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Digital transformation of Central Library of Dhi Qar University: Koha system Opportunities and Challenges

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Abstract

From the standpoint of social science and society at large, artificial intelligence has already transcended all previous boundaries. The latest long wave of human socioeconomic development is digital technology, with its ubiquitous connectivity and potent artificial intelligence. Undoubtedly, the university library serves as the center of academic activity inside the institution, which may have made it necessary for libraries to adopt the usage of contemporary ICT in order to satisfy patron needs. Libraries and information centers face the difficult challenge of updating their cataloguing and categorization systems in the quickly changing digital age in order to satisfy user requests and guarantee the effective arrangement and retrieval of information resources.

An open-source integrated library system (ILS) called Koha has become a potent instrument for libraries looking to transform their administration procedures. This case study examines the advantages, difficulties, and lessons discovered during the Dhi Qar University Central Library's transformational journey to the Koha system. The research adopted the descriptive-analytical approach, as it is the most suitable for studying library management systems and analyzing their technical and functional capabilities, through describing the Koha system and its characteristics, analyzing its suitability to the university library environment, and comparing the university library's needs with the system's capabilities. Data collection relied on direct observation and interviews conducted with the library director and the IT manager to understand the



administrative and technical vision regarding the implementation of the system. The study's conclusions demonstrated and identified a number of issues, such as inadequate money, personnel retraining and training, network outages, a lack of stationery for providing cataloguing worksheets, and a culture of poor computer upkeep. The study suggested that staff members receive proper ICT training and retraining, learn how to use Open Source Software (OSS), solve network issues to prevent network outages, and diversify their funding sources.

Keywords: Koha System, Library Management Systems, Dewey Decimal Classification System, Open Source.

1. Introduction:

When the library first started, everything was done by hand. This included tasks including getting materials, charging and unloading books, indexing and classifying, including typing catalog cards and putting cards in cabinets. Both library employees and patrons found the entire process to be very tiresome. Automation gives the user up-to-date, pertinent information based on their needs. Automation improves the library's services and operations. It demonstrates how automation can increase the library's significance to the scholarly community.

(Egunjobi & Awoyemi, 2012). Many ICT applications, including open-source library management software, online resources, library web portals, institutional repositories, cloud computing, and social media, have made it possible for academic libraries to undergo a digital transformation while offering users easy access to virtual libraries. (Saxena, 2019). Artificial intelligence is the intelligent mind of digital transformation, and digital transformation is the environment in which artificial intelligence operates. Artificial intelligence is not an integral part of Koha's software itself however, tools provided by artificial intelligence have the potential to greatly enhance services of library like smart indexing, providing smart index search and improving retrieval results within Koha, as well as providing smart chat assistants to answer readers' queries directly in the OPAC interface or library website. Librarians can use it for a variety of purposes, such as reviewing and assessing material, teaching information literacy, offering reference services, and conducting information search and retrieval procedures (Gujral et al., 2019). Within the dynamic landscape of librarianship today, library software has established itself as a vital instrument for providing library services. Information and Communication Technology (ICT) operations or library functions were designed and carried out by library software packages. Librarians and information service providers can increase their work productivity, accuracy, timeliness, and ease of use by using library software. (Okewale & Adetimirin, 2011). Classification, acquisition, circulation, cataloguing, serials management, and other library operations depend heavily on the



use of information and communication technology, sometimes known as library automation. Recent advancements in information processing procedures have also forced libraries to adopt automation as a way to improve the services they provide to its patrons (Ukachi et al., 2014) .

In librarianship, continuing professional development, or CPD, is crucial. To be able to give people exceptional service, librarians must stay up to date on the latest developments and trends affecting their field (Moonasar & Underwood, 2018). The librarians were questioned about how their typical roles in the library had changed over time. Librarians now oversee electronic databases, e-books, online journals, digitized historical materials, and many more resources in addition to traditional print materials, marking a significant change from physical to digital resources in many libraries (Raju, 2017) . Considering the features of surfing, browsing, and obtaining necessary documents, it is crucial to integrate these services into a web-based system that gives consumers access to available data through a single point of entry.

The General Secretariat of the Central Library at Thi Qar University still relies on traditional methods and a costly, closed system, which limits the efficiency of library operations and the quality of services provided to users. With the emergence of open-source library management systems such as Koha, new opportunities have arisen for developing library operations. However, the transition to the Koha system faces several challenges related to technical infrastructure, staff training, costs, and the system's compatibility with the library's needs.

The research problem focuses on the feasibility of the Central Library's General Secretariat adopting the Koha library management system, and what are the expected requirements for achieving this transition successfully and identifies a number of opportunities and obstacles to the potential digital transformation of library through the use of the Koha system, as well as how the library might get over these obstacles.

The importance of studying the digital transformation of the General Secretariat of the Central Library at the University of Dhi Qar to an open-source automated system lies in providing a theoretical framework that can be used in future studies that address digital transformation in university libraries and highlight the technical and human requirements necessary to implement the system in the college libraries affiliated with the University of Dhi Qar, this enables researchers and beneficiaries can access information in the quickest and easiest ways possible. This will allow them to join international organizations that specialize in information and libraries, establish cooperation and exchange relationships with other universities and libraries, take advantage of the digital environment, and subscribe to databases for books, references, periodicals, and systems.

2. Objectives of the Study



The study aims to identify the Koha system and assess Koha's efficacy and efficiency in cataloguing and classification procedures as well as library operations, the possibility of implementing it in the central library of Thi Qar University as an integrated library system, and identifying the library's readiness to implement the system for library management by studying the opportunities, difficulties, and challenges facing the Koha system in the central library of Thi Qar University which This supports the library's move towards digital transformation and keeping pace with technological developments in the field of information management.

3. Research Methodology

The study employed a descriptive- analytical approach to identify the criteria for selecting the Koha system, as well as the challenges encountered in its implementation. The study sample consisted of the central library at Thi-Qar University because it represents the link between students, faculty members, and information sources, its technological development will positively impact the rest of the educational process., and interviews (an interview with library director and the Central Library's Secretary-General) in addition to direct observation of the current work mechanism in the library, the system currently in use, the level of automation, and the technical infrastructure. were used to assess the library's current situation and determine the feasibility of implementing the Koha system there.

4. The establishment of the General Secretariat of the Central Library of Thi Qar University

A public library connected to the Ministry of Higher Education and Scientific Research is the Central Library. In 2004, as the institution started to build the foundation of its library and was eager to maintain and grow it, the General Secretariat of the Central Library of Thi Qar institution was founded. The library's collection of almost 32,000 (32,000) thirty-two thousand resources encompasses all forms of human intellectual output, both ancient and contemporary, including rare and costly materials, manuscripts, photos, and recordings on laser discs or tapes.

The library started off with rudimentary books and journals, but as time went on, it evolved to take into account the library's realities by offering scientific and human literature, references, periodicals (both Arabic and international), and laser discs.



5. The message of the General Secretariat of the Central Library of Thi Qar University

The General Secretariat of the Central Library's mission is to support and aid scientific research and the educational process by providing the most up-to-date knowledge sources, such as books, periodicals, references, and university theses, electronically to researchers, students, and beneficiaries. It also aims to advance the services offered in accordance with quality and excellence standards by establishing scientific cooperation with Arab and international libraries and fostering an environment that is conducive to safe, comfortable, and encouraging access to information sources.

6. Library staff information

Only one of the library's five male and three female employees held a Ph.D., while the other four employees' highest level of education was a bachelor's degree.

Table (1) Information Technology in the General Secretariat of the Central Library

Seq	Devices	number	Notes
1.	Copying Machines	3	Two devices are out of order
2.	Scanner Device	2	
3.	Laptops	10	
4.	Printers (Canon type)	5	Two devices are out of order
5.	Color printers	1	
6.	Internet system	1	
7.	Disc burner	1	
8.	Desktop calculator	2	
9.	Hard disk	3	
10.	CD reader	1	

7. Forms of library materials

Table (2) Library materials that classify the Dewey Decimal Classification System



Seq	Sources	number
1.	Books	15504
2.	University Theses	6389
3.	journals	2797
4.	English books	5000
5.	laser discs	3084
6.	periodicals	2700

Since books are the primary source of information in libraries, Table No. (2) makes it evident what kinds of library resources are available at Dhi Qar University's Central Library. University theses are under the second level of classification. Magazines, periodicals, and laser discs are among the various materials that fall under the last level of classification.

8. Dewey Decimal Classification System (DDC)

The pieces of human knowledge are arranged logically in this framework. The DDC was initially published in 1876 and was called for its creator, Melvil Dewey. The tables that comprise the sections, assets, branches, parts, auxiliary tables, and alphabetical index comprise the system's fundamental components (Golub et al., 2020) . Disciplines or areas of study are used to organize basic classes. Ten major classes, each further subdivided into ten divisions, each of which is further subdivided into ten sections, make up the top level. Because of this, the DDC is hierarchical and works well for hierarchical browsing.

There is the possibility of cross-lingual integrated search services because each class is represented by a distinct combination of Arabic numbers that are the same in all languages. The primary class is represented by the first digit of the class number, followed by the division by the second and the section by the third. For instance, the numbers 500, 530, and 532 represent the sciences, physics, and fluid mechanics, respectively. A decimal point is employed as a psychological break after the third digit of a class number because, if necessary, the division by 10 proceeds to several additional, more precise categorization levels.(Thornton, 2024) .

9. Justification for the adoption of Koha

For libraries to operate with better service quality, software selection and resource integration are essential when needed. The administration of the library should choose the software wisely in

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order to successfully automate the library and reduce waste. As a result, university libraries should choose the best software for their use in order to offer effective services as quickly as possible. Additionally, the library might not be able to function properly and efficiently if quality software is not accepted and used.(Ogbenege & Adetimirin, 2013) . Users of libraries anticipate easy access to the information materials and prompt answers to their questions. The Dewey Decimal System is the library software used by Dhi Qar University's Central Library. The Central Library of Dhi Qar University continues to use an unfinished copy of the 18th edition of the Dewey Decimal Classification System, which was published in 1971, despite subsequent advancements in the sciences and the appearance of new editions of the system. None of the classifiers at Dhi Qar University's Central Library are aware that websites pertaining to foreign classification systems, like the Library of Congress Classification Web Classification System and the Web Dewey Classification System, exist on the Internet.

The majority of classifiers in the Dhi Qar University Central Library classify library resources using Excel tables and the alphabetical index to identify the right symbol for the subject. The search for any library resource is done by hand. . There are no theoretical limits to the number of subdivisions, but we do not know if subdivisions further than 10 decimals exist in DDC, and very long notations may provide practical problems. Dewey A decimal classification has advantages and disadvantages. Among the advantages is its simplicity and ease of use. Paul Otlet, the founder of the UDC saw in Dewey's decimal system a rigorous language for designating concepts .A disadvantage of the decimal notation is that it introduces an element of arbitrariness because subjects have to be adjusted to ten subdivisions, although they may naturally fall in either less or in more subclasses (Hjørland, 2025) .

For big or special libraries, the DDC is generally considered unsuitable because DDC from the start was not designed to suit large libraries or databases and even today, it is generally not judged suitable for to be used for large libraries.

To keep up with global development, the Central Library has started working on developing library databases. The system guarantees efficiency and consistency, organizes online line public access catalogs, is flexible and easy to use, makes it easier to classify digital library resources, allows users to customize search using advanced search terms, and facilitates quick classification, among other benefits.

The most cutting-edge open-source library software program is Koha, which is utilized by many libraries across the globe. It was created and is guided by an expanding community of libraries and users who work together to accomplish their technological objectives. Koha reduces manual labor and errors by streamlining essential cataloguing and categorization operations with automated workflows and strong metadata management.



10.Open Source Software

It is a word that describes the collection of guidelines and precepts that ensure the user has access to the program's design and may replicate it using its original models . This phrase is typically used to refer to opening the source vulnerabilities, which permits the following freedoms in development and use:

- The ability to disclose and alter the program's original code.
- The ability to re-distribute the program following changes
- The unrestricted ability to observe and analyze other people's work
- The ability to build upon, support, and alter the work of others without being constrained by legal barriers
- The ability to create software based on the original

11.Open Source Library Systems

Open source library systems are those that permit unrestricted development of the system's code. It is referred to as open source because it is one of the guidelines used when creating computer programs and systems, permits the source code to be viewed and shared, and provides developers with the freedom to alter it to suit their requirements. The software development process among various library employees fosters cooperation, which develops into a community and creates a group of professionals who share the objective of increasing the system's usefulness. More sophisticated features are being added as the system is being collaboratively developed over time, making other library services much simpler than they were previously. (Noel W. Cabfilan, 2015)

12.Koha system

The first free and open source library management system in the world, KOHA, is being used in digital libraries to enable them to better manage their holdings and optimize operations. Katipo Communications proposed a new system in 1999 that was the first open source Integrated Library Automation Package (ILAP) using open-source tools. It was installed at Horowhenua Library Trust (HLT) in New Zealand in 2000 and released under the general public license (GPL). Koha,



which was created on the tenets of open-source software, provides a variety of modules and features to meet the various requirements of libraries. Authorities, flexible reporting, label printing, multi-format notices, purchases, circulation, cataloging, serials management, authorities, and many other modules are included in KOHA. KOHA functions for multi-branch and single-branch libraries, as well as consortia of various sizes (ABU KAUSAR, 2025) .

12.1 Why Koha?

Knowledge must be arranged so that users may easily access and retrieve information for any library system to operate properly and efficiently. Given the benefits of employing online resources like Koha, automation of the library is essential to making this possible (Madhav Kulkarni et al., 2023)(Msonde et al., 2025) .

The reasons for migrating to Koha ILS and a significant effect of the usage and adoption:

- OPAC, or online public access catalog. Since the OPAC is web-based, users don't need to install any software on their computers.
- Safety. To prevent unauthorized users from accessing the system, Koha offers strong security measures. For instance, in order to use the library database for specific purposes, registered users must log in using their user name and password.
- An interface for web-based circulation. able to manage problems, transfers, returns, etc. Once an intranet is established, staff PCs don't require any additional software to be installed.
- Television shows. Through the OPAC, users can access holdings information and catalog journals with ease.
- Branches. It is simple to borrow a book from one branch and return it to another because the software is web-based.
- Comments, tags, and borrower history. Users have the ability to tag books, leave reviews, comment on them, and see their reading history. They can also recommend purchases and view their records.
- An adaptable search. The fields on a library's search form are up to them. An author, title, subject, and keyword search, for instance. An advanced search option is also available.
- Purchases. This covers budgets, pricing details, vendor orders, book bags, and virtual shelves. Users can save books according to their needs in a virtual library.

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- Support for OPAC in multiple languages. Koha allows users to access the OPAC in several languages depending on the language chosen by the library.
- Managing user records. It permits maintenance of precise information about each person that is enrolled as a library user.
- Past-due penalties and notifications. Koha is in charge of managing past-due penalties and notifications that users can get via email.
- A barcode reader and printer. In order to eliminate the possibility of human error, Koha completely supports the usage of barcodes.
- Statistics and reports. In the areas of circulation, acquisitions, serials, and cataloging, Koha is able to produce management reports and data.
- User reservations and renewals of items online. Users of the library can make reservations and self-renew their checkouts.. This has reduced the traffic at the circulation desk and has freed some circulation staff for other duties.

12.2 Koha OPAC

An essential part of the open-source Integrated Library System (ILS), which gives patrons access to the library's resources, services, and collections via an intuitive web interface, is the Koha OPAC (Online Public Access Catalogue) module. Patrons can search for materials, place holds, manage their accounts, and communicate with the library through the OPAC module. Library patrons may search, find, and use library resources and services with ease thanks to the Koha OPAC interface. The OPAC module improves user experience and makes it easier to access the library's collections and resources by providing search capabilities, item availability information, hold placement, account management features, access to digital resources, personalization options, and smooth integration with other modules. (Halder & Haldar, 2023).

12.3 Koha system's online cataloguing

In a university library, online cataloguing is the process of building and managing an electronic database of library resources so that patrons may readily search and access them. The effectiveness, precision, and usability of the catalogue are frequently used to gauge the success of online cataloguing for university libraries(Abdussalam & Saliu, 2014)(Vandana & Singh, 2024)

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.The following are some significant components and achievements of the Koha system's online cataloguing:

- **Community Support:** Koha boasts a robust and engaged user base that offers regular updates, improvements, and support. Libraries can seek support and direction from this community.
- **Economical Solution:** Since Koha is open-source software, there are no costly licensing fees and it is free to use. Because of this, it is a desirable choice for libraries with tight budgets.
- **Standards Compliance:** Koha is appropriate for libraries that follow international cataloguing and classification standards, such as MARC21.
- **Web-Based Access:** Library employees may work conveniently from any location with an internet connection thanks to Koha's web-based access to the cataloguing and classification modules.
- **Integration:** Koha can be integrated with other library services and systems, enhancing efficiency and enabling smooth processes.
- **Customization:** Because Koha is so adaptable, libraries can modify the system to suit their own requirements. Libraries with particular cataloguing and classification needs will benefit from this flexibility.
- **User-Friendly Interface:** Koha provides catalogers with an intuitive interface that makes managing and creating bibliographic information simpler.

12.4 Koha Modules:

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Koha is fundamentally made up of a number of important modules that address fundamental library operations. Acquisitions, cataloging, circulation, serials, reporting, patrons, administration, tools, and the online public access catalogue (OPAC) are all covered in these sections. Libraries can effectively manage their collections, automate processes, and improve user experiences with Koha's modules..(Pund & Jain, 2016) (Nur Amirah et al., 2023).

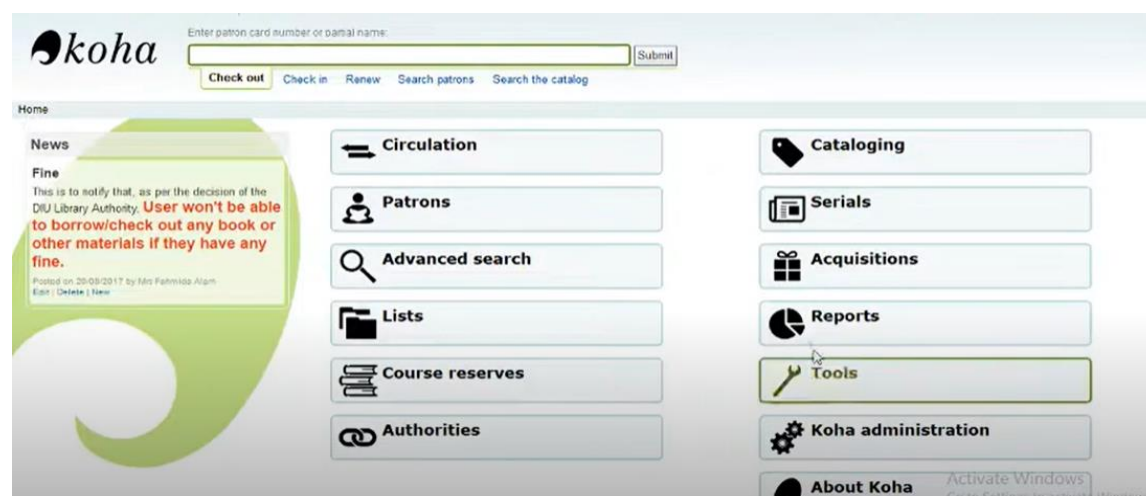


Figure- 1: all Modules in Koha Home Page

- 1- Acquisition Module: A crucial component of the open-source Integrated Library System (ILS), the Koha Acquisition module makes it easier to manage library ordering and acquisition procedures. From the first selection to the last item receipt, this module expedites the process of acquiring new resources for the library's collection.
- 2- Module for Cataloguing: An essential part of the open-source Integrated Library System (ILS) that concentrates on maintaining and organizing bibliographic entries inside a library is the Koha Cataloguing module. This module gives Koha users the resources and capabilities they need to produce, modify, and preserve thorough and correct bibliographic information for library resources.
- 3- Circulation Module: An essential part of the open-source Integrated Library System (ILS), the Koha Circulation module automates and simplifies library circulation processes. By making it easier to lend and borrow library materials, this module guarantees effective patron account management and seamless circulation operations.



- 4- Control Module for Serials: An integral part of the open-source Integrated Library System (ILS) that makes managing serial publications in a library easier is the Koha Serials module. The special traits and complexity of serials—such as journals, periodicals, newspapers, and other ongoing publications—are handled by this module.
- 5- Reporting Module: Libraries can create and examine a variety of reports using the robust Koha Reports module to learn more about their collection, circulation, and general library operations. With the use of this module, Koha users can generate personalized reports according to certain standards and parameters, which aids in decision-making and performance evaluation of their library services.
- 6- The Patrons Module: A library's patron or user data is managed using the Koha Patrons module of the open-source Integrated Library System (ILS). By allowing Koha users to establish, edit, and administer patron accounts, this module guarantees effective user record administration and offers library users individualized services.
- 7- The Koha Administration module gives Koha users the capabilities and resources they need to set up and modify the Koha system to suit the unique requirements of their library. This module makes it possible to access a variety of administrative settings and functions, facilitating effective system maintenance and administration.
- 8- Tools Module: One component that gives Koha users a collection of practical tools and utilities to improve system management and upkeep is the Koha Tools module. Numerous features provided by this module facilitate data management, system upkeep, and troubleshooting.

13. Opportunities for using Koha in the Central Library

Shifts in scholarly communication and the publication and dissemination of research, technology that enables users to access information without the need for intermediaries, user demands for



access to new forms of scholarly information (such as data sets and multimedia resources), and accelerated globalization are just a few of the external factors driving transformative change in libraries. The complexity of blended learning, experiential learning, and distributed learning, along with the resulting necessity for mobile material delivery, as well as the growing emphasis on research data management and data mining and the expansion of research dissemination choices, have created new demands for both learners and researchers. Both private and public higher education institutions tend to increase the potential value and use of information and communication technology while also lagging behind in the practice of implementing it.

.(Fang, 2002). emphasized that e-government and e-commerce are the outlines of a massive technical advancement movement through government innovation. The broad strokes of technical advancement through government reinvention are embodied in e-commerce and e-Government. It is a fantastic incentive to advance into the twenty-first century with high-quality, cost-effective management facilities and better ties between nations and governments.

The way teachers and students utilize libraries has changed significantly as a result of the digital age, which has also brought about revolutionary changes to the scholarly information environment. Libraries around the world are reconsidering approaches to library infrastructure, services, and collections in response to the challenges of the digital age. Library customers have a wide range of information needs.

All of this results in shifting user needs for services and space, including a decline in demand for print collections. Even though the majority of professors and students are aware of how much they depend on online access to information resources, the subject of collections can be challenging. This will make it possible to adapt library spaces to the demands of academics, staff, and students in the current digital information era.

14. What challenges are associated with KOHA software application in the Central Library of Dhi Qar University?

Results from Tables 1 and 2 as well as the library's Secretary-General's interview showed that. According to the report, Dhi Qar University's Central Library encountered several difficulties integrating the Koha system as well as new trends in innovation and digital transformation:



- 1- Poor use of digital resources, negative attitudes and perceptions of digital literacy, a lack of knowledge about digital technology, and inadequate training in digital literacy and digital technology competency.
- 2- Slow progress is caused by an unreliable and insufficient power supply, network outages, and a slow internet speed.
- 3- The deployment of ICT in academic libraries is still in its infancy due to a lack of qualified staff, as evidenced by ICT applications, devices, and library and information professionals' ICT abilities.
- 4- The limited number of classifiers with the necessary training, expertise, and credentials to perform the classification procedure.
- 5- Insufficient stationery to provide a cataloging worksheet.
- 6- The cost of purchasing hardware and software is high.
- 7- Outdated ICT equipment and inadequate library budget financing: While a clear strategy is required for digitizing library resources, sufficient funding is crucial for creating a well-equipped library with current infrastructure.
- 8- The difficulty of learning: Users should be able to pick up the system quickly and use it effectively.
- 9- The incapacity to strike a balance between the tactical and strategic. There are instances where the implementation process is unclear despite having a clear vision.

15. Recommendations

- 1- It may be costly to implement the latest technology, but it is necessary to meet user expectations and remain up to date in the quickly changing academic area. Despite the difficulties in implementing KOHA software at Dhi Qar University's Central Library, some suggestions were made.
- 2- Library employees must be trained in the use of Koha and modern technologies in order to guarantee that the Koha system and the regulations controlling the integration of modern technology in Dhi Qar University's Central Library are implemented correctly. A campaign to raise awareness among library users is also required.



- 3- The library must have experienced, specialized classifiers with the necessary qualifications.
- 4- The only way library professionals can do their jobs and obligations is if they are committed to continuous self-improvement and being at the forefront of technological advancements
- 5- Adequate funding is essential for establishing a well-equipped library with modern infrastructure, while a consistent policy is necessary for digitizing library holdings.

16. Conclusion

According to the study's findings, libraries are vibrant institutions that significantly enhance the academic community by offering an environment that fosters learning, research, and knowledge creation. In order to meet user needs and remain up to date in the quickly changing academic area, they are more than merely repositories. Academic libraries should continuously adapt and change to meet the changing needs and expectations of researchers, faculty, and students in order to stay up with the rapid improvements in technology. The study's conclusions demonstrated that Koha is a feature-rich, adaptable, and reasonably priced ILS that enables libraries to effectively manage their holdings, offer users improved services, and adjust to changing library requirements.

It is a dynamic and dependable option for libraries looking for a powerful and adaptable library management system because of its open-source nature and vibrant community. Lack of funding, inexperienced library staff, power outages, a culture of poor computer maintenance, a lack of infrastructure and equipment, and a lack of awareness are some of the issues the Central Library of Dhi Qar University has been having adopting current trends to implement the Koha system. According to the report, among other things, staff should receive proper training and retraining in ICT skills and Open Source Software (OSS) use, alternative power sources should be made available, network issues should be resolved to prevent network outages, and funding sources should be enhanced and diversified.

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