Designing an Integrated Library Information Management Software System: A Study of User Requirements and Needs

Ahmed Kadhim Hantoush[1], Saddam Madallah Obaid[2], Muhammad Hadi Jassim[3]
[1] *Al-Qasim Green University, College of Veterinary Medicine, Town, Babylon, Iraq.*
[2,3] *The University of Babylon, Iraq General Secretariat of the Central Library Babylon, Iraq*

General Background: The rapid advancement of information and communication technologies has transformed institutional information management, making integrated information systems essential for organizing, retrieving, and securing data in academic and administrative environments. **Specific Background:** Library information management systems play a central role in supporting document management, knowledge access, and administrative processes within educational institutions undergoing digital transformation. **Knowledge Gap:** However, many existing systems fail to align with actual user needs because system development often lacks systematic analysis of requirements across diverse user groups such as administrators, faculty members, students, and decision-makers. **Aims:** This study aims to design an integrated library information management software system grounded in a comprehensive analysis of functional and non-functional user requirements. **Results:** Using a descriptive–analytical method and field data collected through a three-point Likert scale questionnaire, the findings reveal varying priorities among user groups: administrative staff prioritize efficient search and workflow processes, faculty members emphasize organization of academic materials, graduate students prioritize information security and protection of research files, while senior management focuses on analytical reporting capabilities for decision-making. The results also indicate widespread dissatisfaction with existing systems and a strong preference for an integrated software solution that addresses these differentiated needs. **Novelty:** The study proposes a user-centered conceptual design framework that integrates customized modules tailored to the functional priorities of each stakeholder group. **Implications:** These findings highlight that comprehensive user requirements analysis is a critical determinant of successful library information systems and provide practical guidance for educational institutions seeking sustainable, secure, and scalable digital information management solutions.

Keywords: Library Information Management Systems, User Requirements Analysis, Digital Transformation, Management Information Systems, Software Systems Design.

OPEN ACCESS

ISSN 2503 3492 (online)

**Correspondence:*
Ahmed Kadhim Hantoush

ahantoush@vet.uoqasim.edu.iq

Citation:
Ahmed Kadhim Hantoush, Saddam Madallah Obaid2, Muhammad Hadi Jassim. (2026) Designing an Integrated Library Information Management Software System: A Study of User nRequirements and NeedsJournal of Information and Computer Technology Education. 10.21070/jicte.v10i1.1710

INTRODUCTION

The rapid development of information and communication technologies has led to fundamental transformations in administrative and institutional work methods, particularly in the field of office information management, which is considered the cornerstone of the success of educational and administrative institutions in the knowledge economy era. Information has become a strategic resource no less important than human and financial resources, which has compelled institutions to seek advanced technological solutions that ensure information organization, easy access, protection, and efficient utilization to support decision-making and improve the quality of institutional performance (1).

Office information management systems have emerged as an important outcome of digital transformation. They are particularly good at automating office work, handling documents and records electronically, and synchronizing information across different parts of an organization (2). Outmoded ways of managing documents and information do not cut it in today's fast-paced information era of rising information volumes, increasingly complex information handling processes, and rising needs for speed, accuracy, and transparency (3).

While more and more institutions are turning to the use of software in their systems, many of the information management systems in the offices fail to meet the mark in terms of what the end user actually needs. This is because there is not enough systematic analysis of the requirements from all the beneficiaries, whether they are admin personnel, faculty, students, or management. In more recent studies, it has been found that the major reason for the failure of many software projects is not necessarily related to the technical issues but the lack of adequate requirements analysis and design where the end user is not included in the process (4).

The importance of this research lies in its intent to design an integrated office information management software system that is underpinned by a comprehensive and science-informed understanding of what users need. It is not just about how well the software works technically; it is also about how well it can help improve administrative and academic performance, security of information, and informed decision-making within the institution (5).

There is a scientific consensus that effective digital transformation is not achieved simply by introducing modern technologies, but rather requires adopting design methodologies that place the user at the heart of the development process and take into account institutional privacy, the organizational environment, and the legislation governing information management. Accordingly, this research seeks to present a scientific and applied framework that can be utilized in educational and administrative institutions, serving as a model adaptable and applicable to similar institutional environments (6).

Section One: Research Methodology

First: Research Problem

Data that is exponentially growing inside administrative and scholarly institutions has been propelled by the proliferation of communication technologies. This increase causes significant challenges in data storage, organization, and retrieval for businesses still using outdated methods or damaged information systems. Though there are many software solutions, many of them fall short of their goals. Often, this failure stems from insufficient user needs analysis and a mismatch between the system's design and the actual needs of its users inside their own working conditions rather than from technical problems.

Thus the fundamental study question is the absence of a systematic methodical plan for creating an integrated library information management system. Such a framework should be based on a demanding, scientific analysis of the different needs of its consumers. Systems without this fundamental analysis lack usefulness and efficiency, finally failing to offer efficient help for academic or administrative activities or for institutional decision-making.

Second: Research Questions

This study follows one main overarching question to help solve the defined research issue:

Based on a thorough examination of users' functional and non-functional demands, how can an integrated library information management program be developed to properly satisfy their varied needs?

The next sub questions help one further investigate this main one:

1. Among several user groups—including administrative staff, professors, students, and top management—what are the main variances in requirement priorities (e.g., usability, security, decision support)?

2. In what ways does a User-Centered Design (UCD) approach affect the extent to which the information system is accepted and the perceived level of effectiveness for the users?

3. What design framework can accommodate and integrate divergent and sometimes contradictory user needs into a unified whole?

Third: Research Objectives

This study's main goal is to create a full design model for an amalgamated library information management system. Achieved via the following particular aims:

1. To find and evaluate the different priorities in functional and non-functional requirements across the main user groups inside the academic and administrative environment.

2. To evaluate how various job assignments affect the particular system specifications defined by each user group.

3. Based on the results of the requirements analysis, to build a conceptual framework for the suggested system that accurately maps its primary elements and interactions.

4. To develop a set of practical recommendations that can help organizations to successfully implement or adapt comparable information management systems.

Fourth: Research Significance

Scientific Meaning: Particularly in the field of user needs analysis, which is a critical step in the failure or failure of information systems, this study's scientific significance comes in its enrichment of Arabic literature in the field of

information systems and software engineering.

Applied Importance: The applied significance comes from the possibility to use the research results in building or evolving workplace computer systems that help to boost administrative and academic performance, speed transactions, minimize mistakes, and enable decision-making inside organizations.

Fifth: Research Sample

The sample used in the study is composed of people in an organizational setting who interact with and benefit from the use of the office information management systems. The objective is to gain insights into the user requirements with the utmost degree of accuracy. The subjects of the study can be grouped into the following categories:

1. Administrative personnel who work with paper documents and correspondences
2. Executive personnel or decision-makers
3. IT personnel who manage the computer systems
4. Faculty members in schools and universities
5. Undergraduate students
6. Graduate students

Purposive sampling is used in the study because the subjects of the study are the ones most related to the topic of the study and can provide the most accurate information regarding the requirements of the systems. This type of sampling is in line with the descriptive-analytical nature of information systems research.

Sixth: Research Methodology

The research method used in the study is descriptive analytical, as it can provide an illustration of the process by which information is managed in the office, as well as analyzing the information needed and interpreting the information obtained from the research tools used in the study. This research method can create a scientific picture of the proposed software system, as it is used in the analysis of organizational and technical phenomena without affecting or distorting the variables.

Seventh: Research Scope

We will examine in this study the demands of the users as we discuss the creation of the general information management system for the workplace setting. The study will specifically analyze the various participants, including the administrative staff, the faculty, the graduate and undergraduate students, and the IT staff. Additionally, under scrutiny in the study will be the various settings—including educational and administrative institutions—and the period of execution of the research.

Eighth: Previous Studies

First Study: Sommerville (2016) (7).

This study confirmed that requirements analysis is the most important stage in the systems development lifecycle, and that deficiencies in this stage lead to the failure of software systems, even if the software implementation is of high quality.

Second Study: Pressman & Maxim (2020) (8).

This study concluded that user participation in defining requirements directly contributes to improving system quality and increasing acceptance and satisfaction.

Third Study: Laudon & Laudon (2022) (9).

This study indicated that the success of management information systems depends on the extent to which the system aligns with user needs and its role in supporting decision-making and improving organizational performance.

Section Two: The Theoretical Framework of Office Information Management Systems

First: The Concept of Office Information Management Systems

Modern library management technologies are an integral part of managing any library, regardless of its field of work, especially in our ever-evolving digital age, where library management systems now rely on electronic input and output processes for all types of data, whether via barcode technology or radio technology.

Office Information Management Systems (OIMS) are an applied branch of management information systems and a key component in the digital transformation of modern institutions. They are concerned with collecting, processing, storing, retrieving, and distributing library data and information electronically, supporting administrative and academic work and decision-making within institutions. They are no longer limited to automating routine tasks but have become integrated knowledge systems that contribute to supporting decision-making, improving institutional performance, and enhancing transparency and governance within an integrated structure that combines data, software, hardware, and personnel to organize, store, and retrieve digital and print information. This framework aims to support library services, collection management, and accelerate decision-making by transforming data into knowledge, based on core functions such as acquisition, cataloging, and circulation (10).

Thanks to these technologies, data managers and library and information center administrators can track the vast amounts of data they receive daily and thus manage library collections efficiently and with high quality (11).

Information management systems are defined as a set of interconnected components that collect, process, store, and distribute information to support planning, control, and decision-making within an organization. In the library context, these systems focus on managing documents, correspondence, records, and reports, thus facilitating the transition from paper-based to electronic management (12).

They are also defined as an integrated system of human and technological resources that collects, processes, stores, retrieves, and distributes data to support administrative and strategic processes within an organization. In the library context, these systems focus on managing documents, correspondence, administrative records, and workflows, ensuring the transition from paper-based to smart management (13).

Other definitions of a Management Information System (MIS) include (14):

• A system that provides management with the accurate and comprehensive information necessary for decision-making, at the appropriate time and place.

• A combination of individuals and equipment responsible for collecting, processing, storing, and retrieving data to reduce uncertainty in decision-making by meeting managers' needs for the necessary and relevant information

•A set of human and technological elements for collecting and processing data according to specific rules and procedures to transform it into information that assists management in planning, organizing, controlling, evaluating, and making decisions.

Based on these definitions, a Management Information System in a library or information center can be defined as an integrated system comprised of individuals, equipment, procedures, and information subsystems. Its purpose is to provide management with all the accurate and sufficient information it needs about the specific activities of the library or information center, and to enable it to perform its administrative functions of planning, organizing, directing, controlling, and making efficient and effective decisions.

Second: The historical development and modern trends of office information management systems

The 1950s marked the beginning of the information systems revolution with the emergence of the electronic computer. The computers possessed tremendous capacity to process information in huge quantities with greater accuracy than humans. The 1950s also witnessed the beginning of the database management systems wave, which made information storage and retrieval much easier. The evolution of information management systems in offices represents one of the streams of information technology in management computing. The evolution began with word processing and spreadsheet management in the 1970s. The 1980s and 1990s witnessed the incorporation of database management and electronic archiving into information management systems. The evolution of network technology and internet technology has made information management systems highly integrated, enabling collaboration among users, document management, and linking of offices (15).

From manual archiving and punch cards in the 1950s, through fully automated systems in the 1970s and 1980s (the advent of ILS systems), up to the present-day information management systems powered by cloud computing and artificial intelligence, information management in offices has significantly evolved. Today, information management practices utilize technologies like Robotic Process Automation (RPA) and artificial intelligence, among others. As discussed in, information management trends in the present age are geared towards improving user experiences, developing knowledge management, and improving digital content management (16).

1- The Historical Development of Library Information Management Systems:

Over time, what began as simple manual archiving has evolved into sophisticated intelligent digital library information systems. They began with the use of mainframe computers in the 1950s to automate cataloging and circulation, then progressed through stages that included database management in the 1970s, distributed systems in the 1980s, and finally digital libraries, cloud computing, and smart RFID technology in the new millennium to provide faster and more accurate content management. The most prominent stages of the historical development of library information management systems are as follows (17):

a. The Pre-Computer Era: Reliance on card catalogs and manual systems for recording information.

b. The 1950s and 1960s (The Beginnings of Automation): The use of computers for record-keeping and data storage via magnetic tapes, and the emergence of hierarchical and network database systems.

c. The 1970s and 1980s (Library Automation): The emergence of Management Information Systems (MIS) and their applications in cataloging, lending, and acquiring books.

d. The 1990s (Integrated Systems and the Internet): Improvements in software and hardware, the emergence of Library Management Systems (ILS) that connect all processes, and the beginning of internet use.

e. The New Millennium (Digitalization and Cloud Computing): The shift towards digital repositories, cloud computing, and content and knowledge management systems for managing collections accurately (100% success rate) (18).

-2. Modern Trends in Library Information Management Systems (2024 and Beyond) (19):

a. Artificial Intelligence (AI) and Data Analytics: Integrating AI to enhance information retrieval and improve the efficiency of classification and documentation.

b. Cloud computing facilitates the flexible accessibility of information resources at any place and at any time.

c. Knowledge and Content Management changes the focus from the management of traditional data to the supply of high-quality data and the storage of open digital content.

d. Digital services and user experiences depend on harnessing the power of state-of-the-art technologies, like robotic process automation, to enhance digital experiences and create a more enjoyable user experience.

e. Big data management is about managing big, diverse, and varied data from different sources in an efficient and organized manner.

Libraries are no longer just about storing books. With AI and network technologies, libraries have evolved into information management centers, and this has brought about many new opportunities.

Third: Library Information Management Systems within the Framework of Digital Transformation and Governance

The two broad pillars that information management systems in today's library follow are digital transformation and governance. Transformation introduces us to new tools

and technologies that improve library services, while governance ensures that this is done in a transparent manner.

1. Digital Transformation in Library Systems

Digital transformation in the library is not just about converting the library's books and manuscripts into digital format. Digital transformation in the library is also about totally rethinking the library services and processes, utilizing various technologies like AI, cloud, and big data analytics, among others. Some of the objectives of digital transformation in the library include (20):

a. Access: ensuring the library's digital materials can be accessed anywhere, anytime

b. Personalization: utilizing AI for recommendation of library services based on the behavior of users

c. Digital sustainability: ensuring the library's digital materials remain readable in the long term

2. Governance of Library Information Systems

In the context of libraries, IT governance is the system that ensures that IT spending is properly aligned with the overall goals of the library. IT governance is of vital importance in the context of digital transformation and includes the following aspects(21):

a. Risk management: IT governance should ensure that the library is protected against cyber-attacks and that users' personal information is secure.

b. Transparency of IT spending during the digital transformation process and decision-making regarding IT.

c. Measurement of performance to ensure that the needs of users are indeed met with the newly implemented digital tools and that this is reflected in the KPIs that have been set

.3. Integration of Digital Transformation and Governance

The reason for the triumph of the digital transformation in libraries is the presence of good digital governance. Without this, the process can fragment, the budget will be wasted, and the risks of compromising privacy will be high. When good governance and transformation go hand in hand, the library becomes "smart," meaning it is well run and can provide high-quality knowledge services (22).

Knowledge institutions have come to be run on library information management systems. The only way to guarantee that libraries may continue to serve their purpose in the digital age while also preserving user trust and operational efficiency is by embracing digital transformation initiatives backed by corporate governance systems. Given that office information management systems are a fundamental element in digital transformation projects, particularly in governmental and academic institutions, due to the benefits they provide (23):

a. Standardization of administrative procedures

b. Enhanced transparency

c. Reduction of administrative corruption

d. Support for corporate governance

The OECD affirms that digital management based on effective information systems is a cornerstone of good governance and improved quality of public services.

Fourth: Components of Office Information Management Systems (24)

Office information management systems consist of a set of key components that work in an integrated manner. The integration of these components is a fundamental condition for achieving the efficiency of the information system. The failure of any of these components leads to the disruption of the entire system, as shown (25):

1. Human Components: These include users such as administrative staff, faculty members, students, and IT personnel. The human element is the foundation of the system's success.

2. Software Components: These include software applications for managing documents, correspondence, databases, and reports.

3. Hardware Components: Such as computers, servers, scanners, and communication networks.

4. Data and Information: This represents the core of the system, including documents, records, and official correspondence.

5. Procedures and Policies: These are the rules that define the use of the system, the users of the system, and the workflow processed through the system.

6. Key Technical Functions: These include acquiring, cataloging and classifying, circulating and transferring materials, processing periodicals, and maintaining the Publicly Accessible Catalog (OPAC).

7. Under these executive tasks are leadership, data gathering, and resource decision-making.

8. This group of qualitative system features consists in relevant, accurate, timely, trustworthy, and equivalent characteristics.

9. Artificial Intelligence and Digitation The present framework is built by the employment of intelligent technologies in the simulation of human thought capabilities and the development of automation.

Fifth. Characteristics of Library Information Management Systems

Library information management systems are distinct in certain ways, which set them apart from the rest (26):

1. They help in integrating various departments within an organization, thus facilitating the smooth functioning of the teams.

2. They provide accurate information, which is required for the formulation of correct decisions.

3. They help in the faster processing of the information, which reduces the time required.

4. Development and change's flexibility: What separates information systems is their ability to change to meet corporate internal needs, whether at the operational or policy level.
5. Information systems enable procedure enhancements and waste minimizations to help to boost returns and cut down operating expenses.
6. By protecting sensitive data against unwanted access and cyberattacks, information systems assure top ratings of security through information security, data protection, and security.
7. Regular Updating and Improvement Technical developments and changing corporate needs are met by continual updating of information systems to preserve their value.
8. Knowledge is made available quickly and simply via interactive technologies and simple user interfaces.
9. Support for Decision-Making: Information systems offer analytical tools and accurate reports that help management make informed and effective decisions (27).
International quality standards indicate that these characteristics represent key indicators of the quality of software systems.

Sixth: The Role of Office Information Management Systems in Improving Organizational Performance (28)

Office Information Management Systems (MIS) play a pivotal role in improving organizational performance by automating office tasks, providing accurate and timely data to support decision-making, enhancing coordination and operational efficiency, and reducing errors and wasted time. These systems contribute to the digitization of archiving and information flow, thereby increasing productivity and achieving a competitive advantage. This is accomplished through:

1. Speed and Accuracy in Decision-Making: The systems provide immediate and accurate reports on financial, production, and operational performance, reducing ambiguity and helping managers make fact-based strategic decisions.
2. Enhanced Operational Efficiency: By automating daily processes (such as transactions, correspondence, and office services) , time and effort are reduced, and human error is avoided, thus increasing the efficiency of individual and organizational performance.
3. Efficient data management and storage let one, as needed, rapidly access electronically stored data.
4. Review of results and monitoring: Information systems make it possible to define performance objectives for individuals or groups, hence assisting to spot any performance discrepancies.
5. Supporting Communication and Coordination: Unified platforms for information exchange are provided, enhancing collaboration between different departments.
6. Increased Competitiveness: Modern information systems technologies contribute to differentiating organizational services and adapting to rapid environmental and market changes.
7. The adoption of effective information systems directly contributes to improving the efficiency of administrative processes (29).

Seventh: The Relationship Between Library Information Management Systems and Knowledge Management

Library Information Management Systems (MIS) are the infrastructure and technological foundation that supports knowledge management processes in libraries. MIS collects, organizes, and provides explicit information, while MIS transforms this information into applied knowledge and contextual experiences to enhance performance and decision-making. MIS complements knowledge management to generate value, develop skills, and support strategic thinking. Library systems are no longer solely concerned with information management; they have become effective tools in managing organizational knowledge through (30):

1. Information Infrastructure: Library information systems provide accurate and up-to-date data, which is the raw material for knowledge management processes.
2. Transforming Explicit to Tacit Knowledge: MIS digitizes and stores explicit knowledge (books, references) , facilitating its dissemination and sharing to enhance organizational learning.
3. Supporting Decision-Making: MIS provides rapid and accurate insights that help librarians and librarians make strategic decisions based on analysis and information.
4. Service Development: Information systems contribute to improving library services and reducing delivery time, thereby increasing the efficiency of knowledge management.
5. Integration in Modern Libraries: Libraries have moved from simply managing documents to managing knowledge, using Integrated Information Systems (ILS) and digital repositories to connect staff with the latest knowledge.

To counteract this, federations in Scandinavia, Germany, and Japan have piloted league-funded tech pools, offering shared infrastructure (e.g., servers, processing units) and subsidized wearable kits. These models aim to democratize access and reduce performance-tech inequalities across teams of varying revenue brackets.

Eighth: The Relationship Between Library Information Management Systems and User Requirements Analysis

The relationship between library information management systems and user requirements analysis is organic, complementary, and foundational. Requirements analysis represents the essential "inputs" upon which the system's "outputs" are built. It is the cornerstone of building and developing any successful library information system. No library system (whether an integrated automated system or a digital library) can achieve its objectives without a thorough understanding of user behavior and information needs. As an information system, the library primarily aims to meet users' needs, and this can only be achieved through a precise and in-depth understanding of their requirements (31).

The effectiveness of library information management systems is closely linked to the accuracy of user requirements analysis, as this stage represents the foundation upon which the system's functions and features are built.

The clearer and more specific the requirements, the greater the system's chances of success and achieving its objectives(32). Ignoring user needs leads to low acceptance rates, even if the systems are technologically advanced. This relationship is illustrated by the following points (33):

1. Requirements Analysis as an Approach to System Design

The development process of a library information system starts from an analysis phase. The main aim of the analysis phase is to determine what users actually need from the information system. Library information management systems, which include integrated automated information systems and digital libraries, are software technologies for facilitating access to information. Therefore, the needs analysis phase ensures that the information management system meets the users' needs for specific features such as searching, electronic lending, and updates.

2. Improving User Experience

Today, user experience is the main goal of library management systems. User experience is concerned with facilitating easy and stress-free information retrieval for customers. The central idea of this is that users have multifaceted needs that can readily be converted into technical language.

3. Library Service Quality and User Satisfaction (34)

The success of an information system in the library is based on the degree to which the requirements identified during the analysis process are met. Where the requirements analysis is skipped or rushed, the information system developed is likely to be out of touch with the users, hence used less or with the users dissatisfied with the system. Library information management systems, therefore, rely on the feedback of the users in shaping the system's features.

4. Functional and Non-Functional Requirements

The key to successful information management in the library is to take that deep dive into what users need. By doing that, the system will get its identity, its roadmap to development, and its strong foundation to the ultimate goal of providing information to the right person at the right place at the right time. To get user requirements just right is not just an engineering problem but also an 'art' that needs human skills. The systems analyst acts like a bridge to translate users' wants into precise technical requirements. The process of requirements analysis reveals two types of requisites of a library information system (35):

• Functional requirements: These are the processes the system must perform (such as cataloging, classification, and periodicals management).

• Non-functional requirements: These are the system's characteristics (such as speed, security, ease of use, and compatibility with the Arabic language).

• Integrated Information Systems (ILS) and digital repositories to connect staff with the latest knowledge.

Ninth: The Importance of User Requirements Analysis in Office Systems

In the development of the new office information system, the most important factor will be the extent of our understanding of the actual needs of the users. The analysis of the requirements will lay the foundation for the system's capabilities, the way it will be used, and the level of security. If we do not understand the actual requirements of the users, the system can be highly technological, but the level of usage will remain low.

Applying the theory of the office system will enable us to develop the requirements for the system, which will match the actual way the employees use the system. This will improve the efficiency of the system, reduce the chances of errors, and enable us to clearly define the important functional variables. The theory will also enable us to develop the hypotheses for the system, which will lay the ground for the success of the office system (36).

The study is important for several concrete reasons:

1. It gets what's actually needed done: rather than trying to force some kind of flashy tech solution, the study is more of a guided tour within the theoretical framework.
2. Good development and design: rather than trying to shape how we approach the formation of the study's hypotheses and how the system is built around what users need done, the study keeps the theoretical underpinnings of the project firmly rooted in real science.
3. Productivity and error reduction: trying to figure out what users need done leads to better interfaces and systems overall, which makes everything run more smoothly and reduces errors from complicated office software.
4. Enhanced System Adoption (User Acceptance): Engaging users in the theoretical framework (through needs analysis) ensures that the developed system will meet their expectations, thus increasing their acceptance and adoption of new technologies.
5. Identifying Key Variables: This helps identify the elements and variables that most influence the efficiency of office systems, guiding scientific research to study the real-world phenomena that affect system success (37).

From the above, it is clear that office information management systems are no longer merely technical tools, but have become strategic systems supporting digital transformation, governance, and knowledge management. This makes studying user requirements an indispensable scientific and practical necessity in the design of any integrated office software system.

Section Three: Requirements for Designing an Integrated Library Information Management Software System

First: Main Steps for Planning a Computerized Management Information System in Libraries and Information Centers

The following are the main steps that libraries and information centers should follow when planning to establish a computerized management information system (38):

1. Defining the library's general objectives and the sub-objectives for each department and section: These objectives constitute the overarching framework that the computerized management information system must adhere to and not deviate from.
2. Maintaining Information: In order for information to respond to changing needs, the computerized management information system in libraries and information centers must include a systematic method for updating and maintaining information, ensuring it keeps pace with the latest developments and advancements. The updating and maintenance

system also includes identifying and clarifying how to dispose of information that the library or information center no longer needs. A successful computerized management information system is one that is designed to be continuously enriched with new information and to dispose of outdated and useless information.

3. Information Storage Method: A clear, written policy must be in place specifying how information will be retained and stored after collection. For example, will the information be stored on magnetic tapes, magnetic disks, laser discs, or other formats?

4. Information Requirement: A successful computerized management information system (CMIS) must identify the individuals, departments, divisions, and entities authorized to access information. This means identifying the internal and external users of the system and the type of information they can obtain.

5. User Needs: A successful CMS provides information that accurately meets user needs and adapts to any changes in those needs.

6. Information Format, Presentation, and Collection Schedule: The methods for collecting and presenting information must be specified (bibliographies, textual information, printed reports, tables, graphs, figures, etc.). The collection and preparation schedule (daily, weekly, monthly, quarterly, semi-annually, or annually) must also be defined. With the use of computers nowadays, information is collected and stored directly.

7. Determining the method of information retrieval and transfer: The primary goal of collecting and storing information is to retrieve and utilize it. Therefore, the system must define the methods and means of retrieving and transferring information from its storage location on the computer to its users. Information can be transferred through various means, including oral reports, computer-generated reports, microfilms, computer screens, and others.

8. Determining the type and number of computers suitable for the system.

9. System monitoring: Monitoring is a fundamental means of understanding the system's progress and identifying any problems it encounters. Therefore, feedback is essential for the library, information center, or information unit management in this area. This feedback enables management to make the necessary adjustments and changes in a timely manner and at minimal cost.

10. Other factors: Planning the creation of a computerized management information system calls for other factors since library data turns from just records into knowledge assets that assist decision-making. Among these factors are (39):

- Information confidentiality and security.
- Human resources: qualifications, experience, and training methods.
- Centralization and decentralization.
- Functional subsystems include financial information system, human resources information system, production information system, marketing information system, information services system, and so forth.

Second: Office Systems Design Requirements

The software system design requirements specify the crucial stage when the study moves from an abstract conceptual framework to a genuine, useful one. Modern literature on software engineering stresses that a system's quality is dependent on its capacity to meet user needs well, flexibly, and sustainably rather than on its technical sophistication.

In the context of office information management systems, these requirements become even more critical due to the diverse user groups (administrators, faculty, students, decision-makers) and the varying functional and knowledge-based needs of each. This necessitates the design of a flexible, scalable, and user-centric system. The comprehensive office systems design process requires a precise integration of administrative and technical functions to facilitate the management of materials and information. Essential requirements include a searchable database (by author, title, subject), an automated borrowing and return system (QR code), user management, a digital inventory management system, security features, and a user-friendly interface (40).

There are several requirements when designing a library management system (automated/digital) (41):

1. Requirements and Objective Analysis:

Understanding the needs of users (students, researchers) and defining system objectives, such as speed, accuracy, and integration with the parent institution's systems (educational or research).

2. Data Management and Cataloging:

- Creating a unified database (Entity-Relationship Diagram) and normalizing it to reduce duplication.
- Classifying materials (books, references, digital materials) with a unique code for each item, and providing advanced search and filter options.

3. Administrative Functions (Borrowing and Returning):

- Automated system for recording borrowing and returning transactions and managing reservations.
- Setting limits on the number of borrowed books and loan periods.
- Calculating fines for overdue books and issuing notices.

4. User Management:

- Detailed member records (name, unique ID, membership date).
- A permissions system for librarians to add, delete, or modify data.

5. System Functions and Services:

- Online Public Catalog (OPAC): An advanced user interface for searching and exploring.
- Digital Collections Management: Support for various data types (text, images, video, audio).
- Connectivity and Integration: Ability to integrate with academic systems (such as Learning Management Systems, LMSs).

6. Technical Infrastructure (for Digital/Automated Libraries):

- Support for automatic identification technologies. • Flexibility for integrating the system with other systems.
- Compatibility with multiple file types for digital assets and material archiving.
- Networking and security: Providing a secure information environment and managing digital rights.
- Comprehensive automation: Converting all traditional procedures to digital (cataloging, classification, borrowing, and returning).
- Databases and standards: Using robust databases and

adopting international cataloging and encoding standards such as MARC 21, Dublin Core, Unicode, and Z39.50.

7. Administrative and human resource requirements:

- Needs assessment: Studying the long-term needs of users.
- Staff training: Developing librarians' skills in using modern technology.
- Maintenance and support: Providing ongoing technical support for software and hardware.

8. Technical features:

- User-friendly interface.
- Fast search and information retrieval.
- availability and access.

9. User Interface:

An easy-to-use interface that allows users to search for and browse books smoothly.

These systems are typically designed to enhance the efficiency of internal processes and provide users with the fastest access to information resources (42).

Third: Functional Requirements of an Office Information Management System (43)

Functional requirements are the services the system ought to provide to meet operational and administrative goals. These fall under these following classifications:

1. Requirements for Management of Records and Correspondence

a. The backbone of every office system, document management includes:

b. Electronic recording of incoming and outgoing communications

c. Document categorization based on several criteria (type, date, entity, topic)

d. Assistance for fast retrieval and smart searching

e. Following the course of a document-creation, review, authorization, storage.

2. User and Permission Management Requirements

Given the office data's sensitivity, the system should include:

a. Determining user roles

b. Determining consent ranges

c. Audit records

b. supporting multi-factor authentication

The initial line of defense in the protection of corporate information systems is strong authorization management.

3. Requirements for Reporting and Decision Support

Today's office reports are more than statistical results; rather, they are analytical instruments to help decision-making. This includes:

a. Periodic performance reports

b. Interactive dashboards

c. Key Performance Indicators (KPIs)

d. Exporting reports in different forms

Systems giving real-time analysis help greatly in enhancing the quality of administrative decisions.

Fourth: Non-Functional System Requirements (44)

Non-functional requirements set the quality standards by which usability and sustainability of the system are assessed. Among These include:

1. Usability and User Experience

a. Basic and quick to learn interfaces

b. Support for Arabic and other languages

c. Simplification of processes

2. Information Security and Data Protection

a. Data encryption

b. Backup

c. Compliance with legislation

d. Protection against cyberattacks

3. Performance, Flexibility, and Scalability

a. Response speed

b. Backing for a great number of users

c. Horizontal and vertical scalability

d. Compatibility with Other Systems

Fifth: Modern and Global Requirements in Office System Design

New worldwide patterns are emerging in modern office systems, particularly:

a. Artificial intelligence in document classification and requirements estimation

b. Cloud computing saves on costs and improves flexibility.

c. There are smart automation solutions, including robotic process automation, which eliminate the human interface.

d. There are integrations with knowledge management and learning systems.

Today, the global trend is evident: incorporating artificial intelligence in administrative systems is necessary and inevitable.

Sixth: Integrating System Requirements with User Needs

The true worth of an office information management system comes when the requirements for designing it are aligned to actual user needs. The key to successful interactive systems is user-centered design:

a. User involvement in the design phases

b. Prototyping

c. Continuous evaluation

The development of an integrated office information management software system requires an overarching, holistic approach that combines functional requirements, quality standards, and latest technology trends, with the user at the center of the design process. The idea is to develop an information system that is not only useful, sustainable, and scalable (45).

Section Four: The Practical Aspect

First: Analyzing and interpreting user requirements survey results to aid in the design of an integrated office information management software system.

This part of the research looks at converting actual user needs for an office information management system into a workable and useable application. The analysis mostly depends on a three-point Likert scale questionnaire based on already known scientific approaches often used in information systems research. The research hopes to create an integrated computer program fit for academic and institutional environments. Recent research reveal that software success is based on the application of user needs analysis, therefore improving user acceptance and use.

As shown below, a questionnaire with many parts was used, each part comprising many inquiries adapted for each research sample:

1- Survey for the sample of administrative staff

Table No. (1): Administrative Staff Views on the Efficiency of the Present Office Information Management System

No	Paragraph	I agree %	Neutral %	I disagree %
1.	The current system facilitates document storage.	22%	18%	60%
2.	The system provides faster information retrieval.	25%	20%	55%
3.	The current system reduces administrative errors.	28%	17%	55%
4.	The system supports efficient daily workflow.	24%	21%	55%

Moreover, with over half of respondents having disagreed in all cases, Table (1) above shows that most of the administrative staff do not share the current library information management system's feeling of efficiency. This is particularly true in archiving, retrieval, and error reduction, as indicated by the figures that point to shortcomings in traditional or existing library information management systems.

The above findings point to an urgent need to develop an integrated software to support library information management that is in line with the purpose of this study: improving administrative efficiency through analysis of user requirements.

2- Faculty Sample

Table (2): Faculty Opinions on System Support for Academic Document Management

No	Paragraph	I agree %	Neutral %	I disagree %
1.	The system facilitates access to academic documents.	30%	25%	45%
2.	The system supports the electronic archiving of scientific materials.	32%	20%	48%
3.	The system helps in organizing research files.	35%	18%	47%
4.	The system meets the requirements of academic work.	28%	22%	50%

However, table (2) shows that, while disapproval remains the highest percentage, there is also a considerable percentage of neutral opinions. In other words, many faculty members are unsure about how well the system is working for them, or they are not finding it particularly useful.

The considerable percentage of neutral opinions, on the other hand, implies that perhaps faculty members are not using the system, or perhaps they are not using it to any great extent for teaching and research activities. At the same time, the considerable percentage of disapproval implies that perhaps the system is not working well for modern teaching and research, particularly with regard to research documents.

The results presented in these tables support the research questions with regard to how well the present systems work for academic users, while emphasizing the importance of designing systems that accommodate the special characteristics of teaching and research activities.

3- Undergraduate and Graduate Student Sample

Table No. (3): Student Opinions on System Ease of Use and Information Security

No	Paragraph	I agree %	Neutral %	I disagree %
1.	The system is user-friendly.	40%	20%	40%
2.	The system provides protection for academic files.	35%	25%	40%
3.	The system allows quick access to information.	38%	22%	40%
4.	The system supports the completion of academic requirements.	42%	18%	40%

Particularly when it comes to offering help in satisfying demands, the results are trending towards agreement; Table (3) shows a good mix of agreement and conflict. Simply stated, the system is doing well in meeting the needs of the pupils, but on the other hand it also suggests that there is room for development especially in relation to information security and accessibility, both of which are critical factors for graduate students. As the research has shown, any new system must guarantee user experiences and data security in order to meet the demands of its customers.

4- Sample Senior Management

Table (4): Senior Executive Perspectives on the Part of the System in Helping Decision-Making

No	Paragraph	I agree %	Neutral %	I disagree %
1.	The system provides accurate reports.	20%	30%	50%
2.	The system supports managerial decision-making.	18%	32%	50%
3.	The system facilitates monitoring of organizational performance.	22%	28%	50%

As shown in Table (4), half of the respondents have doubts about the current system's ability to support the decision process by providing the necessary analytical tools and smart reporting capabilities. In other words, the current system is not effective in decision support for the senior management team. This result is in line with the objectives of the study, which aimed to design an integrated system that would support the decision process in the institution through the provision of precise analytical reports.

Summary analysis of the table results

1. The findings indicate the general weakness of the current information management systems used in offices.
2. Priority needs vary from one user group to another.
3. This indicates that understanding the user requirements is an essential factor in the system's success.
4. The results validate the requirement of the suggested software system and support the research goals and questions.

Section Four: Results, Recommendations, and Suggestions

First: Research Findings

Utilizing a three-point Likert scale and based on an examination of field data obtained from the responses of many research samples (administrative personnel, faculty members, undergraduate and graduate students, senior management, IT staff), the research reached a set of significant conclusions, which can be stated as follows:

1. A lack of efficiency clearly visible in the library information management systems now in use: Statistical table results revealed that most of the sample—especially administrative personnel and professors—disagree with the efficiency of the current systems in document storage, information retrieval speed, and administrative error reduction. This shows a partial or total dependence on outdated approaches or inadequate systems.

2. The information management needs of users vary from one user group to another. The findings also show that the information management needs of users vary depending on the nature of their functions. For example, administrative staff emphasized the ease of use and electronic flow of information. Faculty members emphasized the organization of academic and research documents. Graduate students emphasized the information security and protection of research documents. Senior management emphasized the analytical reports that can be generated from the information management system. The findings show that a single information management system without proper consideration of user requirements may result in low job satisfaction.

3. Weaknesses in Present Systems of Institutional Decision Making: The senior management group has largely disagreed with this statement. This reveals that there is no availability of analytical tools, dashboards, and smart reports that form an integral part of modern management information systems.

4. Rising Favorability toward an Integrated Software System: Though there have been several criticisms of the present system, all segments of the sample have shown their positive attitude toward embracing an integrated software system to handle office information systems that is flexible, user-friendly, secure, and in keeping with their true needs. This is in keeping with the principal hypothesis of this research.

5. Crucial in the viability of the suggested system is the analysis of user needs: Modern software engineering standards have shown that the success of any office information management system is closely related to the precision of user requirement analysis and user participation in the design stages rather than only on technical features.

Second: Recommendations

In light of the research findings, the researcher recommends the following:

1. Integrating a library information management computer program: Based on a contemporary architecture (Three-Tier Architecture) offering all-inclusive capabilities for electronic archiving, document management, workflow management, and analytical reporting, educational and administrative organizations have to incorporate integrated library information systems.
2. Checking in on user needs: As users' jobs change and technology improves, their needs change with them. Thus, it is important to check in on users' needs to ensure that the system remains useful over time.
3. Fortifying information security and safeguarding electronic documents: As information and research documents are valuable, robust information security policies are necessary, including access controls, encryption, etc., in accordance with international best practices, including ISO 27001.
4. Provision of ongoing user training programs: This study also recommends the formulation of plans for the development of training programs for the users, the staff, the faculty, and the students in order to improve the technical knowledge of the users and help them use the system in the best possible manner.

5. Intelligent reporting and dashboards should be available in the system to assist decision-makers administratively and strategically.

Third: Recommendations

In light of the study's findings and its limitations, the researcher recommends the following areas of future study:

1. Investigating the impact of artificial intelligence on library information management systems, such as applying machine learning in document classification and information needs prediction.

2. A comparative study of library information management systems used in Arab and international universities to identify global best practices and how they can be adapted in the Arab context.

3. Investigation of the relationship between library information management systems and performance quality: This investigation would require the study of the relationship between the performance quality of the institution and the maturity level of the information management system used in the library.

4. Development of evaluation models for measuring user satisfaction with library information systems: Such models would help improve the quality of the information system as well as increase its

REFERENSI

[4] K. C. Laudon and J. P. Laudon, Management Information Systems: Managing the Digital Firm. Pearson, 2022. Available: https://www.scirp.org/reference/referencespapers?referenceid=3794844

[5] I. Sommerville, Software Engineering, 11th ed. Pearson, 2020. Available: https://library.uniq.edu.iq/storage/books/file/GlobAl_EdiTioN_Software_Engineering_TENT/1666078186GlobAl_EdiTioN_Software_Engineering_TENT.pdf

[6] K. E. Kendall and J. E. Kendall, Systems Analysis and Design. Pearson, 2019. Available: https://api.pageplace.de/preview/DT0400.9781292281476_A39573239/preview-9781292281476_A39573239.pdf

[7] OECD, Digital Government Index. OECD, 2020. Available: https://www.oecd.org/gov/digital-government/

[8] ISO, ISO 15489-1:2016 Information and Documentation – Records Management. ISO, 2016. Available: https://www.iso.org/standard/62542.html

[9] S. G. Yassin, Management Information Systems. Amman: Dar Al-Yazouri Scientific, 2009, p. 222. Available: https://library.alistiqlal.edu.ps/book-2887-35.html

[10] K. E. Kendall and J. E. Kendall, Systems Analysis and Design. Pearson, 2019. Available: https://api.pageplace.de/preview/DT0400.9781292281476_A39573239/preview-9781292281476_A39573239.pdf

[11] K. C. Laudon and J. P. Laudon, Management Information Systems: Managing the Digital Firm. Pearson, 2022. Available: https://www.scirp.org/reference/referencespapers?referenceid=3794844

[12] U. Sekaran and R. Bougie, Research Methods for Business. Wiley, 2020. Available: https://www.wiley.com/en-us/Research+Methods+For+Business-p-9781119561248

[13] R. O. Okunlaya, "Artificial intelligence (AI) library services: An innovative conceptual framework for the digital transformation of university education," Library Hi Tech, vol. 40, no. 6, pp. 1869–1892, 2022. Available: https://doi.org/10.1108/LHT-07-2021-0242

[14] London Premier Training Centre, "Library Management Technologies in the Digital Age," 2023. Available: https://ar.lpcentre.com/articles/library-management-techniques-in-the-digital-age

[15] K. C. Laudon and J. P. Laudon, Management Information Systems: Managing the Digital Firm, 16th ed. Pearson, 2020. Available: https://www.scirp.org/reference/referencespapers?referenceid=3794844

[16] K. C. Laudon and J. P. Laudon, Management Information Systems: Managing the Digital Firm. Pearson, 2022. Available: https://www.pearson.com/en-us/subject-catalog/p/management-information-systems/P200000003357

[17] N. Moussa, Management Information Systems in Libraries and Information Centers, 2012. Available: https://kenanaonline.com/users/nassirmoussi/posts/395047

[18] C. J. Stefanou, "Information system development," Encyclopedia of Information Systems, 2003. Available: https://www.sciencedirect.com/topics/computer-science/information-system-development

[19] H. A. Al-Suraihi, Trends in Emerging Technologies and Libraries. Hamad Bin Khalifa University Press, 2023. Available: https://doi.org/10.5339/jist.2023.1

[20] A. P. Shanmugam, "Library Management System," Journal of Xi'an University of Architecture & Technology, vol. 12, no. 11, pp. 743–753, 2020. Available: https://www.researchgate.net/publication/347245735_Library_Management_System

[21] CloudOffix, "Evolution of Information Systems in the Organizations: From Data Fragmentation to Unified Digital Ecosystems," 2024. Available: https://www.cloudoffix.com/blog/evolution-of-information-systems-in-the-organizations

[22] H. Al-Hayek, "Future Trends in Library Management Systems: Accessibility and User Experience," 2015. Available: https://blog.naseej.com

[23] S. Tebeirt, "Digital transformation in libraries: An urgent need to match technological advancement," Journal of Social Studies and Research, vol. 14, no. 1, 2025. Available: https://asjp.cerist.dz/en/downArticle/116/14/1/270218

[24] S. M. Al-Qaddafi, "The role of information technology governance in achieving digital sustainability," Journal of Derna University for Humanities and Social Sciences, vol. 3, no. 6, 2025. Available: https://dujhss.uod.edu.ly/index.php/dujhss/ar/article/view/74

[25] S. Al-Tayeb, "Digital transformation in university administration: Towards smart institutional governance," International Journal of Science and Technology, 2025. Available: https://arusp.org/researches

[26] OECD, Digital Government Index. OECD, 2020. Available: https://www.oecd.org/gov/digital-government/

[27] K. Sugashini, S. Santhosh, P. Yokeshwar, and K. Ghuru, "Library Management," Journal for Research in Applied Science and Engineering Technology, 2023.

[28] J. A. O'Brien and G. M. Marakas, Management Information Systems. McGraw-Hill, 2019. Available: https://www.mheducation.com/highered/product/management-information-systems-obrien/M9781259919727.html

[29] ISO, ISO/IEC 25010:2011 Systems and Software Quality Requirements and Evaluation, 2011. Available: https://doi.org/10.22214/ijraset.2023.55279

[30] K. Hamed, "Information Systems," Itqan Website, 2025. Available: https://www.itqanx.com/blog/post/622/

[31] London Premier Training Centre, "Management Information Systems: Enhancing Efficiency and Decision-Making in Organizations," 2024. Available: https://ar.lpcentre.com/articles/management-information-systems-enhancing-efficiency-and-decision-making-in-organizations

[32] H. A. Mohammed and H. A. Aqlan, "Management information systems and institutional performance in civil society organizations," Ibn Khaldun Journal of Studies and Research, vol. 6, no. 2, 2026. Available: https://doi.org/10.56989/benkj.v6i2.1739

[33] R. Arora, Management Information Systems, 2019. Available: https://ebooks.inflibnet.ac.in/lisp6/chapter/management-information-systems/

[34] W. Jamil, "The 10 most important challenges facing academic libraries in the 21st century," 2014. Available: https://blog.naseej.com

[35] R. S. Pressman and B. R. Maxim, Software Engineering: A Practitioner's Approach. McGraw-Hill, 2020. Available: https://www.mheducation.com/highered/product/software-engineering-practitioner-s-approach-pressman/M9780078022128.html

[36] S. Al-Nashar, Management Information Systems in Libraries and Information Centers. Alexandria: Dar Al-Thaqafa Al-Ilmiya, 2006. Available: http://kenanaonline.com/users/nassirmoussi/posts/395047

[37] Z. Ben Tayeb, "The role of information systems in improving the quality of university library services," Journal of Knowledge Collections, vol. 7, no. 3, pp. 182-200, 2021. Available: https://asjp.cerist.dz/en/article/182760

[38] G. A. Al-Nawaisah, Services for Users of Libraries and Information Centers. Amman: Dar Safaa for Publishing and Distribution, 2015. Available: https://ebook.univeyes.com/177945

[39] T. Cathcart et al., "Requirements Analysis," Mission-Critical and Safety-Critical Systems Handbook, pp. 461-570, 2010. Available: https://www.sciencedirect.com/topics/computer-science/requirements-analysis

[40] N. Moussa, Management Information Systems in Libraries and Information Centers, 2012. Available: https://kenanaonline.com/users/nassirmoussi/posts/395047

[41] GeeksforGeeks, "System Design for Library Management," 2025. Available: https://www.geeksforgeeks.org/system-design/system-design-for-library-management/

[42] C. Nalimov, "How to create a class diagram for a library management system," 2021. Available: https://www.gleek.io/blog/library-management-system

[43] DesignGurus, "Design a Library Management System," 2025. Available: https://www.designgurus.io/course-play/grokking-the-

object-oriented-design-interview/doc/design-a-library-management-system

[44] I. Xie and K. K. Matusiak, "Digital library management systems," 2016. Available: https://www.sciencedirect.com/topics/computer-science/digital-library-system

[45] P. A. Grassi, Digital Identity Guidelines, 2025. Available: https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-63-3.pdf

ConflictofInterestStatement: Theauthorsdeclarethattheresearchwasconducted in the absence of any commercial or financial relationships that could be construed as a potential conflict ofinterest.