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Evaluation of Integrated Library Management Software (ILMS) Koha and e-Granthalaya: A Comparative Analysis

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Abstract

The present study compares the features, modules and technical aspects of two common and popular Integrated Library Management System (ILMS) Software, i.e. Koha and e-Granthalaya. The study aims to find the common and special features among both software and find the most suitable software for particular libraries. A checklist comprising several parameters like technical specifications and requirements, functional modules, general features, specific features, module integration, and many more were tabulated for comparison. The study found that Koha has more specific features than e-Granthalaya. Some modules in Koha are superior to those in e-Granthalaya, like the acquisition module, which is simpler and more user-friendly, and Koha has an advanced OPAC system. Although, e-Granthalaya outperforms Koha regarding cataloguing, circulation, and serial management. The study also recommends further improvement in e-Granthalaya. Study also revealed the literature and research gap on e-Granthalaya which open the scope of future study on e-Granthalaya software and its comparison with other software.

Keywords: *Library Software; Library Automation; Information Technology; Library Management System; Application Software.*

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1. Introduction

Library automation revolutionised the traditional methods of managing and accessing information within libraries, offering a streamlined and efficient approach to housekeeping operations like acquisition, cataloguing, circulation, and resource discovery. Through technology integration, libraries can enhance their services, improve user experience, and adapt to the evolving needs of users in the digital age. Library automation may be defined as the process of using computer-based technologies to streamline and enhance various library functions and services. It involves the implementation of software systems and hardware infrastructure to automate tasks such as acquisition, cataloguing, circulation, and resource management. By digitising and centralising library operations, automation aims to improve the time-saving, efficiency, accuracy, and accessibility of library resources for both librarians and patrons. Some key components of library automation generally include Integrated Library Management System (ILMS), Online Public Access Catalogue (OPAC), Radio Frequency Identification (RFID) Technology, Electronic Resource Management (ERM), Digital Libraries and Repositories, Networking, Inter Library Loan (ILL) etc. Integrated Library Management Software are of two types: open-source and proprietary. Names of some widely-used ILMS are Koha, e-Granthalaya, SOUL, Libsys, NewGenLib, Virtua, Alice for Windows, Librarian, Cybrarian and many more.

1.1 Koha

Today, there are nearly fourteen major open-source ILS available in the field of library automation. However, Koha was the first open-source ILS (released as open source in 2000), and it is now possibly the most feature-rich open-source ILS. Koha was born in New Zealand's public library system. Koha is a Maori word that means "unconditional gift". In July 2000, Koha's first version (1.0) was made available for download as open-source software. The most recent version of Koha is version 23.05.05, which was released last year on 8 November 2023.

Koha (http://www.koha.org) is the first open-source LAMP-based fully featured Integrated Library System (ILS). Koha's development began in 1999 and was funded by a group of rural New Zealand libraries that discovered proprietary software to be expensive and lacking in essential features. The full-featured Koha was created by Katipo Communications Ltd. in New Zealand and was first used by Horowhenua Library Trust in January 2000. A global team of software vendors and library technology experts is maintaining Koha. Koha is designed to operate with the bare minimum of hardware resources. It is written in Perl programming language and runs on the Linux and Microsoft Windows operating systems in conjunction with the Apache Web server. It makes use of the popular MySQL open-source database management system. Koha supports MARC21 and UNIMARC bibliographic records.

The following are some of Koha's most important features:

- Based on the Internet.
- z39.50 and copy cataloguing
- For professional cataloguers, MARC21 and UNIMARC
- Use the same tool to manage online and offline resources.

- New acquisitions RSS feed
- Send overdue and other notices to patrons by e-mail and/or text message.
- Create barcodes with your printer.
- A module for managing serials.
- For library stock management, a complete catalogue, circulation, and acquisitions system is available.
- OPAC system with a web interface
- A simple, clear and concise search interface for all users.
- Comprehensive and Simple acquisition options.

Modules of Koha

i. Circulation
ii. OPAC
iii. Cataloguing
iv. Serial Control
v. Acquisitions
vi. Reports
vii. Patron management

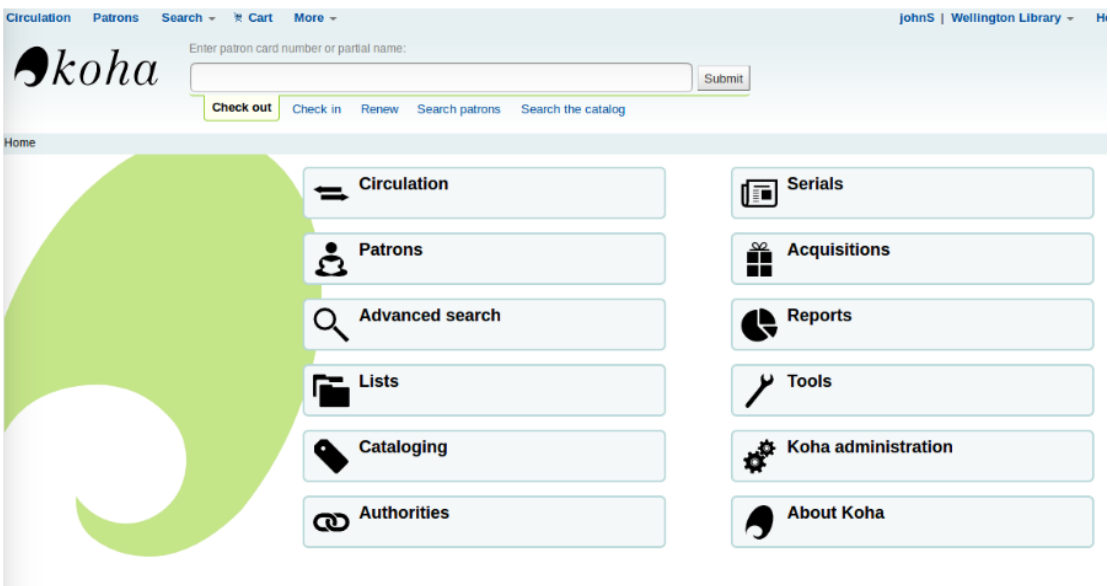

Figure 1: Koha Landing Page of Staff Login

1.2 e-Granthalaya

The National Informatics Centre (NIC), Department of Electronics and Information Technology, Ministry of Communications and Information Technology, Government of India, developed e-Granthalaya, a library automation software. A team of experts from the software and library and information science disciplines collaborated to create the software. Using this software, libraries can automate both internal and external activities.

E-Granthalaya began as an in-house project at the 'Karnataka State Centre of NIC, Bangalore,' with the first version of the software designed for the state's public libraries. Later, the NIC HQ's 'Library and Information Services Division' took over the design of the software, and library professionals were involved in the process, improving the software with an improved user interface and simplifying the work-flow of library functions so that it could be used by all types of libraries.

The latest version, e-Granthalaya 4.0, is web-based. Now, we don't need to install the software like in the previous version; all the data will be stored on the cloud. The software includes a Web OPAC interface to show the library catalogue over the Internet/Intranet. The ICT solution is well compliance with international standards prevalent in Libraries with the use of the latest ICT technology and Cloud hosting. e-Granthalaya 4.0 uses PostgreSQL - an Open Source DBMS as a back-end database solution and is made available on NIC National Cloud (Meghraj).

Following are some of the most important features of e-Granthalaya:

- Common Application for Libraries
- Multi-Tenancy with Single-Sign-up Interface
- Adheres to Domain Specific MetaData/ Cataloging Standards (AACR2/ MARC)
- Support Data Exchange standards such as MARC21/MARCXML/ISO: 2709/EXCEL/CSV
- Download Catalog Records from the Internet
- Built-in Z39.50 Search
- Barcode/Email/SMS Alert/Smart Card Integration
- Digital Library Options
- E-Books Manager with e-Books Viewer
- Standard Work-flow with UserDefined Data Entry Format
- Customisable Circulation Module for Issue/Return of Books
- Multi-Volume/ Multi-Copies/AutoAccessioning with Retro-conversion

Modules of e-Granthalaya

i. Library Administration
ii. Master Data
iii. Book Acquisition
iv. Cataloguing
v. Circulation

vi. Serials
vii. Micro Documents
viii. Bills Processing
ix. Search & Reports
x. Web OPAC

Figure 2: Modules of e-Granthalaya v4.0

2. Review of Literature

Gupta and Gupta (2023) checked the current status of library automation in government degree colleges of Jammu division. Data was gathered through questionnaire, and interview methods, from 46 college libraries of Jammu division. Findings of the study revealed that only 11% libraries

are fully automated, only 2/3rd of librarians are aware and familiar with library automation, 1/4th of libraries under study have a collection of more than twenty thousand print reading materials, half of libraries are subscribing to e-resources. Koha is the most using software among the libraries and majority of them use only cataloguing module for online cataloguing. **Neupane (2023)** studied the customisation of the Koha Library software interface for better user experience and usability. Five military libraries situated in Nepal have been surveyed, and they are currently using a customised version of the Koha Integrated Library System (ILS). The questionnaire was developed to address the eight usability matrices related to Koha. The study found that before customisation and updating to the latest version of Koha, the librarians and the users were unable to utilise the full features of the Koha software. It is also found that the customisation of interfaces has improved the usability of the software.

Bajral (2022) studied library automation with Integrated Library Management Software e-Granthalaya. The study discussed the need of e-Granthalaya, hardware requirements of the software version 4.0, each and every modules of e-Granthalaya 4.0 and all other aspects of the e-Granthalaya with a fruitful conclusion. **Ahmad and Bakhshi (2021)** conducted a comparative study of library automation software, namely Virtua, Alice for Windows, SOUL, and LibSys. A checklist of features and functions was prepared to compare the software under study. In addition, a rating scale ranging from 0-4 was used to evaluate the different features and facilities of standard modules of these software. The study found that RFID compatibility, FRBR, RDA standards and maintaining thesaurus are other shortfalls of SOUL. Virtua has taken the lead in the serials control module. Alice for Windows does not support the UNICODE feature.

Bhawan and Mahawar (2021) did a comparative study on the adoption and functionality of Koha ILMs between IIT Bombay and IIT Bhubaneswar. A questionnaire-based survey method was used to conduct the study. The study's major findings are that the open-source and user-friendly interface was the primary reason for choosing Koha over commercial ILMS. Both institutions use all the Koha modules and are satisfied and had a good experience with Koha ILMS. **Gireesh (2021)** explored the opportunities and challenges of open-source software (OSS) for library automation, including digital archiving, management of library housekeeping operations, etc. The study also describes the general characteristics, specific functions, technical requirements of OSS, and significant technical problems encountered by library professionals in the implementation of open-source library automation software. Lack of technical knowledge and software training, scarcity of trained staff for proper installation and maintenance of software and insufficient library budget are major challenges in the adoption of automation in Indian libraries.

Kumar and Prasad (2021) conducted a comparative study on SOUL, NewGenLib, and Libsys library automation software. Researchers collected data from 123 professionals through a structured questionnaire. The study reveals that Out of 79 features, only 38 (48.1%) features were available in common in all three selected software, and 65 (82.3%) features were rated as 'Good' by the respondents. **Naik (2016)** performed a comparative study of the four-library automation software: Koha, Libsys, NewGenLib, and SOUL. Content analysis of all the software under study was used as methodology. The study highlighted the features, functions, modules and standards

of open-source and commercial ILMS software. Koha has more features than other integrated library management software.

3. Objectives of the Study

i. To compare Koha and E-Granthalaya ILMS for automation and management purposes of libraries.
ii. To learn more about the ILMS Koha and e-Granthalaya.
iii. To understand the functionality and technology used in Koha and E-Granthalaya.
iv. To explore the special features and standards built into the software.
v. To explore and compare the basic and advanced modules of the software.

4. Scope and Limitation of the Study

The study of library management software is mainly focused on management aspects of library automation software, namely Koha and e-Granthalaya, which are currently being used by major libraries. Software key features and management functions were selected from various modules available in both software in view of housekeeping operations performed in the library such as acquisition, cataloguing, circulation, serial control, online public access catalogue (OPAC), budgetary control, report and help cum update features.

5. Methodology

The methodology used for the present comparative study of the Integrated Library Management Software (ILMS) Koha and e-Granthalaya by tabulating the list of customised features often available in standard software modules. The study of the functioning of various modules, features, and technical aspects of the software has been reviewed and compared by examining all the modules and features practically.

6. Data Analysis and Interpretation

Table 6.1: Technical Specification of the Software

SN	Technical Specifications	Koha	e-Granthalaya
1	Version	21.05	4.0 (Network Edition), Rev.19
2	Operating systems (Server and Client)	Linux/Windows	Windows
3	Programming language	Perl / PHP	ASP.NET
4	Application server	Active state Perl Modules	ODBC
5	Web server	Apache	Internet Information Server (IIS)
6	Database Server	MySQL, Oracle	MS SQL Server 2000/2005 Standard edition
7	Client	Browser based	.NET Framework 2.0
8	Interface	GUI	GUI

Note: Availability (✓) and non-availability (X) of specifications

Table 6.1 shows the software's essential technical specifications for installation and operation on the platform. Koha is a Perl/Python/PHP application that runs on Linux, Mac OS X, and Windows. Zebra and Perl scripts must be installed in order for the Koha to work. Using web servers, Perl scripts serve as a buffer between the application and the database. MySQL or Oracle database servers can be used to store the information. There is no need for a plug-in to use Koha with browser-based clients.

E-Granthalaya is an ASP.NET application that can only be installed on Windows. The application must run on both the server and the clients, so .NET is required. Through the Internet Information Server (IIS) web server and the application server ODBC, data can be stored in an MS SQL server. Koha and e-Granthalaya both have a graphical user interface, and both support international and Indian languages. From the above analysis, it can be seen that the technology used in software design architecture differs, with Koha being based on Perl and e-Granthalaya being based on ASP. NET. Koha uses complicated technology, whereas e-Granthalaya uses simple technology, making it simple to set up. However, because e-Granthalaya uses only commercial software and runs on Windows platforms, there is a cost associated with running the application.

Table 6.2: Functional Modules

S. No.	Functional Modules	Koha	e-Granthalaya
1	**Circulation**	✓	✓
2	**Acquisitions**	✓	✓
3	**Serials**	✓	✓
4	**Cataloguing**	✓	✓
5	**Reports**	✓	✓
6	**Budget**	✓	✓
7	**Micro Documents**	✗	✓
8	**CAS/SDI**	✗	✓
9	**Accession Register**	✓	✓
10	**Digital Library**	✓	✗
11	**News Paper Clippings**	✗	✓

Note: Availability (✓) and non-availability (X) of element/item

Various modules in the software are required to automate various housekeeping operations in any library. The functional modules of the ILMS software are listed in Table 6.2. All of the modules are present in both software. Micro documents, CAS/SDI, and newspaper clippings modules are not available in Koha, and the Digital library module is not available in e-Granthalaya. Although e-Granthalaya contains almost all of the modules, it lacks standards and is difficult to use and install on machines.

Table 6.3: General Features

SN	General Features	Koha	e-Granthalaya
1	Authority file and controlled vocabulary	✓	✓
2	Client-server architect	✓	✓
3	Source code	✓	✗
4	Binaries installation	✓	✓
5	Report generation	✓	✓
6	Article indexing	✓	✓
7	Scalable, manageable, high speed and efficient	✓	✓
8	Union cataloguing	✓	✓
9	RFID integration	✓	✓
10	Windows compatible	✓	✓
11	Intranet support	✓	✓
12	Retro conversion	✓	✓
13	Web-based interface	✓	✓
14	Network and standalone	✓	✓
15	Internet compatibility	✓	✓

Note: Availability (✓) and non-availability (X) of element/item

Both software have numerous common features that are studied and analysed based on their capability and functionality. Table 6.3 lists the general characteristics of Koha and e-Granthalaya. Both of these ILMS have similar features, but e-Granthalaya has fewer features than Koha. One of the most important features missing from e-Granthalaya is source code and integration. Both Koha and e-Granthalaya support RFID.

Table 6.4: Database Design

S. No.	Features	Koha	e-Granthalaya
1	Data Entry	✓	✓
2	Database Design (Dual)	✓	✗
3	Restrictions on the number of records	✗	✓
4	Data import/export	✓	✓
5	Data backup	✓	✓
6	Database searchable	✓	✓

Note: Availability (✓) and non-availability (X) of features

Table 6.4 depicts a database comparison of both software. Both software allows users to enter data as needed, but Koha has a dual database design that allows it to handle any transaction load (ASCII and RDBMS), whereas e-Granthalaya does not have a dual database design and stores data using RDBMS. However, because it uses the MS SQL server's free edition, e-Granthalaya

has a limit on the number of records it can store. If you purchase the enterprise edition, the limit is removed. MARC records from other sources can be imported into both software. Data can be exported from e-Granthalaya to a text file, MS Access file, MARC 21 display format, MARC 21 communication format, MARCXML format, ISO:2709 format, and Microsoft Excel. Data can be exported to MARC format in Koha. Data from both ILMS can be used as a backup, but Koha is a little more complicated.

Table 6.5: Acquisition Module Functions

SN	Acquisition function	Koha	e-Granthalaya
1	Acquisitions administration	✓	✓
2	Configurations of Acquisitions	✓	✓
3	Process request	✓	✓
4	Processing of on-approval supplies	✓	✓
5	Firm orders	✓	✓
6	Receive orders	✓	✓
7	Delete invoices	✓	✓
8	Processing of gifts	✓	✓
9	Accessioning	✓	✓
10	Delete accession number	✓	✓
11	Processing of payments of invoices	✓	✓
12	Payment details	✓	✓

Note: Availability (✓) and non-availability (X) of functions

Any automated system's acquisition is one of the most important housekeeping operations. This module should have almost all of the necessary features; Table 6.5 shows the acquisition module's functions in detail**.** Both ILMS have very simple and straightforward acquisition administration options, as well as almost all of the acquisition functionalities. It is simpler in e-Granthalaya than in Koha; it has a very simple and free flow of processes such as request processing, supply processing, item ordering, accessioning, and payment processing. In Koha, the acquisition module is a little more complicated.

Table 6.6: Cataloguing Module Functions

SN	Cataloguing Function	Koha	e-Granthalaya
1	Catalogue administration	✓	✓
2	Retro-conversion	✓	✓
3	Full cataloguing	✓	✓
4	Import catalogue records from the Internet	✓	✓
5	Modify catalogue records	✓	✓

6	Search catalogue functionality	✗	✓
7	OAI-PMH	✗	✗
8	Abstracts	✓	✓
9	Printing of catalogue in AACR2 format	✗	✓
10	Printing of catalogue in CCF format	✗	✓
11	Change copy status	✓	✓
12	Barcode generation	✓	✓

Note: Availability (✓) and non-availability (X) of functions

The cataloguing module is a mirror image of any library, revealing the library's holdings as well as bibliographic details for each item. Table 6.6 shows that the cataloguing administration in Koha uses the MARC bibliographic framework and that the bibliographic records in e-Granthalaya are also created using the MARC framework. Both software programs prepare items for technical processing and allow for the copying of catalogue records. The original cataloguing is much simpler in e-Granthalaya than in Koha, but Koha has a lot of sub-options that many libraries may not require. OPAC/WEBOPAC can be used to view the catalogued records. In e-Granthalaya, catalogue printing in AACR2 and CCF is possible, but it is not available in Koha. In both software, barcode generation is also possible.

Table 6.7: Circulation Module Functions

SN	Circulation Function	Koha	e-Granthalaya
1	Circulation Administration	✓	✓
2	Issue & Return of items	✓	✓
3	Configuration of parameters	✓	✓
4	Reservation & Renewal of items	✓	✓
5	E-mail alerts to members	✓	✓
6	Print gate pass	✓	✓
7	Collection of fines	✓	✓
8	Printing of Identity cards	✓	✓
9	Use of RFID	✓	✓
10	Overdue notices	✓	✓

Note: Availability (✓) and non-availability (X) of functions

The circulation module is a critical feature of any library that allows patrons to access the library's resources. This module allows users to borrow and return books, as well as aid in collection development, weeding, and collection maintenance. Table 6.7 shows the circulation module's basic information. Both software have nearly identical features; circulation administration and configuration parameters are identical, but sub-options may differ. Return and reservation

facilities are available in both software releases; check-in messages are possible in Koha, but e-Granthalaya with this gate pass can also be printed. Both ILMS allow for the printing of identity cards, as well as the collection of fines for overdue items.

Table 6.8: Serial Module Functions

S. No.	Serial Function	Koha	e-Granthalaya
1	Administration	✓	✓
2	Configuration	✓	✓
3	Serial subscription details	✓	✓
4	Add acquisition record	✓	✓
5	Approval of serial	✓	✓
6	Ordering	✓	✓
7	Subscription maintenance	✓	✓
8	Receive loose issues	✓	✓
9	Reminders	✓	✓
10	Renew subscriptions	✓	✓

Note: Availability (✓) and non-availability (X) of functions

There are numerous issues with serial modules in both open-source and commercial ILMS software that require significant effort to resolve. This module handles subscriptions, serials management, registration, and missing issues, among other things. The serial module's functionality is detailed in Table 6.8. In both software, serial parameters are preferred and of unequal importance. Both the ILMS allow for the receipt of loose issues, the sending of reminders for unsupplied issues, and the renewal of subscriptions.

Table 6.9: Online Public Access of Catalogue and Searching Functions

S. No.	OPAC/ Web OPAC/ Searching Functions	Koha	e-Granthalaya
1	Web interface	✓	✓
2	Basic search	✓	✓
3	Advance Search	✓	✓
4	Boolean Search	✓	✓
5	Recent arrivals	✓	✓
6	Status inquiry	✓	✓
7	Member login	✓	✓
8	Feedback	✓	✓
9	Web OPAC	✓	✓
10	Library statistics	✓	✓

Note: Availability (✓) and non-availability (X) of functions

The catalogue is a mirror image of the library's holdings, and the Online Public Access Catalogue (OPAC) is critical for resource access and use. Table 6.9 depicts the software's OPAC functionality and search capability. Koha has a very nice web interface, whereas e-Granthalaya allows you to browse items from A to Z. Both software have a standard search feature, but Koha also has a guided search option. In both ILMS, library statistics and member login are available, as well as item status. User assistance and reservation items are available in Koha but not in e-Granthalaya. Lists and cart/book bag, which allow you to add title lists to your cart, are a Koha-only feature. Purchase suggestions are available in Koha but not in e-Granthalaya. Koha is clearly superior to e-Granthalaya in terms of advanced features and a user-friendly web interface.

Table 6.10: Reporting Functions

S. No.	Reporting Functions	Koha	e-Granthalaya
1	View Index	✓	✓
2	Catalogue Queries	✓	✓
3	Acquisition queries	✓	✓
4	Approval Queries	✓	✓
5	Order Queries	✓	✓
6	Vendor Queries	✓	✓
7	Invoice queries	✓	✓
8	Holding Search	✓	✓
9	Patron Statistics	✓	✓
10	Most issued Books	✓	✓

Note: Availability (✓) and non-availability (X) of functions

Reports are essential for collecting library statistics and determining the library's performance. The reporting functions of both ILMS are shown in Table 6.10. Although Koha has integrated reporting, e-Granthalaya has crystal reporting. Both ILMS have catalogue, acquisition, approval, order, vendor, invoice queries, holding search, and patron statistics.

Table 6.11: Help and Update Functions

S.No.	Help & Update Functions	Koha	e-Granthalaya
1	Discussion forums/mailing lists	✓	✓
2	FAQ	✓	✗
3	Feature request system	✓	✓
4	Help desk support	✓	✓
5	News/Events	✓	✓
6	Training	✗	✓
7	E-mail	✓	✓

8	Updates of Version	✓	✓
9	User Manual	✓	✓
10	Request form	✓	✓
11	Backup	✓	✓
12	Data migration	✓	✓

Note: Availability (✓) and non-availability (X) of functions

Table 6.11 depicts the help and update functions in both software under study. Discussion forums, help desk support, e-mail updates, user manuals, software updates, backups, and data migration are the features that are available in both Koha and e-Granthalaya. However, the frequently asked questions (FAQ) feature is not available in e-Granthalaya.

7. Major Findings of the Study

i. Both software are free software, although Koha is open-source software, and e-Granthalaya has a nominal one-time charge only.

ii. E-Granthalaya and Koha both software have excellent and significant features, but e-Granthalaya is more easy to learn and simple to use in comparison to Koha.

iii. Both Koha and e-Granthalaya have major functional modules of need with significant features.

iv. Koha and e-Granthalaya both support the MARC-21-based cataloguing, but Koha has more features and customization option than e-Granthalaya.

v. E-Granthalaya provides more features in Cataloguing modules than Koha.

vi. Koha is fully customisable, while e-Granthalaya is not.

vii. e-Granthalaya is more user-friendly than Koha.

viii. An expert is needed for the installation of Koha.

ix. There should be a server for Koha, and the server should only be installed on the LINUX operating system.

x. e-Granthalaya 4.0 is cloud-based, with no need for installation, and it can be accessed from any computer with an active Internet connection from anywhere round the globe.

xi. e-Granthalaya 4.0 also has a mobile app available for mobile phones (smartphones) users.

xii. Koha and e-Granthalaya both have Web OPAC (Online Public Access Catalogue) feature for searching of documents.

xiii. Koha and e-Granthalaya both software supports the all major reporting functions and features of need.

xiv. E-Granthalaya provides training and vendor support while there is no any training and support service available in Koha.

8. Conclusion

The comparison of Koha and e-Granthalaya software (both of which are web-based) reveals that library automation is both necessary and simple. The study reports on the software's actual working and functioning, as well as all of its prominent aspects and other features and functions. For the workflow, each software has its own design and architect. Almost all modules, necessary features, and technology are available in each software, but after a thorough evaluation and comparison, it was determined that Koha has more specific open-source ILMS characteristics. e-Granthalaya, which needs to be upgraded, modified, and improved, has fewer features than Koha. Because e-Granthalaya v4.0 is web-based, it does not require installation anymore. While Koha uses complex technology, it requires an expert to install it. However, a few of the modules in Koha are superior to those in e-Granthalaya, such as the acquisition module, which is simpler and more user-friendly, and the advanced OPAC system. The study shows that e-Granthalaya outperforms Koha in terms of cataloguing, circulation, and serial management. In addition, the study suggests that small libraries should use e-Granthalaya and big or medium-sized libraries should use Koha for vast collections and more features. Library staff should be trained in operating library software.

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