✗

Table 2: Comparative features of Acquisition Module of SOUL and Koha

Both SOUL and Koha integrated library software come equipped with acquisition modules that share several standard functionalities. These modules include user purchase recommendations, duplicate verification, ordering processes, acquisition workflows, payment tracking for orders, multi-currency support with exchange rates, and report creation capabilities. These represent the core functionalities found in both SOUL and Koha systems.

5.2. Cataloguing Module:

Sr. No.	Feature	KOHA		SOUL	
		Yes	**No**	**Yes**	**No**
1.	Catalogue facility	✓.	✕	✓	✕
2.	Adding/editing/deleting/catalogue record	✓	✕	✓	✕
3.	Multilingual support	✓	✕	✓	✕
4.	Format for different item type	✓	✕	✓	✕
5.	Authority file for author, publisher	✓	✕	✕	✓
6.	User services(CAS/bibliographic services)	✕	✓	✓	✕
7.	Z39.50	✓	✕	✕	✓
8.	Export/import data	✓	✕	✓	✕
9.	RFID integration	✓	✕	✓	✕
1	Barcode label printing	✓	✕	✓	✕
1	Report generation	✓	✕	✓	✕

Table 3: Comparative features of Cataloguing Module of SOUL and Koha

The cataloguing module is a critical component of any library automation software, facilitating the organization and management of bibliographic records. Both SOUL and Koha offer cataloguing modules with basic functionalities, making them comparable in some aspects. However, significant differences set them apart, as highlighted in Table 3.

One notable feature available in Koha is Z39.50 protocol support, which allows importing MARC records from external databases. This feature enhances cataloguing efficiency but is absent in the SOUL cataloguing module. Additionally, Koha provides authority control for authors and publishers, which helps maintain consistency in bibliographic entries. This feature is not offered in SOUL.

Conversely, SOUL includes a unique feature user service for Current Awareness Service (CAS) and bibliographic services—which is not available in Koha. These services help keep users informed about new acquisitions and bibliographic updates within the library system.

In conclusion, while both systems offer robust cataloguing functionalities, the comparison highlights Koha's strength in advanced cataloguing and interoperability features, whereas SOUL excels in certain user-focused services. The analysis in Table 3 provides a detailed critical comparison between the cataloguing modules of SOUL and Koha, aiding in the evaluation of their suitability for various library needs.

5.3. Circulation Module:

Sr. No.	Feature	KOHA		SOUL	
		Yes	No	Yes	No
1.	Membership registration	✗	✓	✓	✗
2.	Member card creation	✗	✓	✓	✗
3.	Check in/check out	✓	✗	✓	✗
4.	Renewal/reservation	✓	✗	✓	✗
5.	Offline circulation	✓	✗	✗	✓
6.	Inter library loan	✓	✗	✓	✗
7.	Circulation reports	✓	✗	✓	✗
8.	Print transaction for borrower	✓	✗	✓	✗

Table 4: Comparative Feature analysis of the Circulation Module in Koha and SOUL

The circulation module is the core component responsible for managing the daily transactions of library resources, including issuing, returning, and renewing materials. In SOUL, the circulation module requires library members to register before generating a member card. This registration step ensures that each member has a unique identity within the system. However, this feature is not explicitly required in Koha, which offers a more streamlined approach to member management.

One of the most significant advantages of the Koha circulation module is its support for offline circulation. This feature allows library transactions to continue seamlessly even when the server is down or there is no internet connectivity. Transactions are recorded locally and later synchronized with the central database once connectivity is restored. This capability greatly enhances the reliability and usability of Koha, making it more flexible and user-friendly than SOUL, where such a feature is not available.

In summary, while both SOUL and Koha offer essential circulation functionalities, Koha's offline circulation feature provides a critical edge in ensuring continuous service delivery, highlighting its suitability for libraries requiring uninterrupted transaction management

5.4. Serial Control Module:

Sr. No.	Feature	KOHA		SOUL	
		Yes	No	Yes	No
	Subscription suggestion from user	✓	✗	✓	✗
	Adding new subscription	✓	✗	✓	✗
	Receipt of new issue	✓	✗	✓	✗
	Cataloguing	✓	✗	✓	✗
	Search subscription	✓	✗	✗	✓
	Creating purchasing order	✓	✗	✓	✗
	Check-in of individual issues of journals	✓	✗	✗	✓
	Claims	✓	✗	✓	✗

Administration of binding	✓	✗	✓	✗
Payment	✓	✗	✓	✗

Table 5: Comparative facilities Serial control module of Koha and SOUL

Above table shows the outlines of various features and facilities offered by the serial control modules of SOUL and Koha, highlighting critical functionalities for managing serial publications such as journals and magazines. Both software solutions provide standard features like subscription management, adding new subscriptions, receiving new issues, cataloguing, administration of binding, and payment processing. These features support efficient serials management in libraries. However, distinct differences arise due to the availability of advanced functionalities in Koha that are absent in SOUL. Koha includes features such as searching for specific subscriptions, check-in of individual journal issues, and managing claims for missing issues. These capabilities enhance the precision and flexibility of serials management, allowing for more granular control and proactive issue tracking. The lack of these advanced options in SOUL limits its effectiveness in managing complex serial collections. In contrast, the comprehensive feature set of Koha makes it more robust, user-friendly, and adaptable for handling a broader range of serials management tasks. Thus, the comparison emphasizes Koha's superior functionality in this module, contributing to its overall advantage as a library automation system.

5.5. OPAC Module:

Sr. No.	Feature	KOHA		SOUL	
		Yes	No	Yes	No
	Simple search	✓	✗	✓	✗
	Advance search	✓	✗	✓	✗
	Boolean search	✓	✗	✓	✗
	Tag cloud	✓	✗	✗	✓
	Most popular	✓	✗	✗	✓
	Any other search	Name: Authority search		Name: Member OPAC	

Table 6: Comparative facilities of OPAC Module of SOUL and Koha

The Online Public Access Catalogue (OPAC) module is a vital component that allows library patrons to search and access bibliographic information easily. It serves as a user-friendly interface for finding resources based on various search criteria. Both SOUL and Koha have robust OPAC modules offering standard search techniques, including Simple Search, Boolean Search, and Advanced Search, enabling efficient information retrieval.

However, Koha's OPAC module stands out due to additional search functionalities that enhance user experience. These include the Tag Cloud, which displays frequently used search terms, Most Popular Searches, and Authority Search, which improves search precision by linking entries to controlled vocabularies. These features make Koha's OPAC more intuitive and dynamic, providing users with enhanced navigation and search capabilities.

On the other hand, SOUL offers a unique feature called Member OPAC, allowing personalized access to library resources, including borrowing history and account management, which is not available in Koha. This feature adds a level of customization and user-specific interaction that may appeal to libraries focusing on personalized services.

In conclusion, while both systems provide comprehensive search capabilities, Koha's additional search features make its OPAC more user-centric and interactive. SOUL's Member OPAC offers a valuable personalized service, highlighting a different strength in its design. This comparison illustrates how both OPAC modules cater to distinct user needs.

5.6. Administrative Module:

Sr. No.	Feature	KOHA		SOUL	
		Yes	No	Yes	No
	Authority creation for acquisition module	✓	✕	✓	✕
	Authority creation for cataloguing module	✓	✕	✓	✕
	Authority creation for circulation module	✓	✕	✓	✕
	Authority creation for serial control	✓	✕	✓	✕
	Authority creation for OPAC	✓	✕	✓	✕

Table 7: Comparative function of administrative module of Koha and SOUL

The administrative module is the central component of library management software, responsible for configuring and managing all other modules. It sets up the entire program, enabling the creation and control of key modules such as acquisition, cataloguing, circulation, serial control, and OPAC. Both SOUL and Koha offer comprehensive administrative modules with all essential functions, ensuring smooth integration and management of library operations.

Conclusion:

Library automation has become an essential part of modern academic and public libraries, significantly enhanced the management of library collections and improved service delivery to users. The adoption of library management software is growing rapidly as institutions seek to streamline their operations and offer efficient access to resources.

The literature review and data analysis conducted in this study reveal that while both SOUL and Koha are robust integrated library management systems, Koha stands out as more user-friendly and flexible due to its open-source nature and advanced features. Key differences in functionalities, particularly in cataloguing, circulation, and OPAC modules, highlight Koha's adaptability and superior user experience compared to SOUL's more structured but less customizable approach.

The data collected through checklists, tables allowed a critical comparison between the modules of SOUL and Koha, successfully achieving the objectives of this research. The study concludes that Koha's ease

of use, offline functionality, and broader search capabilities make it a preferable choice for many libraries, particularly those looking for scalable and cost-effective automation solutions. In contrast, SOUL offers specific strengths that may be suited to institutions prioritizing structured workflows and local support services.

Overall, this comparative analysis provides valuable insights for libraries selecting a management system, emphasizing the importance of aligning software capabilities with institutional needs and user expectations.

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