

# LIS212

## INTRODUCTION TO ICT IN LIBRARY AND INFORMATION SERVICES



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# LIS212 Introduction to ICT in Library and Information Services (2 Units)

## Series 1 Foundations of ICT in Library Services

### Series outline

- **Part 1: Basic Concepts of Information and Communication Technology**
  - Sub-Part 1.1: Definition of Information
  - Sub-Part 1.2: Definition of Communication
  - Sub-Part 1.3: Definition of Technology
  - Sub-Part 1.4: Definition of Information and Communication Technology (ICT)
- **Part 2: ICT in Library and Information Services**
  - Sub-Part 2.1: Role of ICT in Libraries
  - Sub-Part 2.2: ICT in Technical Services
  - Sub-Part 2.3: ICT in Readers' Services
- **Part 3: ICT as a Foundation for Modern Library Practices**
  - Sub-Part 3.1: ICT and Information Seeking in Electronic Environments
  - Sub-Part 3.2: ICT as a Basis for Database Use
  - Sub-Part 3.3: ICT as a Gateway to Internet Resources

### Introduction

Libraries have always been central to the preservation and dissemination of knowledge. In the past, they relied heavily on manual systems of cataloguing, indexing, and information retrieval. Today, however, the integration of **Information and Communication Technology (ICT)** has transformed how libraries operate, making information more accessible, efficient, and dynamic. This Series introduces you to the foundational concepts of ICT and its relevance to library services.

The aim of this Series is to equip you with a clear understanding of the basic concepts of ICT and to show how these concepts underpin modern library and information services.

We shall commence this Series by defining the basic concepts of information, communication, technology, and ICT. Next, we will explore how ICT is applied in library services, particularly in technical and readers' services. Finally, we will conclude by



examining ICT as a foundation for modern library practices, focusing on its role in electronic information seeking, database use, and Internet resources.

### Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 1.1** define the concepts of information, communication, technology, and ICT,
- **SLO 1.2** explain the role of ICT in library services, including technical and readers' services,
- **SLO 1.3** analyse how ICT supports information seeking in electronic environments,
- **SLO 1.4** demonstrate the relevance of ICT in database use and Internet resources.

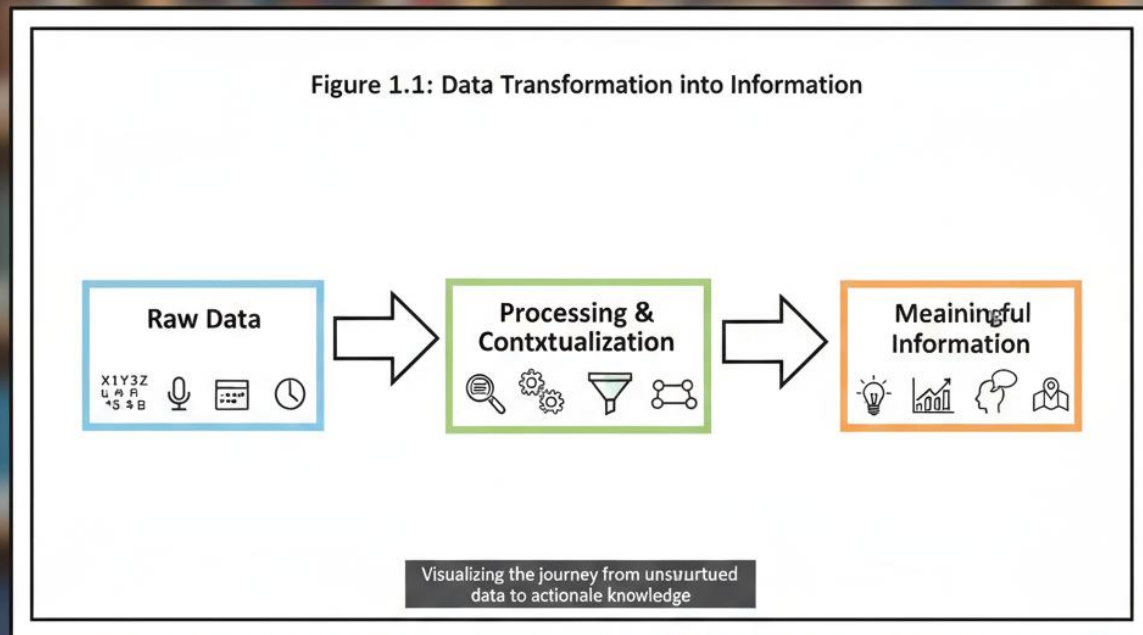
## 1.1 Basic Concepts of Information and Communication Technology

### 1.1.1 Definition of Information

**Information** refers to processed data that is meaningful and useful to the recipient. Unlike raw data, which may be unorganised and lacking context, information provides clarity, relevance, and value. For example, a list of numbers becomes information when it is organised to show student scores in an examination.

In libraries, information is the core resource that users seek. It can be stored in books, journals, databases, or digital repositories. Fill in the blank: Information is processed \_\_\_\_\_ that has meaning and value.



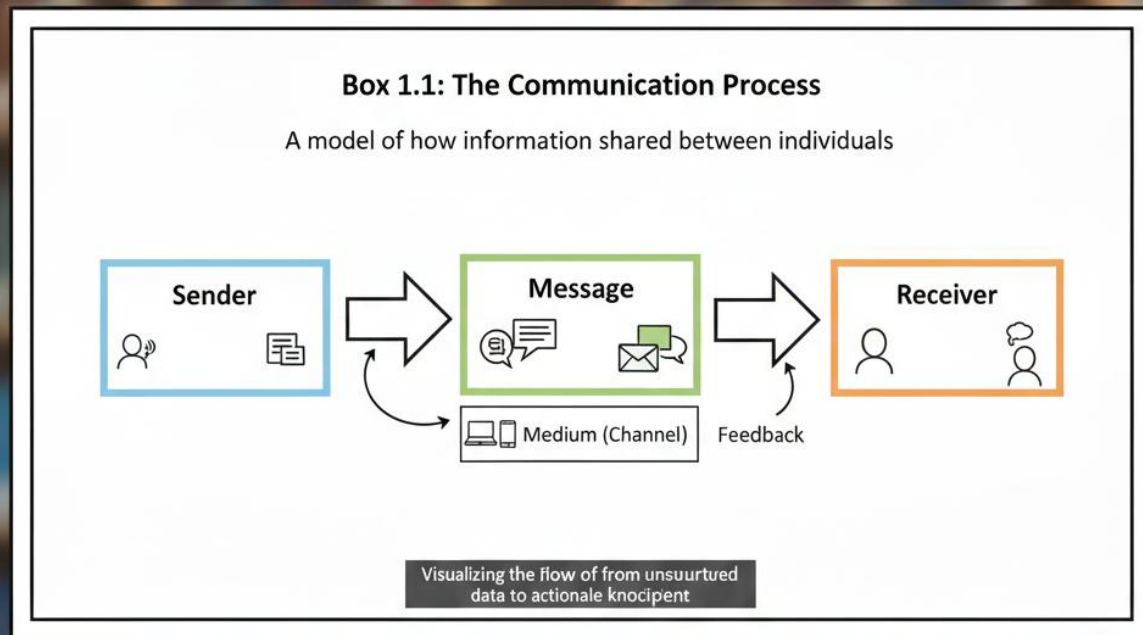


### 1.1.2 Definition of Communication

**Communication** is the process of transmitting information from one person or system to another. It involves a sender, a message, a medium, and a receiver. Effective communication ensures that the intended meaning is understood by the recipient.

In the context of libraries, communication occurs when librarians share information resources with users, or when users interact with library systems to retrieve information.





### 1.1.3 Definition of Technology

**Technology** refers to the application of scientific knowledge for practical purposes. It includes tools, machines, systems, and processes that help solve problems or improve efficiency.

In libraries, technology ranges from simple cataloguing tools to advanced digital systems that manage collections and facilitate access to information.

Fill in the blank: Technology is the application of \_\_\_\_\_ knowledge for practical purposes.

### 1.1.4 Definition of Information and Communication Technology (ICT)



**Information and Communication Technology (ICT)** is the integration of information technology and communication technology to process, store, retrieve, and transmit information. ICT encompasses hardware, software, networks, and digital platforms that enable efficient information management.

In libraries, ICT supports cataloguing, digital databases, online access, and communication between users and information centres. ICT is therefore the backbone of modern library services.

**Table 1.1 Comparison of Traditional and ICT-Enabled Library Processes**

Modernizing library operations with technology

| Process Aspect               | Traditional (Manual)                            | ICT-Enabled (Automated)                       |
|------------------------------|-------------------------------------------------|-----------------------------------------------|
| <b>Cataloguing</b>           | Manual entry on cards                           | Digital databases, metadata, MARC records     |
| <b>Circulation</b>           | Hand-stamping, physical ledgers                 | Barcode/RFID scanning, automated check-in/out |
| <b>User Access</b>           | Physical visits, limited hours                  | 24/7 online access, databases                 |
| <b>Information Retrieval</b> | Card catalogs, manual search                    | remote databases                              |
| <b>Information Retrieval</b> | Keyword search, online public catalogs (OPAC)   | Keyword, online access catalogs (OPAC)        |
| <b>Preservation</b>          | Electronic ordering, integrated library systems | Electronic ordering, systems                  |
| Physical archives, control   | Physical repotives, climate dignitization       | Digital cockup,                               |

**Enhancing efficiency and accesibility in modern libraries**

### Pilot questions 1.1

1. Information is processed \_\_\_\_\_ that has meaning and value.



2. The process of transmitting information from one person to another is called \_\_\_\_\_.
3. Technology is the application of \_\_\_\_\_ knowledge for practical purposes.
4. ICT integrates \_\_\_\_\_ and \_\_\_\_\_ to manage information.
5. In libraries, ICT supports cataloguing, databases, and \_\_\_\_\_ access.

## **1.2 ICT in Library and Information Services**

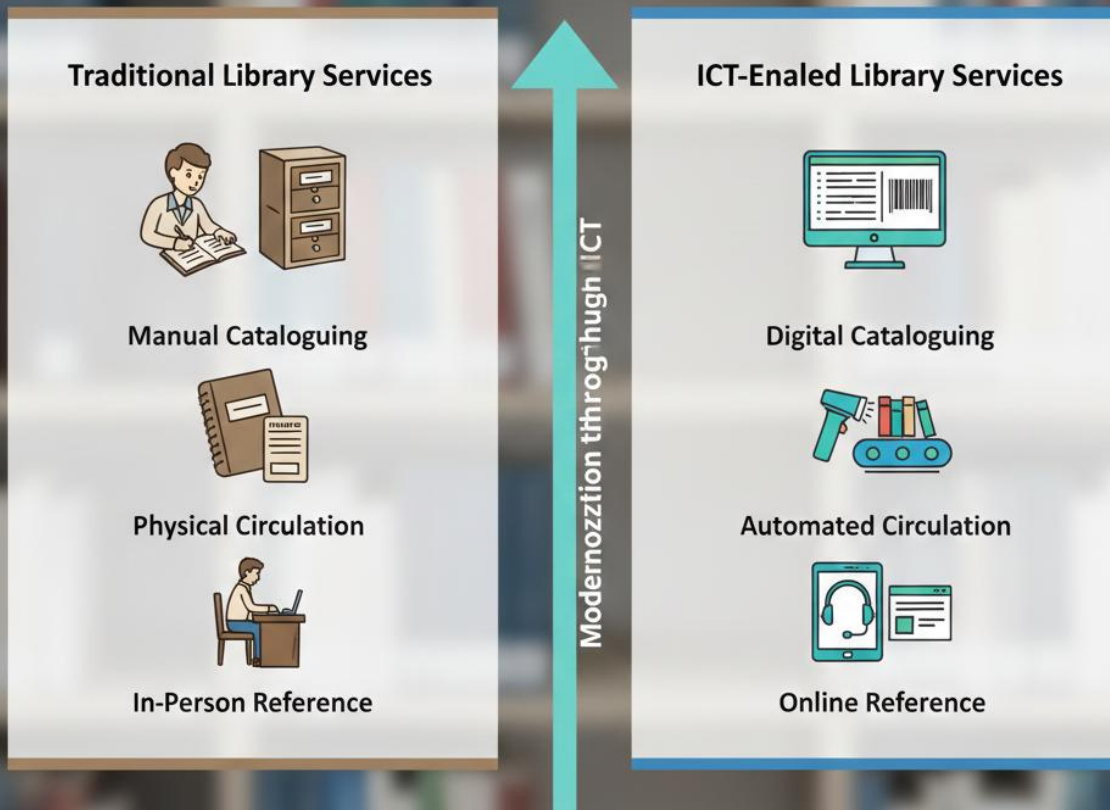
### **1.2.1 Role of ICT in Libraries**

**ICT in libraries** refers to the use of digital tools, systems, and networks to manage, store, and provide access to information resources. ICT enhances efficiency, reduces manual workload, and improves user satisfaction. For example, online catalogues allow users to search for books without physically browsing shelves.

Libraries that adopt ICT can provide faster services, remote access, and better resource sharing. Fill in the blank: ICT in libraries improves \_\_\_\_\_ efficiency and enhances user satisfaction.



**Figure 1.2:  
Traditional vs ICT-Enabled  
Library Services**



Visualizing the evolution of library services  
with information and communication technology

### 1.2.2 ICT in Technical Services

**Technical services** in libraries involve activities such as cataloguing, classification, and acquisition of materials. ICT supports these processes by automating cataloguing systems, enabling metadata creation, and linking records across databases.

For instance, integrated library systems (ILS) allow librarians to catalogue books electronically, making them searchable by title, author, or subject. This reduces duplication and ensures consistency.

Fill in the blank: ICT in technical services supports \_\_\_\_\_ cataloguing and metadata creation.



**Table 1.2:**

| <b>Step</b>                 | <b>Manual Cataloguing<br/>(Traditional)</b>                                          | <b>ICT-Supported Cataloguing<br/>(Digital)</b>                                                      |
|-----------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Data Entry</b>           | Writing or typing bibliographic details onto physical 3x5 index cards.               | Entering data into a Library Management System (LMS) using standardized digital templates.          |
| <b>Resource Description</b> | Manually applying rules (like AACR2) to determine main and added entries.            | Using integrated tools that suggest fields based on international standards like RDA or MARC21.     |
| <b>Classification</b>       | Physically looking up codes in printed Dewey Decimal or Library of Congress volumes. | Utilizing built-in classification modules or online databases for instant code retrieval.           |
| <b>Indexing</b>             | Manual creation of subject headings and cross-reference cards.                       | Automated keyword indexing and linked data capabilities for enhanced discoverability.               |
| <b>Record Retrieval</b>     | Searching through physical card catalog drawers by Author, Title, or Subject.        | Instant searching via Online Public Access Catalog (OPAC) using multiple filters and Boolean logic. |
| <b>Maintenance</b>          | Manually filing, repairing, or replacing worn-out cards.                             | Database backups, batch editing, and global updates across all records simultaneously.              |
| <b>Collaboration</b>        | Isolated work within a single library's collection.                                  | "Copy Cataloguing" by downloading existing records from global databases like OCLC/WorldCat.        |

### 1.2.3 ICT in Readers' Services

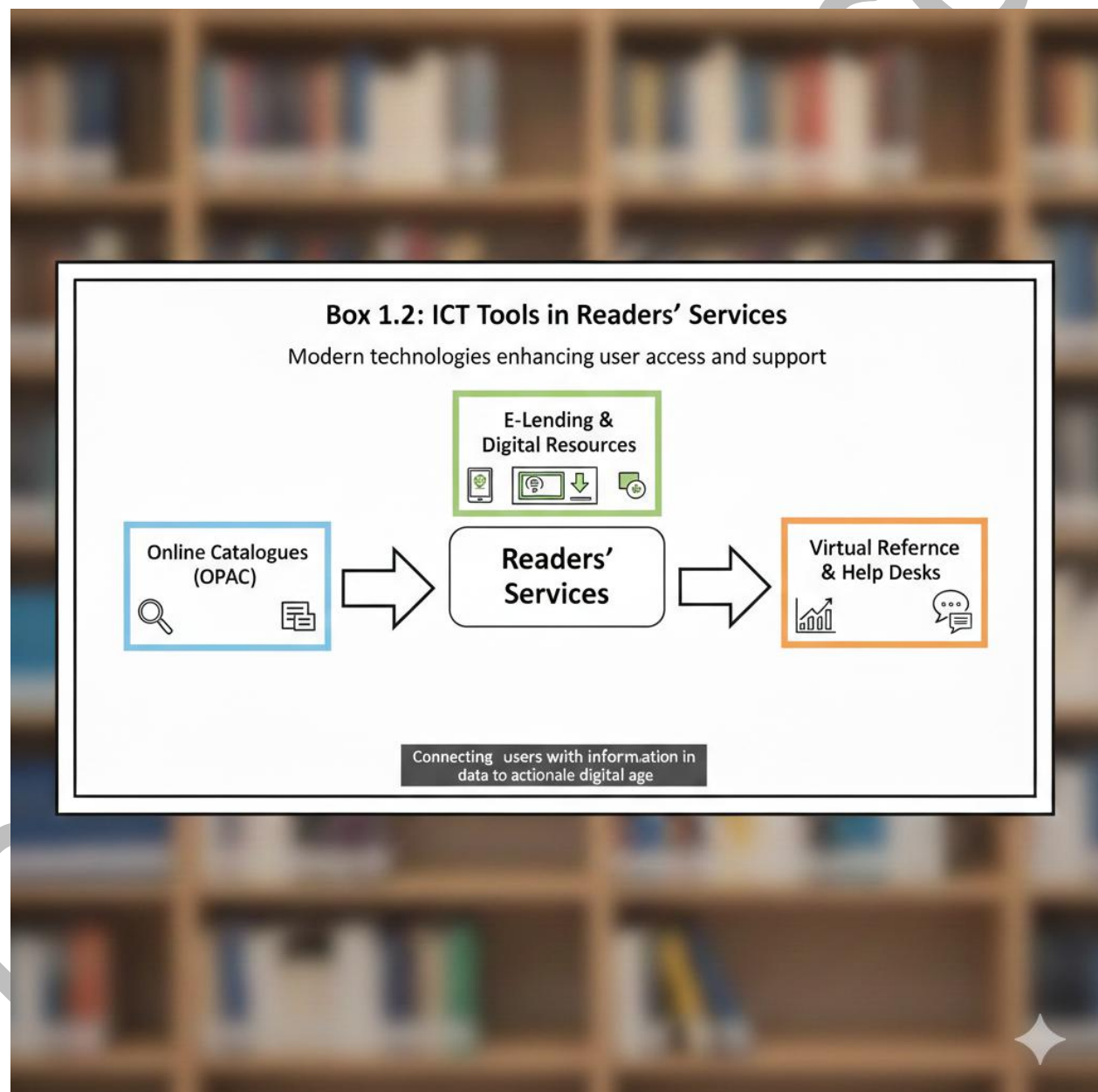


**Readers' services** refer to the direct interaction between libraries and their users, such as lending, reference services, and information retrieval. ICT enhances readers' services by providing online catalogues, electronic lending systems, and digital reference platforms.

For example, users can now access e-books, request materials online, and receive automated notifications about due dates. ICT also supports virtual reference services, where librarians assist users through email or chat systems.

Fill in the blank: ICT in readers' services enables \_\_\_\_\_ catalogues and electronic lending systems.

**Box 1.2:**



## Pilot questions 1.2

1. ICT in libraries improves \_\_\_\_\_ efficiency and enhances user satisfaction.
2. Technical services in libraries include cataloguing, classification, and \_\_\_\_\_.
3. ICT in technical services supports \_\_\_\_\_ cataloguing and metadata creation.
4. Readers' services are enhanced by online \_\_\_\_\_ and electronic lending systems.
5. Virtual reference services allow librarians to assist users through \_\_\_\_\_ or chat systems.

## 1.3 ICT as a Foundation for Modern Library Practices

### 1.3.1 ICT and Information Seeking in Electronic Environments

**Information seeking in electronic environments** refers to the process of locating, retrieving, and using information through digital platforms such as online catalogues, databases, and search engines. ICT enables users to access information quickly, efficiently, and remotely.

For example, instead of physically browsing shelves, users can search an online catalogue using keywords, authors, or subjects. ICT also supports advanced search features such as Boolean operators, which refine search results.

Fill in the blank: ICT enables users to access information \_\_\_\_\_, efficiently, and remotely.

**Figure 1.3:**



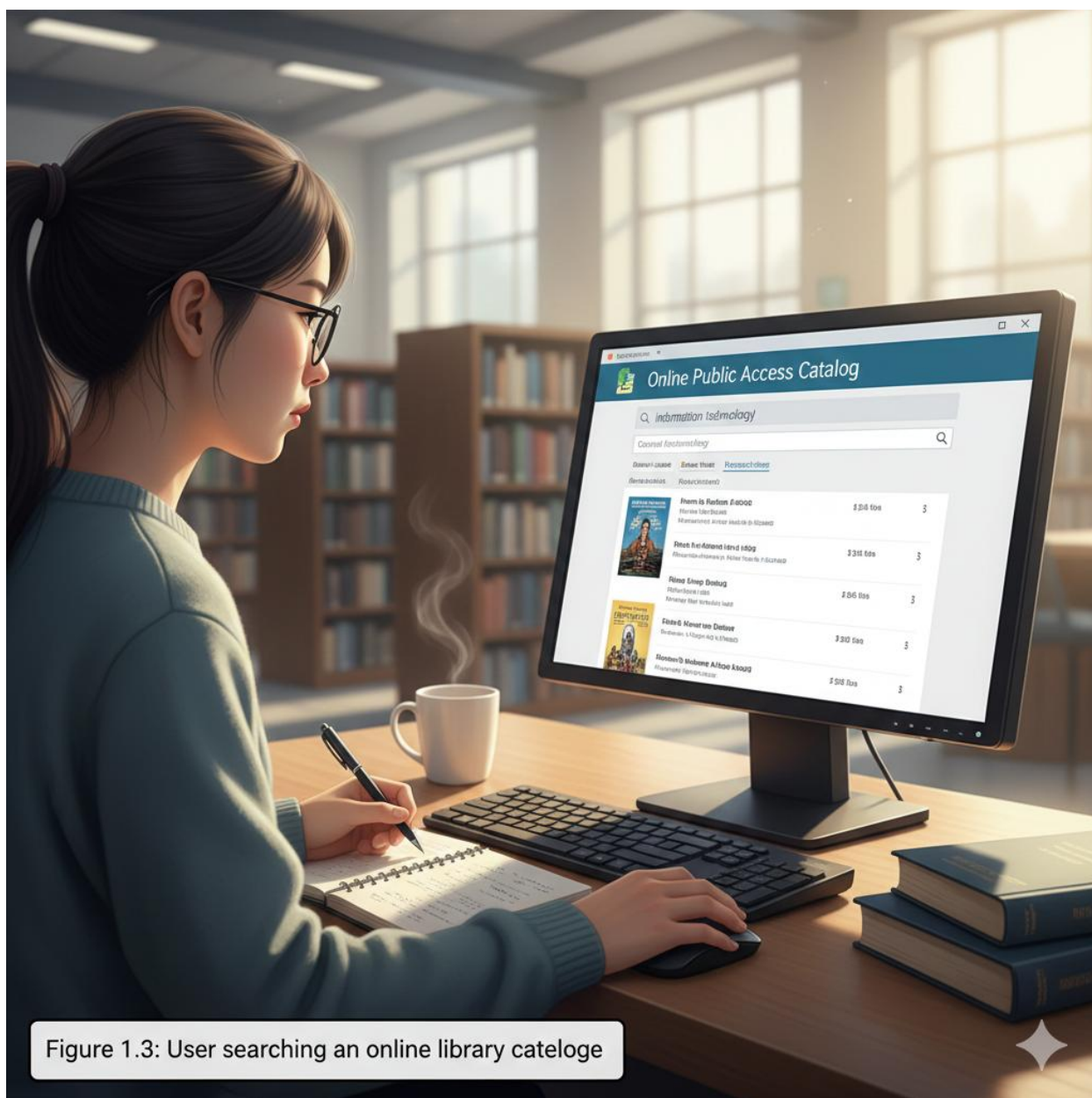


Figure 1.3: User searching an online library catalogue

### 1.3.2 ICT as a Basis for Database Use

**Databases** are organised collections of information that can be accessed electronically. ICT provides the tools for creating, managing, and searching databases in libraries. Examples include bibliographic databases, full-text databases, and multimedia databases.

Databases allow users to retrieve information across multiple sources simultaneously, saving time and improving accuracy. For instance, a bibliographic database can provide references to thousands of journal articles on a single subject.



Fill in the blank: Databases are organised collections of \_\_\_\_\_ that can be accessed electronically.

**Table 1.3: Types of Databases in Digital Libraries**

*Categorizing digital resources for diverse information needs*

| Database Type                                                                                                 | Description                                                        | Example Resources                                              |
|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------|
| <b>Bibliographic Databases</b> , providing citations, abstracts, and metadata, typically not the full content | Index scholarly literature, literature, metadata, but full content | Web of Science, PubMed, PsycINFO                               |
| Offers complete articles, books, and reports, often with searchable text within the documents                 | JSTOR, ScienceDirect, ProQuest Ebook Central                       | JSTOR, ScienceDirect, ProQuest Ebook Central                   |
| <b>Multimedia &amp; Image Databases</b> audio, video, and other non-textual assets                            | Collections of Library of Digital Collections assets               | Getty Images, Library of Congress Digital Collections, Artstor |

Understanding the different kinds of digital resources available for research

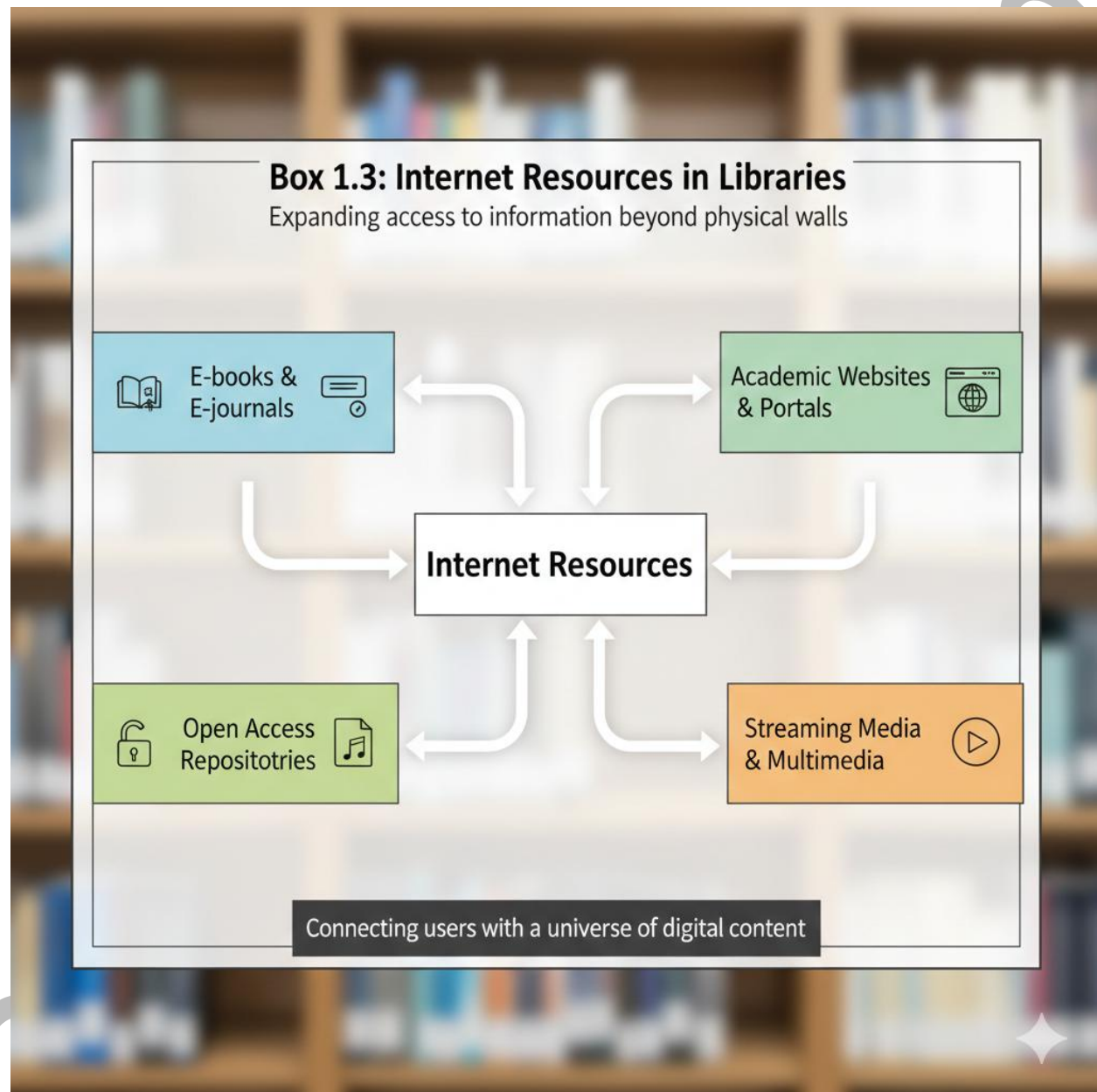
### 1.3.3 ICT as a Gateway to Internet Resources

The **Internet as an information resource** provides access to a vast range of materials, including e-books, journals, websites, and open access repositories. ICT enables libraries to connect users to these resources through portals, search engines, and digital catalogues.



However, the abundance of information on the Internet requires critical evaluation. Librarians and users must assess the credibility, relevance, and accuracy of online resources.

Fill in the blank: The Internet provides access to a vast range of materials, but users must assess their \_\_\_\_\_ and accuracy.



### Pilot questions 1.3

1. ICT enables users to access information \_\_\_\_\_, efficiently, and remotely.



2. Databases are organised collections of \_\_\_\_\_ that can be accessed electronically.
3. Bibliographic databases provide references to thousands of \_\_\_\_\_ articles.
4. The Internet provides access to a vast range of materials, but users must assess their \_\_\_\_\_ and accuracy.
5. ICT connects libraries to Internet resources through portals, \_\_\_\_\_, and digital catalogues.

### Series summary

This Series has introduced you to the foundational concepts of **information**, **communication**, **technology**, and **ICT**, showing how these ideas form the bedrock of modern library services. We began by defining each concept and establishing their relevance, then moved on to examine how ICT supports both technical services, such as cataloguing and classification, and readers' services, including lending and reference interactions. Finally, we explored ICT as a foundation for modern practices, focusing on its role in electronic information seeking, database use, and Internet resources.

By engaging with these topics, you should now be able to define the basic concepts of ICT, explain its role in library services, analyse its contribution to electronic information seeking, and demonstrate its relevance in database use and Internet resources, as outlined in the Series Learning Outcomes.

### Glossary of terms

- **Communication:** The process of transmitting information from a sender to a receiver through a medium.
- **Database:** An organised collection of information that can be accessed electronically.
- **Information:** Processed data that is meaningful and useful to the recipient.
- **Information and Communication Technology (ICT):** The integration of information technology and communication technology to process, store, retrieve, and transmit information.
- **Internet resources:** Digital materials available online, such as e-books, journals, websites, and repositories.
- **Readers' services:** Direct services provided to library users, including lending, reference, and information retrieval.
- **Technical services:** Library activities such as cataloguing, classification, and acquisition of materials.
- **Technology:** The application of scientific knowledge for practical purposes.



## Concept check questions

### Objective questions

1. (Linked to SLO 1.1) Information is processed \_\_\_\_\_ that has meaning and value.
2. (Linked to SLO 1.2) Which library service is enhanced by online catalogues and electronic lending systems?
3. (Linked to SLO 1.3) ICT enables users to access information \_\_\_\_\_, efficiently, and remotely.

### Short-answer questions

4. (Linked to SLO 1.1) Define communication and identify its key components.
5. (Linked to SLO 1.2) Explain one way ICT supports technical services in libraries.
6. (Linked to SLO 1.4) What are two examples of Internet resources that libraries can provide through ICT?

### Long-answer questions

7. (Linked to SLO 1.3) Analyse how ICT has transformed information seeking in electronic environments.
  - *Basic response:* ICT allows users to search catalogues and databases electronically, saving time and improving accuracy.
  - *Value-added response:* Outstanding learners may discuss advanced search features, remote access, and the impact on user behaviour and expectations.
8. (Linked to SLO 1.4) Evaluate the role of ICT in database use and Internet resources in libraries.
  - *Basic response:* ICT provides tools to create, manage, and search databases, and connects users to Internet resources.
  - *Value-added response:* Outstanding learners may highlight challenges such as information overload, credibility issues, and the need for user training in evaluating online sources.

## Answers to Concept Check Questions

1. Data
2. Readers' services
3. Quickly



4. Communication is the process of transmitting information from a sender to a receiver through a medium. Key components are sender, message, medium, and receiver.
5. ICT supports technical services by automating cataloguing systems and enabling metadata creation.
6. Examples include e-books and open access repositories.
7. *Basic response*: ICT allows electronic searching of catalogues and databases. *Value-added response*: ICT also enables remote access, advanced search techniques, and changes in user behaviour.
8. *Basic response*: ICT supports database management and Internet access. *Value-added response*: ICT also raises challenges of credibility, information overload, and user training.

### Answers to Pilot Questions

**Pilot questions 1.1:** Data; Communication; Scientific; Information technology and communication technology; Online.

**Pilot questions 1.2:** Library; Acquisition; Automated; Catalogues; Email.

**Pilot questions 1.3:** Quickly; Information; Journal; Credibility; Search engines.

### References and Attributions

- Course document: *LIS 212 Introduction to ICT in Library and Information Services* (syllabus provided).
- Suggested illustrations:
  - Figure 1.1: Infographic showing data transformed into information (AI prompt: “Generate a simple infographic showing raw data being processed into meaningful information”).
  - Box 1.1: Diagram of communication process (AI prompt: “Create a diagram showing sender, message, medium, and receiver in communication”).
  - Table 1.1: Comparison of traditional library processes with ICT-enabled processes (AI prompt: “Generate a table comparing manual cataloguing vs ICT-based cataloguing”).
  - Figure 1.2: Infographic comparing traditional and ICT-enabled library services (AI prompt: “Create a side-by-side infographic comparing manual cataloguing with ICT-based cataloguing”).



- Table 1.2: Comparison of manual and ICT-supported cataloguing steps (AI prompt: “Generate a table comparing manual cataloguing steps with ICT-based cataloguing steps”).
- Box 1.2: Diagram of ICT tools in readers’ services (AI prompt: “Create a diagram showing online catalogues, e-lending, and virtual reference services”).
- Figure 1.3: Illustration of a student using an online catalogue (AI prompt: “Create an illustration of a student using a library computer to search an online catalogue”).
- Table 1.3: Types of databases (AI prompt: “Generate a table comparing bibliographic, full-text, and multimedia databases with examples”).
- Box 1.3: Diagram of Internet resources in libraries (AI prompt: “Create a diagram showing e-books, journals, websites, and open access repositories as Internet resources”).

## **LIS212 Introduction to ICT in Library and Information Services (2 Units)**

### **Series 2 Library Automation and ICT Applications**

#### **Series outline**

- **Part 2.1: Concept of Library Automation**
  - Sub-Part 2.1.1: Definition and scope of library automation
  - Sub-Part 2.1.2: Historical development and importance of automation
- **Part 2.2: ICT Applications in Technical Services**
  - Sub-Part 2.2.1: ICT in cataloguing and classification
  - Sub-Part 2.2.2: ICT in acquisition and metadata management
- **Part 2.3: ICT Applications in Readers’ Services**
  - Sub-Part 2.3.1: ICT in circulation and lending systems
  - Sub-Part 2.3.2: ICT in reference and information retrieval services
- **Part 2.4: ICT Tools and Systems for Library Automation**
  - Sub-Part 2.4.1: Integrated library systems (ILS)



- Sub-Part 2.4.2: Digital catalogues and online public access catalogues (OPAC)

## Introduction

Libraries have traditionally relied on manual systems for cataloguing, lending, and managing collections. These processes, while effective in the past, often consumed time and limited access. With the advent of **library automation**, supported by ICT, libraries now operate with greater efficiency, accuracy, and accessibility. Automation has become a cornerstone of modern library practice, enabling seamless integration of services and improved user experiences.

The aim of this Series is to introduce you to the concept of library automation and to demonstrate how ICT applications transform both technical and readers' services.

We shall commence this Series by examining the concept and scope of library automation, including its historical development and importance. Next, we will explore ICT applications in technical services such as cataloguing, classification, and acquisition. Following that, we will consider ICT applications in readers' services, focusing on circulation, lending, and reference systems. Finally, we will conclude by studying ICT tools and systems that support automation, including integrated library systems and online public access catalogues.

## Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 2.1** define the concept and scope of library automation,
- **SLO 2.2** explain how ICT supports technical services such as cataloguing, classification, and acquisition,
- **SLO 2.3** analyse the role of ICT in readers' services including circulation and reference systems,
- **SLO 2.4** demonstrate knowledge of ICT tools and systems used in library automation, such as integrated library systems and OPAC.

## 2.1 Concept of Library Automation

### 2.1.1 Definition and Scope of Library Automation

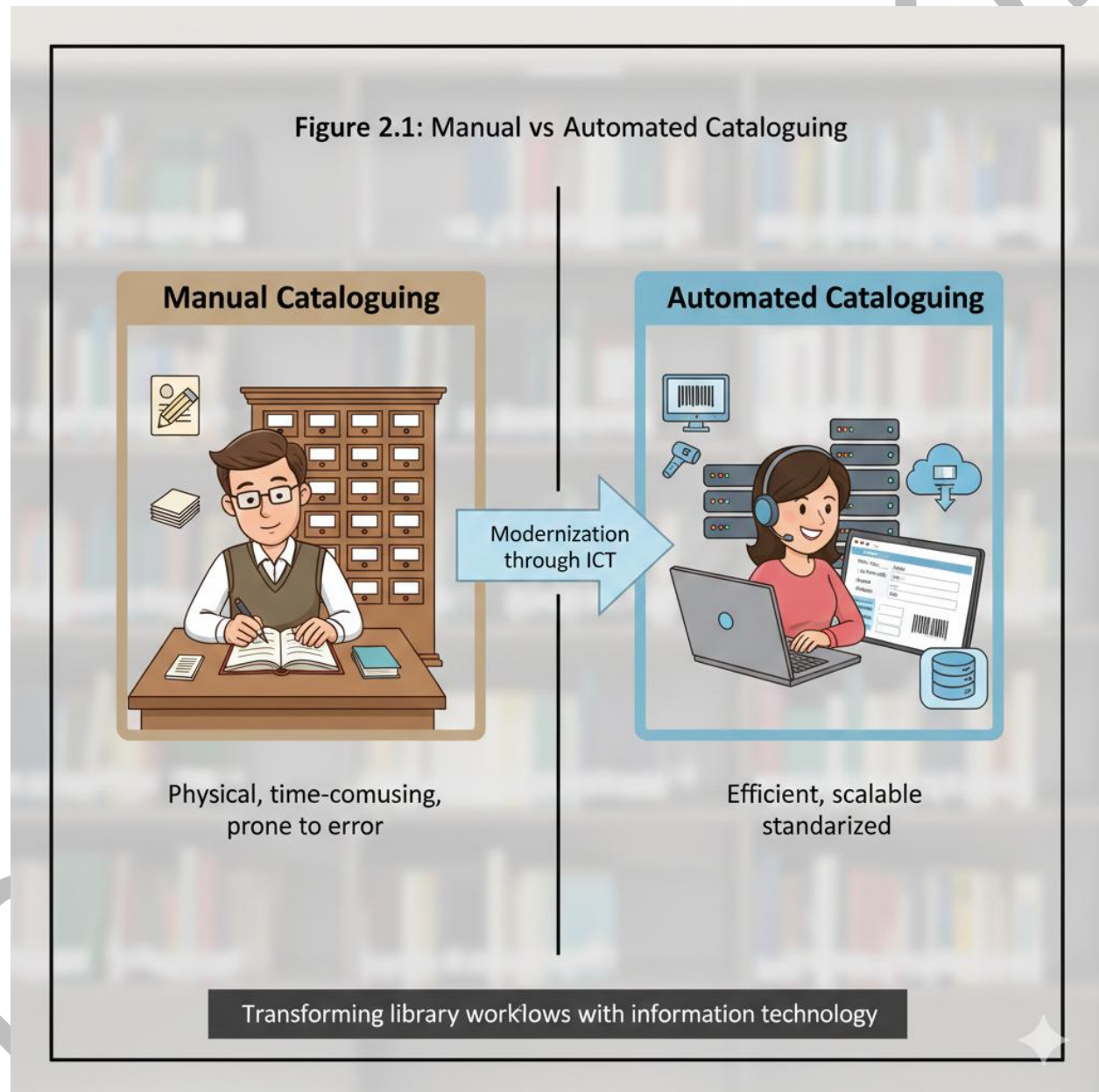
**Library automation** refers to the application of ICT tools and systems to perform library functions such as cataloguing, circulation, acquisition, and information retrieval. It



replaces manual processes with digital systems, thereby improving efficiency, accuracy, and accessibility.

The scope of library automation covers both **technical services** (like cataloguing and classification) and **readers' services** (such as lending and reference). Automation also extends to management functions, including statistics, reporting, and promotion of library services.

Fill in the blank: Library automation applies ICT tools to replace \_\_\_\_\_ processes with digital systems.



### 2.1.2 Historical Development and Importance of Automation



The history of library automation dates back to the mid-20th century, when libraries began experimenting with computerised cataloguing and indexing. Early systems were limited, but they laid the foundation for integrated library systems (ILS) and online public access catalogues (OPAC).

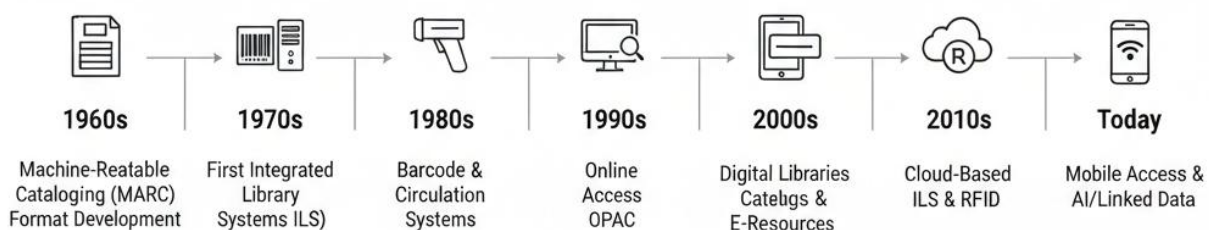
The importance of automation lies in its ability to save time, reduce duplication, and provide users with faster and more reliable access to information. For example, automated circulation systems track borrowed items and send reminders to users, reducing errors and improving accountability.

Fill in the blank: Automated circulation systems help track borrowed items and send \_\_\_\_\_ to users.



## Box 2.1: Milestones in Library Automation

*A chronological overview of technological advancements in libraries*



### Charting the evolution of library technology



## Pilot questions 2.1

1. Library automation applies ICT tools to replace \_\_\_\_\_ processes with digital systems.
2. The scope of library automation covers both technical services and \_\_\_\_\_ services.
3. Early library automation experiments began in the mid-\_\_\_\_\_ century.
4. Automated circulation systems help track borrowed items and send \_\_\_\_\_ to users.
5. One major benefit of library automation is reducing \_\_\_\_\_ in library processes.

## 2.2 ICT Applications in Technical Services

### 2.2.1 ICT in Cataloguing and Classification

**Cataloguing** is the process of creating bibliographic records for library materials, while **classification** involves organising these materials into categories for easy retrieval. ICT supports these processes by providing automated cataloguing systems, metadata standards, and classification tools.

For example, integrated library systems (ILS) allow librarians to input bibliographic details once, and the system automatically generates searchable records. This reduces duplication and ensures consistency across collections.

Fill in the blank: ICT in cataloguing ensures consistency by generating \_\_\_\_\_ records across collections.

**Table 2.1:**

| Process Phase          | Manual Cataloguing & Classification                                                 | ICT-Supported Cataloguing & Classification                                            |
|------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Data Generation</b> | Cataloguer manually extracts bibliographic data and writes it on worksheet or card. | Data is imported via Z39.50 protocols or "copy cataloguing" from global databases.    |
| <b>Standardization</b> | Physical consultation of AACR2 or RDA manuals for entry formatting.                 | Integrated validation rules within the software automatically flag formatting errors. |



| Process Phase              | Manual Cataloguing & Classification                                                | ICT-Supported Cataloguing & Classification                                                          |
|----------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Subject Indexing</b>    | Searching through multi-volume printed Sears List or LCSH books.                   | Digital Subject Authority Files allow for keyword searching and "click-to-assign" headings.         |
| <b>Classification</b>      | Manual calculation of numbers using DDC/LC schedules and "number building" tables. | Automated classification modules suggest class marks based on subject keywords or previous entries. |
| <b>Physical Output</b>     | Typing or duplicating 3x5 cards for Author, Title, and Subject cabinets.           | Instant generation of digital records accessible via OPAC; automated spine label printing.          |
| <b>Cross-Referencing</b>   | Manually creating "See" and "See also" physical cards for name/subject variations. | Automatic linking of authority records ensures all variations point to the preferred term.          |
| <b>Storage &amp; Space</b> | Large physical footprints required for card catalog cabinets.                      | Records are stored on local servers or in the cloud, requiring zero floor space.                    |

### 2.2.2 ICT in Acquisition and Metadata Management

**Acquisition** refers to the process of selecting and obtaining library materials, while **metadata management** involves creating structured information about resources to facilitate discovery. ICT enhances acquisition by enabling electronic ordering, tracking, and budgeting.

Metadata standards such as MARC (Machine-Readable Cataloguing) and Dublin Core are supported by ICT systems, ensuring interoperability between libraries and databases. This allows libraries to share records and integrate resources more effectively.

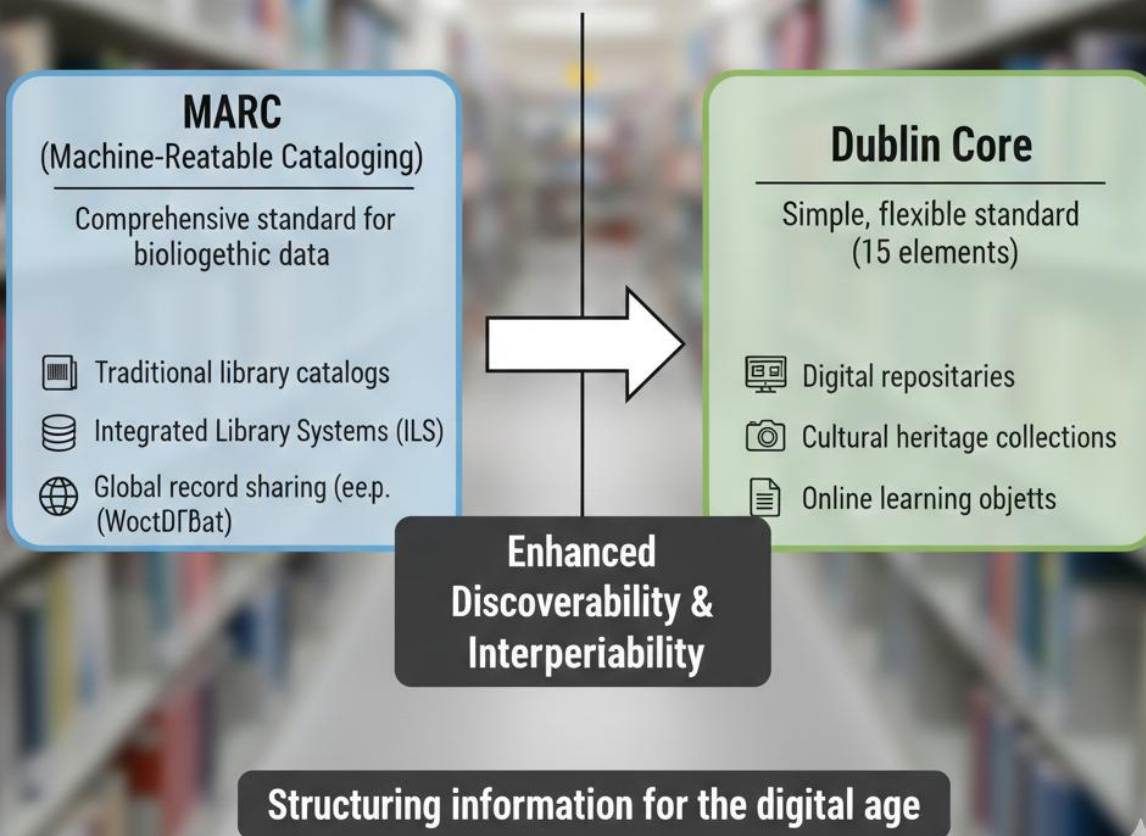
Fill in the blank: Metadata standards such as MARC and Dublin Core ensure \_\_\_\_\_ between libraries and databases.

#### Box 2.2:



## Box 2.2: Metadata Standards in Libraries

Organizing and describing information for discoverability



### Pilot questions 2.2

1. ICT in cataloguing ensures consistency by generating \_\_\_\_\_ records across collections.
2. Classification involves organising materials into \_\_\_\_\_ for easy retrieval.
3. Acquisition refers to the process of selecting and \_\_\_\_\_ library materials.
4. Metadata standards such as MARC and Dublin Core ensure \_\_\_\_\_ between libraries and databases.



5. Integrated library systems reduce \_\_\_\_\_ by automating cataloguing processes.

## 2.3 ICT Applications in Readers' Services

### 2.3.1 ICT in Circulation and Lending Systems

**Circulation** refers to the process of lending and returning library materials, while **lending systems** manage the borrowing records of users. ICT enhances these services by introducing automated circulation systems that track borrowed items, calculate due dates, and send reminders to users.

For example, electronic lending systems allow users to borrow e-books remotely, while automated notifications reduce overdue cases. This improves accountability and ensures efficient management of library collections.

Fill in the blank: Automated circulation systems track borrowed items, calculate due dates, and send \_\_\_\_\_ to users.

**Figure 2.2:**





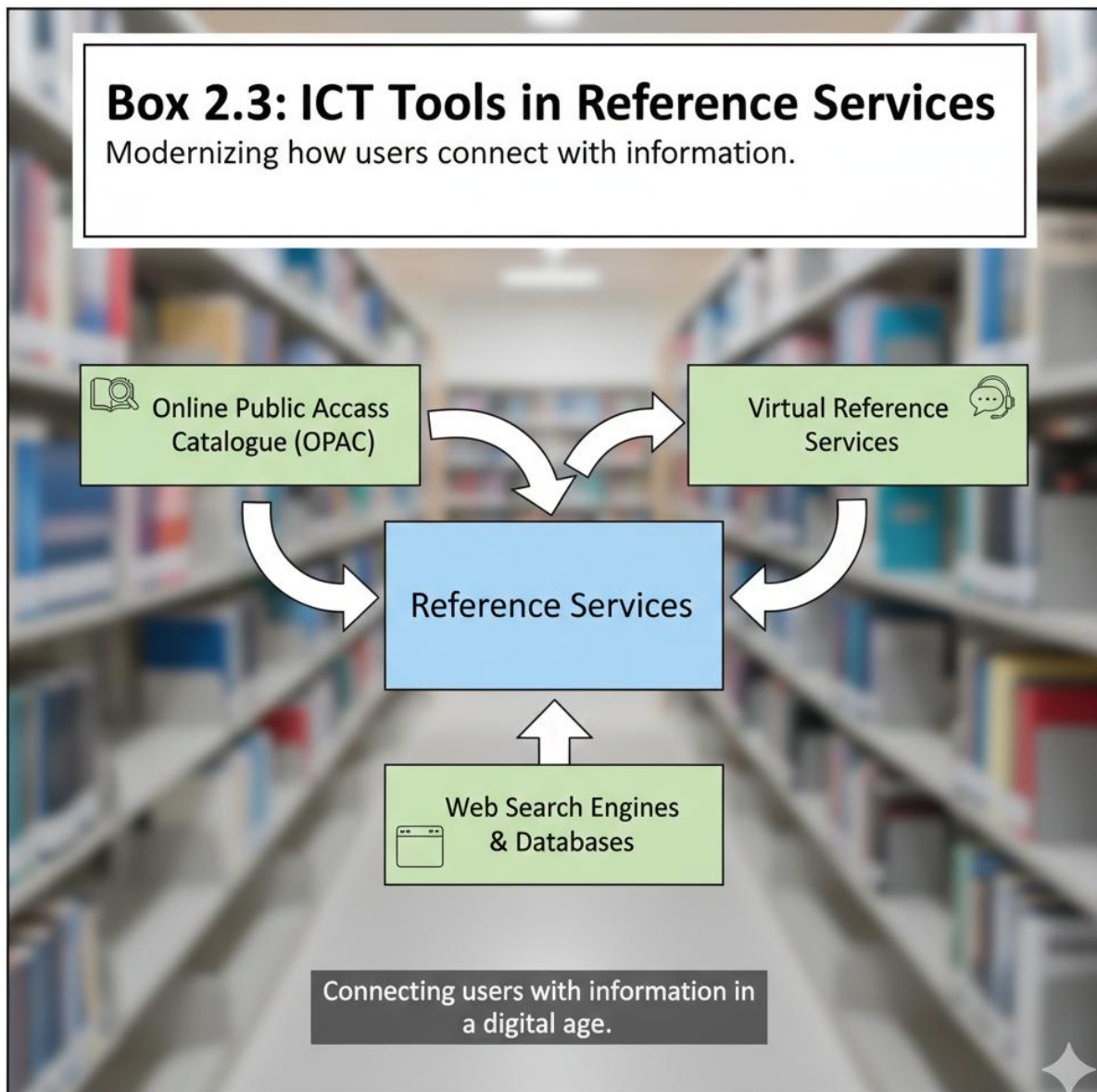
### 2.3.2 ICT in Reference and Information Retrieval Services

**Reference services** involve assisting users in finding information, while **information retrieval** refers to the process of locating specific resources from a collection. ICT supports these services through online catalogues, digital reference platforms, and search engines.

For instance, users can access online public access catalogues (OPAC) to search for materials by title, author, or subject. Virtual reference services, such as email or chat support, allow librarians to assist users remotely.

Fill in the blank: OPAC enables users to search for materials by title, author, or \_\_\_\_\_.





### Pilot questions 2.3

1. Automated circulation systems track borrowed items, calculate due dates, and send \_\_\_\_\_ to users.
2. Electronic lending systems allow users to borrow \_\_\_\_\_ remotely.
3. Reference services involve assisting users in finding \_\_\_\_\_.
4. OPAC enables users to search for materials by title, author, or \_\_\_\_\_.



5. Virtual reference services allow librarians to assist users through \_\_\_\_\_ or chat support.

## 2.4 ICT Tools and Systems for Library Automation

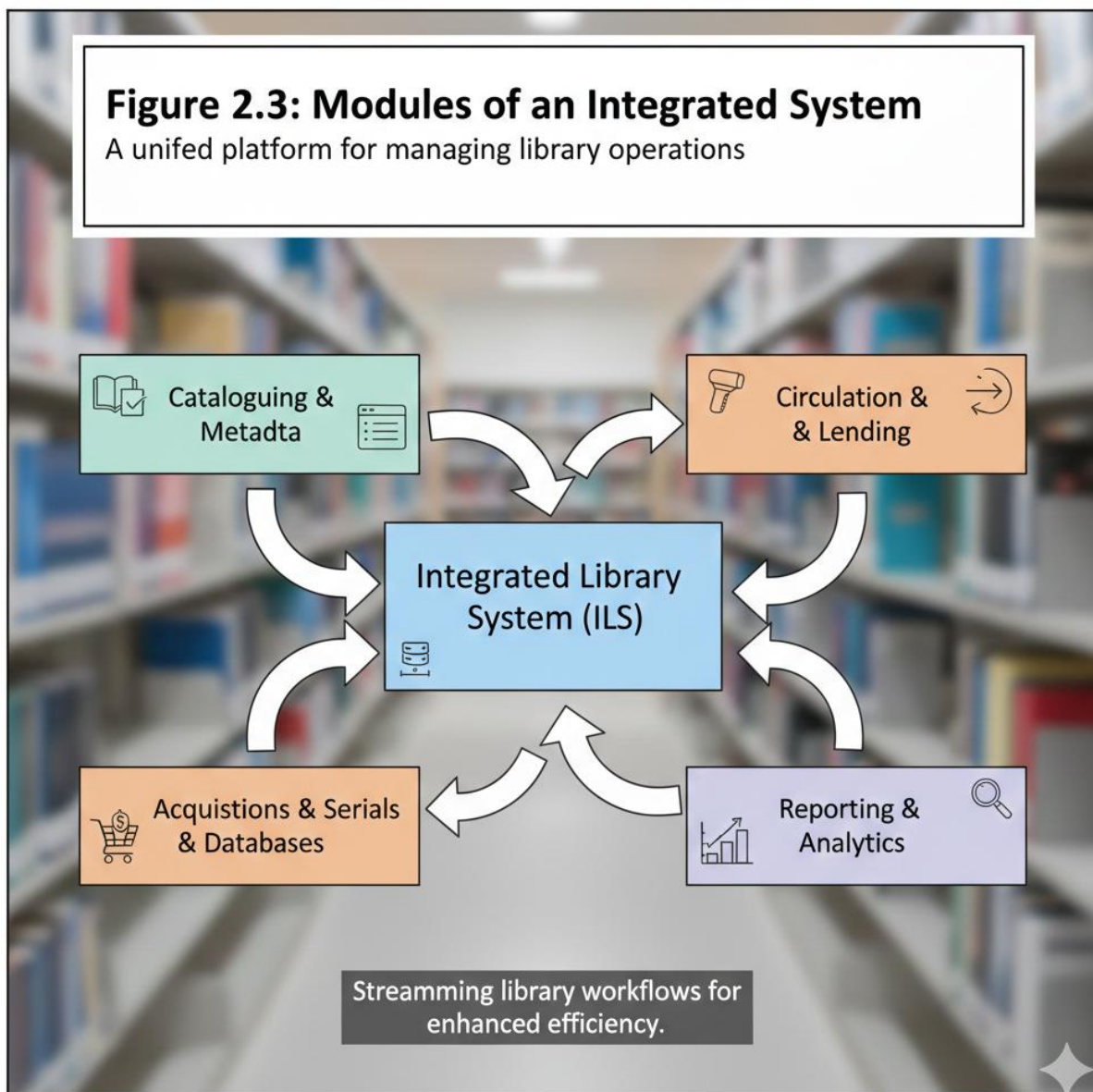
### 2.4.1 Integrated Library Systems (ILS)

An **Integrated Library System (ILS)** is a software solution that combines multiple library functions into one platform. It typically includes modules for cataloguing, circulation, acquisitions, serials management, and reporting. By integrating these functions, ILS reduces duplication and ensures smooth workflow across departments.

For example, when a book is catalogued in the system, the information automatically becomes available in the circulation and OPAC modules, making it accessible to users.

Fill in the blank: An Integrated Library System combines multiple library functions into one \_\_\_\_\_.





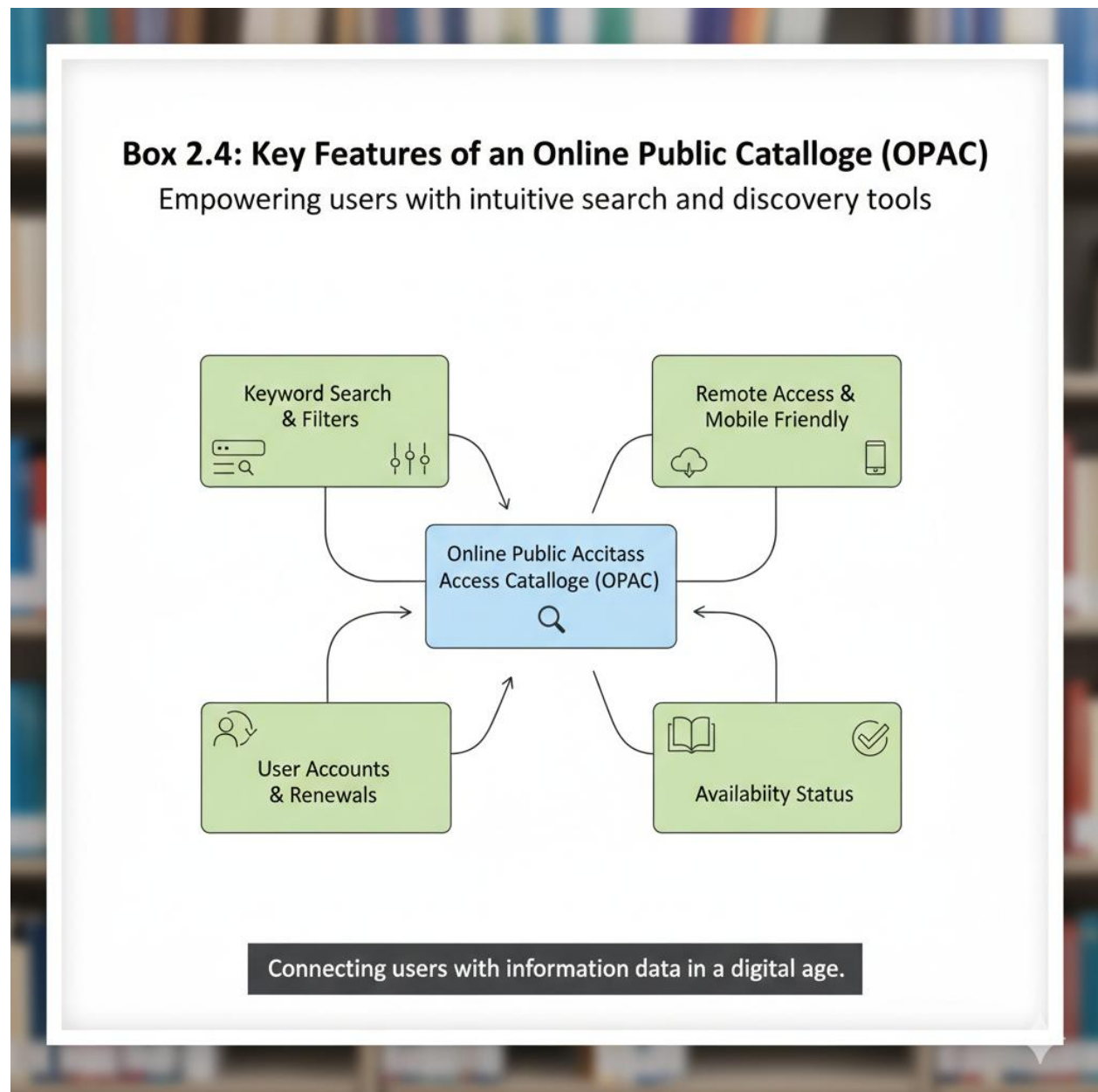
#### 2.4.2 Digital Catalogues and Online Public Access Catalogues (OPAC)

**Digital catalogues** are electronic records of library collections, while **Online Public Access Catalogues (OPAC)** allow users to search these records remotely. OPAC provides search options by title, author, subject, or keyword, and often includes advanced features such as Boolean operators and filters.

OPAC enhances user independence, as patrons can locate materials without direct assistance from librarians. It also supports remote access, enabling users to check availability and reserve items online.



Fill in the blank: OPAC enables users to search library collections remotely by title, author, subject, or \_\_\_\_\_.



#### Pilot questions 2.4

1. An Integrated Library System combines multiple library functions into one \_\_\_\_\_.
2. ILS modules typically include cataloguing, circulation, acquisitions, and \_\_\_\_\_ management.



3. Digital catalogues are electronic records of \_\_\_\_\_ collections.
4. OPAC enables users to search library collections remotely by title, author, subject, or \_\_\_\_\_.
5. One benefit of OPAC is that it supports \_\_\_\_\_ access for users.

### Series summary

This Series has introduced you to the concept of **library automation**, highlighting its definition, scope, and historical development. We examined how ICT supports technical services such as cataloguing, classification, acquisition, and metadata management, showing how automation reduces duplication and improves efficiency. We then explored ICT applications in readers' services, including circulation, lending, and reference systems, which enhance accountability and user independence. Finally, we studied ICT tools and systems such as integrated library systems (ILS) and online public access catalogues (OPAC), which provide the backbone for modern automated library operations.

By engaging with these topics, you should now be able to define the concept of library automation, explain ICT applications in technical and readers' services, analyse their impact on library operations, and demonstrate knowledge of ICT tools such as ILS and OPAC, as outlined in the Series Learning Outcomes.

### Glossary of terms

- **Acquisition:** The process of selecting and obtaining library materials.
- **Cataloguing:** The creation of bibliographic records for library materials.
- **Classification:** The organisation of library materials into categories for easy retrieval.
- **Integrated Library System (ILS):** A software solution that combines multiple library functions into one platform.
- **Library automation:** The application of ICT tools and systems to perform library functions, replacing manual processes.
- **Metadata:** Structured information about resources that facilitates discovery and retrieval.
- **Online Public Access Catalogue (OPAC):** A digital catalogue that allows users to search library collections remotely.
- **Readers' services:** Direct services provided to library users, such as lending and reference.



- **Technical services:** Library activities such as cataloguing, classification, and acquisition.

### Concept check questions

#### Objective questions

1. (Linked to SLO 2.1) Library automation applies ICT tools to replace \_\_\_\_\_ processes with digital systems.
2. (Linked to SLO 2.2) Metadata standards such as MARC and Dublin Core ensure \_\_\_\_\_ between libraries and databases.
3. (Linked to SLO 2.4) An Integrated Library System combines multiple library functions into one \_\_\_\_\_.

#### Short-answer questions

4. (Linked to SLO 2.1) Define library automation and explain its scope.
5. (Linked to SLO 2.2) Explain one way ICT supports acquisition in libraries.
6. (Linked to SLO 2.3) What are two ways ICT enhances readers' services?

#### Long-answer questions

7. (Linked to SLO 2.3) Analyse how ICT has transformed circulation and lending systems in libraries.
  - *Basic response:* ICT introduces automated circulation systems that track borrowed items, calculate due dates, and send reminders.
  - *Value-added response:* Outstanding learners may discuss electronic lending of e-books, accountability improvements, and integration with OPAC.
8. (Linked to SLO 2.4) Evaluate the role of ICT tools such as ILS and OPAC in modern library automation.
  - *Basic response:* ILS integrates multiple functions, while OPAC provides remote access to catalogues.
  - *Value-added response:* Outstanding learners may highlight interoperability, advanced search features, and the impact on user independence.

### Answers to Concept Check Questions

1. Manual
2. Interoperability
3. Platform



4. Library automation is the application of ICT tools to replace manual processes with digital systems. Its scope includes technical services, readers' services, and management functions.
5. ICT supports acquisition by enabling electronic ordering, tracking, and budgeting.
6. ICT enhances readers' services through electronic lending systems and virtual reference services.
7. *Basic response*: ICT introduces automated circulation systems that track borrowed items and send reminders. *Value-added response*: ICT also supports e-book lending, accountability, and integration with OPAC.
8. *Basic response*: ILS integrates cataloguing, circulation, and acquisitions, while OPAC provides remote access. *Value-added response*: They also support interoperability, advanced search, and user independence.

### Answers to Pilot Questions

**Pilot questions 2.1:** Manual; Readers'; 20th; Reminders; Errors.

**Pilot questions 2.2:** Searchable; Categories; Obtaining; Interoperability; Duplication.

**Pilot questions 2.3:** Reminders; E-books; Information; Subject; Email.

**Pilot questions 2.4:** Platform; Serials; Library; Keyword; Remote.

### References and Attributions

- Course document: *LIS 212 Introduction to ICT in Library and Information Services* (syllabus provided).
- Suggested illustrations:
  - Figure 2.1: Manual vs automated cataloguing (AI prompt: "Create a side-by-side infographic comparing manual cataloguing with automated cataloguing using ICT").
  - Box 2.1: Timeline of library automation milestones (AI prompt: "Create a timeline diagram showing key milestones in library automation from the 1960s to present").
  - Table 2.1: Manual vs ICT-supported cataloguing/classification (AI prompt: "Generate a table comparing manual cataloguing and classification steps with ICT-based processes").
  - Box 2.2: Metadata standards diagram (AI prompt: "Create a diagram showing MARC and Dublin Core as metadata standards with their applications in libraries").



- Figure 2.2: Digital lending system interface (AI prompt: “Create an illustration of a library circulation desk with a computerised lending system”).
- Box 2.3: ICT tools in reference services (AI prompt: “Create a diagram showing OPAC, virtual reference services, and search engines as ICT tools in readers’ services”).
- Figure 2.3: Modules of an ILS (AI prompt: “Create a diagram showing cataloguing, circulation, acquisitions, and reporting modules connected in an integrated library system”).
- Box 2.4: OPAC features diagram (AI prompt: “Create a diagram showing OPAC features such as keyword search, filters, and remote access”).

## **LIS212 Introduction to ICT in Library and Information Services (2 Units)**

### **Series 3 Information Access in the Digital Environment**

#### **Series outline**

- **Part 3.1: Information Seeking in Electronic Environments**
  - Sub-Part 3.1.1: Concept of electronic information seeking
  - Sub-Part 3.1.2: Tools and strategies for electronic searches
- **Part 3.2: Database Use in Libraries and Information Centres**
  - Sub-Part 3.2.1: Types of databases (bibliographic, full-text, multimedia)
  - Sub-Part 3.2.2: ICT support for database management and retrieval
- **Part 3.3: The Internet as an Information Resource**
  - Sub-Part 3.3.1: Internet resources for libraries
  - Sub-Part 3.3.2: Evaluating credibility and relevance of online information

#### **Introduction**

In today’s world, information is increasingly accessed through digital platforms rather than traditional print sources. Libraries and information centres have embraced this shift, using ICT to provide users with efficient tools for searching, retrieving, and evaluating information. This Series focuses on how ICT enables access to information in electronic environments, databases, and the Internet.



The aim of this Series is to equip you with the skills to seek information electronically, use databases effectively, and evaluate Internet resources critically.

We shall commence this Series by examining the concept of information seeking in electronic environments and the tools that support it. Next, we will explore database use in libraries, considering the types of databases and how ICT supports their management. Finally, we will conclude by studying the Internet as an information resource, with emphasis on evaluating credibility and relevance.

### Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 3.1** define the concept of information seeking in electronic environments,
- **SLO 3.2** demonstrate strategies and tools for effective electronic searches,
- **SLO 3.3** explain the types of databases used in libraries and information centres,
- **SLO 3.4** analyse how ICT supports database management and retrieval,
- **SLO 3.5** evaluate the credibility and relevance of Internet resources for library use.

### 3.1 Information Seeking in Electronic Environments

#### 3.1.1 Concept of Electronic Information Seeking

**Electronic information seeking** refers to the process of locating and retrieving information using digital platforms such as online catalogues, databases, and search engines. Unlike traditional methods that rely on physical browsing, electronic information seeking allows users to access resources quickly, remotely, and with greater precision.

For example, a student searching for journal articles can use an online database to retrieve hundreds of relevant results within seconds. This efficiency highlights the importance of ICT in modern libraries.

Fill in the blank: Electronic information seeking allows users to access resources \_\_\_\_\_, remotely, and with greater precision.

**Figure 3.1:**



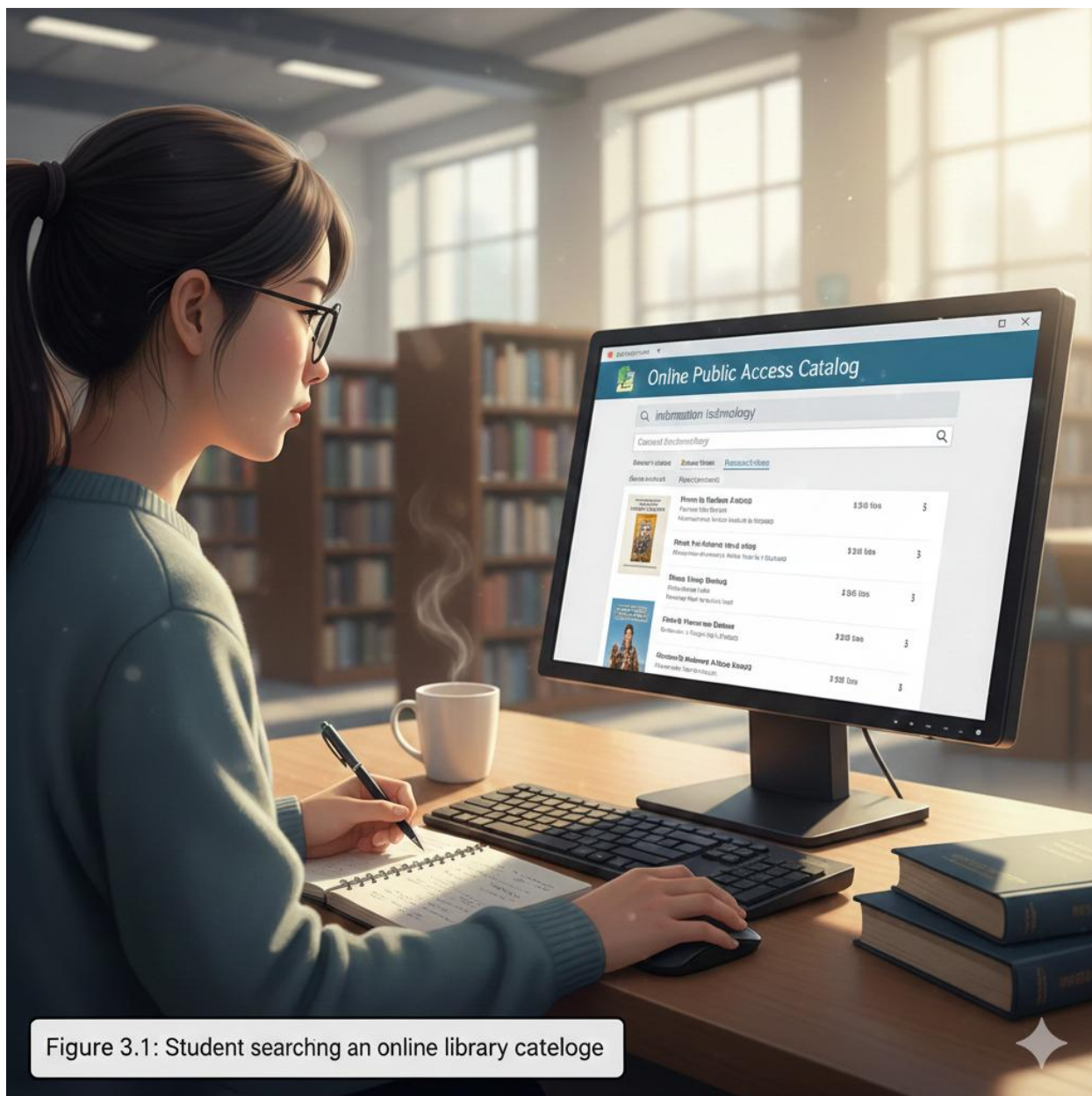


Figure 3.1: Student searching an online library catalogue

### 3.1.2 Tools and Strategies for Electronic Searches

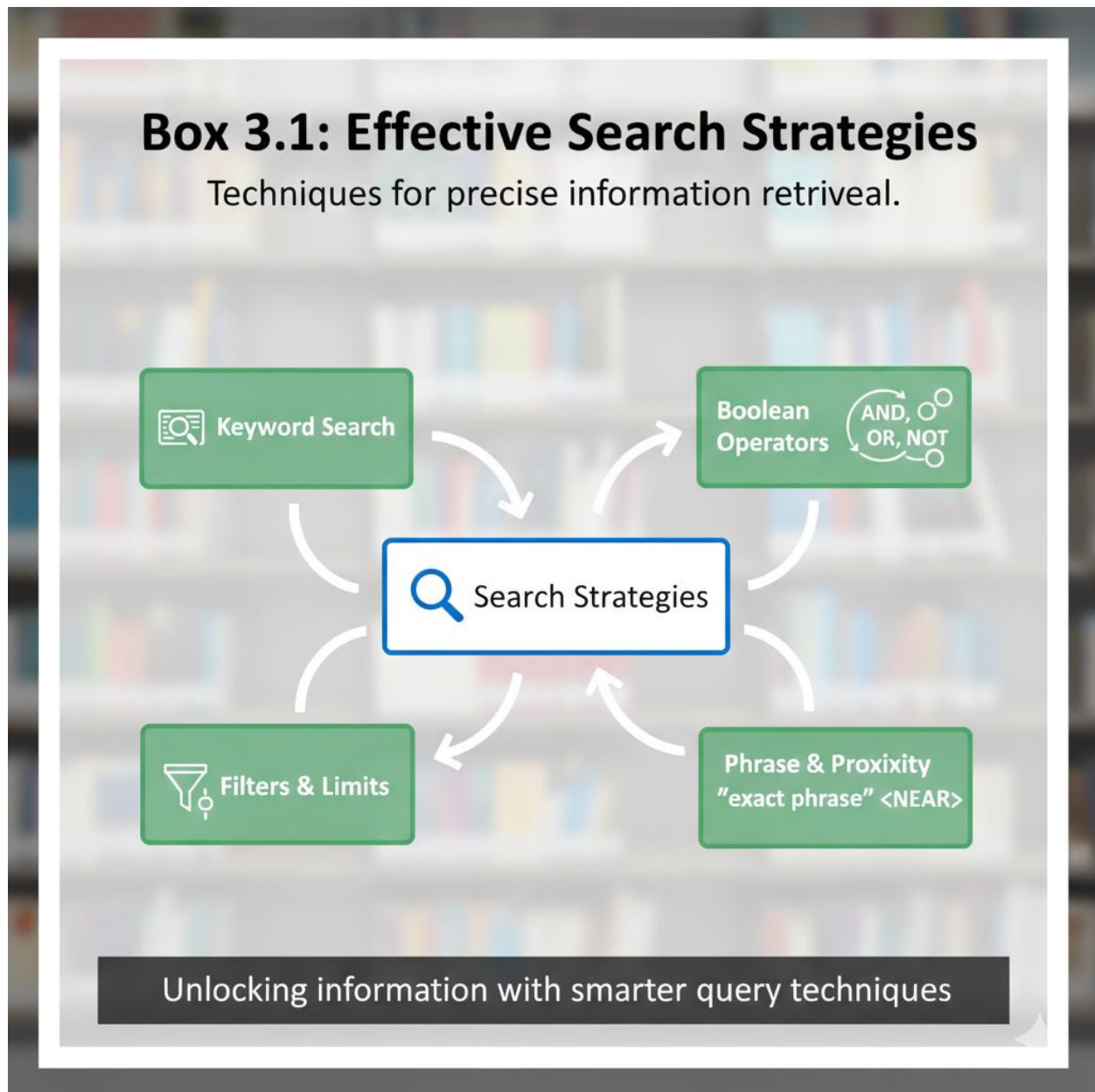
Electronic searches rely on **tools** such as online public access catalogues (OPAC), databases, and search engines. They also require **strategies** to refine results, including the use of keywords, Boolean operators (AND, OR, NOT), and filters such as date or subject.

For instance, a researcher looking for articles on ICT in Nigerian libraries may use the keywords “ICT AND Nigerian libraries” to narrow results. Effective strategies save time and ensure that retrieved information is relevant and credible.

Fill in the blank: Boolean operators such as AND, OR, and NOT are used to \_\_\_\_\_ search results.



### Box 3.1:



### Pilot questions 3.1

1. Electronic information seeking allows users to access resources \_\_\_\_\_, remotely, and with greater precision.
2. Tools for electronic searches include OPAC, databases, and \_\_\_\_\_.



3. Boolean operators such as AND, OR, and NOT are used to \_\_\_\_\_ search results.
4. A researcher looking for articles on ICT in Nigerian libraries may use the keywords "ICT AND \_\_\_\_\_ libraries".
5. One advantage of electronic information seeking is that it saves \_\_\_\_\_ and ensures relevance.

## 3.2 Database Use in Libraries and Information Centres

### 3.2.1 Types of Databases

A **database** is an organised collection of information that can be accessed electronically. Libraries use different types of databases to support information retrieval and resource management.

- **Bibliographic databases:** These provide references to books, journal articles, and reports. They do not usually contain the full text but guide users to sources.
- **Full-text databases:** These contain complete documents such as journal articles, e-books, and reports, allowing users to read and download materials directly.
- **Multimedia databases:** These store non-textual materials such as images, audio, and video files, supporting diverse learning and research needs.

Fill in the blank: Bibliographic databases provide references but usually do not contain the \_\_\_\_\_ text.

**Table 3.1:**

| Database Type        | Primary Content                                                 | Key Features                                                                             | Examples                                                |
|----------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>Bibliographic</b> | Citations, abstracts, and metadata (author, title, date, etc.). | Provides "pointers" to information; does not usually contain the full original document. | <b>PubMed, Web of Science, PsycINFO, ERIC.</b>          |
| <b>Full-Text</b>     | The complete text of articles, books, reports, or documents.    | Allows for keyword searching within the body of the document;                            | <b>JSTOR, ScienceDirect, IEEE Xplore, Project MUSE.</b> |



| Database Type                | Primary Content                                                     | Key Features                                                                            | Examples                                                                        |
|------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                              |                                                                     | immediate access to content.                                                            |                                                                                 |
| <b>Multimedia</b>            | Non-textual assets including images, audio files, and videos.       | Supports visual and auditory learning; requires specialized players or viewers.         | <b>YouTube, Artstor, Getty Images, Library of Congress Digital Collections.</b> |
| <b>Numerical/Statistical</b> | Raw data, census figures, financial statistics, and survey results. | Often used for research and analysis; data can be exported to tools like Excel or SPSS. | <b>Statista, World Bank Open Data, OECD iLibrary.</b>                           |

### 3.2.2 ICT Support for Database Management and Retrieval

ICT plays a crucial role in **database management** by enabling the creation, storage, and retrieval of records. Library databases are often managed using software that supports metadata standards, indexing, and search functions.

ICT also enhances **retrieval** by providing advanced search features such as keyword searching, Boolean operators, and filters. This ensures that users can locate relevant information quickly and accurately.

For example, a full-text database may allow a researcher to filter results by publication year, author, or subject area, saving time and improving relevance.

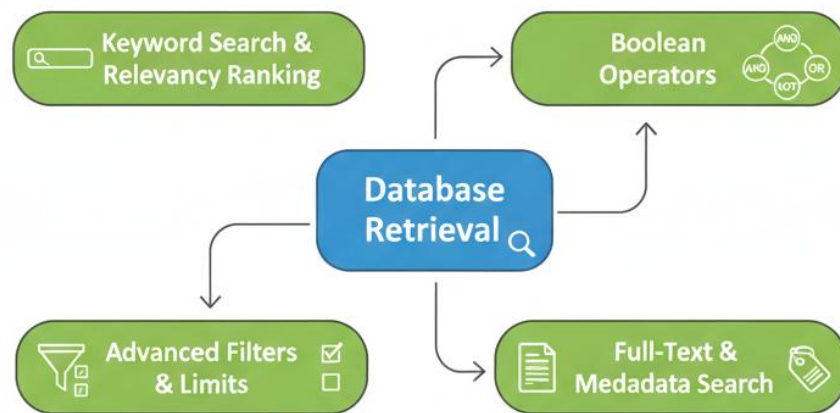
Fill in the blank: ICT enhances retrieval by providing advanced search features such as keywords, Boolean operators, and \_\_\_\_\_.

#### Box 3.2:



## Box 3.2: ICT Features in Database Retrieval

Leveraging technology for precise information discovery



Utilizing digital tools to refine search results

### Pilot questions 3.2

1. Bibliographic databases provide references but usually do not contain the \_\_\_\_\_ text.
2. Full-text databases allow users to read and \_\_\_\_\_ complete documents.
3. Multimedia databases store materials such as images, \_\_\_\_\_, and video files.
4. ICT enhances retrieval by providing advanced search features such as keywords, Boolean operators, and \_\_\_\_\_.
5. Metadata standards and indexing help ensure accurate \_\_\_\_\_ of database records.



### 3.3 The Internet as an Information Resource

#### 3.3.1 Internet Resources for Libraries

The **Internet** provides access to a vast range of resources that libraries can use to support learning, research, and information dissemination. These include **e-books, online journals, websites, and open access repositories**. ICT enables libraries to connect users to these resources through portals, search engines, and digital catalogues.

For example, a library may subscribe to online journal databases, giving users access to thousands of scholarly articles. Similarly, open access repositories provide free resources that can be used without subscription barriers.

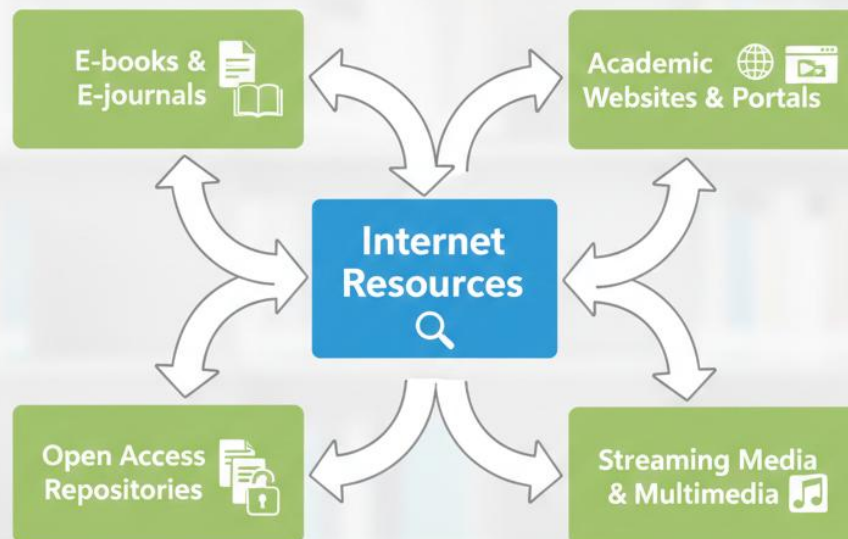
Fill in the blank: Open access repositories provide free resources that can be used without \_\_\_\_\_ barriers.

**Figure 3.3:**



## Figure 3.3: Exploring the Universe of Internet Resources

Gateways to information beyond physical library walls



Connecting users with a universe of digital content

### 3.3.2 Evaluating Credibility and Relevance of Online Information

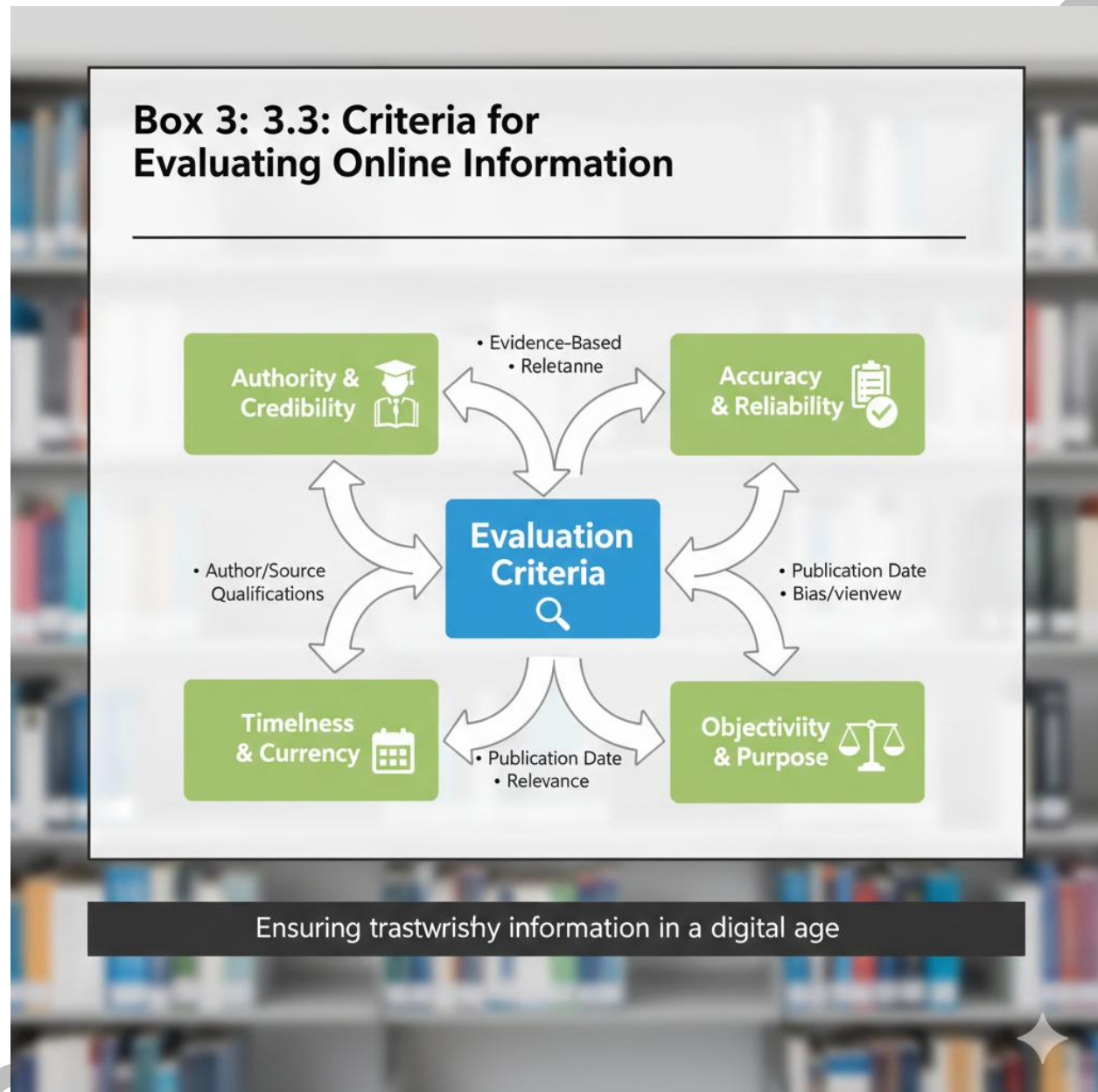
While the Internet offers abundant information, not all sources are reliable. **Credibility** refers to the trustworthiness of a source, while **relevance** refers to how closely the information meets the user's needs. Evaluating these aspects is essential to avoid misinformation.

Libraries often guide users to assess online resources by checking the author's credentials, publication date, accuracy, and whether the source is peer-reviewed. For instance, a scholarly journal article is generally more credible than an anonymous blog post.



Fill in the blank: Evaluating online information requires checking the author's credentials, publication date, accuracy, and whether the source is \_\_\_\_\_ reviewed.

**Box 3.3:**



**Pilot questions 3.3**

1. Open access repositories provide free resources that can be used without \_\_\_\_\_ barriers.



2. The Internet provides access to resources such as e-books, online journals, websites, and \_\_\_\_\_ repositories.
3. Credibility refers to the \_\_\_\_\_ of a source.
4. Relevance refers to how closely information meets the user's \_\_\_\_\_.
5. Evaluating online information requires checking the author's credentials, publication date, accuracy, and whether the source is \_\_\_\_\_ reviewed.

### Series summary

This Series has focused on how ICT enables access to information in the digital environment. We began by exploring the concept of **electronic information seeking**, highlighting the tools and strategies that make searches faster and more precise. We then examined the use of **databases** in libraries, distinguishing between bibliographic, full-text, and multimedia types, and showing how ICT supports their management and retrieval. Finally, we considered the **Internet as an information resource**, emphasising the need to evaluate credibility and relevance when using online materials.

By engaging with these topics, you should now be able to define electronic information seeking, demonstrate effective search strategies, explain the types of databases, analyse ICT's role in database management, and evaluate Internet resources critically, as outlined in the Series Learning Outcomes.

### Glossary of terms

- **Bibliographic database:** A database that provides references to books, journal articles, and reports, usually without full text.
- **Database:** An organised collection of information that can be accessed electronically.
- **Electronic information seeking:** The process of locating and retrieving information using digital platforms such as catalogues, databases, and search engines.
- **Full-text database:** A database containing complete documents such as journal articles, e-books, and reports.
- **Internet resources:** Digital materials available online, including e-books, journals, websites, and repositories.
- **Multimedia database:** A database storing non-textual materials such as images, audio, and video files.
- **OPAC (Online Public Access Catalogue):** A digital catalogue that allows users to search library collections remotely.



- **Search strategies:** Techniques such as keywords, Boolean operators, and filters used to refine electronic searches.

## Concept check questions

### Objective questions

1. (Linked to SLO 3.1) Electronic information seeking allows users to access resources \_\_\_\_\_, remotely, and with greater precision.
2. (Linked to SLO 3.3) Bibliographic databases provide references but usually do not contain the \_\_\_\_\_ text.
3. (Linked to SLO 3.5) Evaluating online information requires checking the author's credentials, publication date, accuracy, and whether the source is \_\_\_\_\_ reviewed.

### Short-answer questions

4. (Linked to SLO 3.2) Explain how Boolean operators refine search results.
5. (Linked to SLO 3.3) List two types of databases used in libraries and describe their contents.
6. (Linked to SLO 3.5) What are two criteria for evaluating the credibility of Internet resources?

### Long-answer questions

7. (Linked to SLO 3.2) Demonstrate strategies for effective electronic searches, giving examples of tools and techniques.
  - *Basic response:* Strategies include using keywords, Boolean operators, and filters in OPAC or databases.
  - *Value-added response:* Outstanding learners may discuss advanced search features, combining multiple strategies, and tailoring searches for specific disciplines.
8. (Linked to SLO 3.4) Analyse how ICT supports database management and retrieval in libraries.
  - *Basic response:* ICT provides software for metadata, indexing, and search functions.
  - *Value-added response:* Outstanding learners may highlight interoperability, integration with other systems, and the role of ICT in improving user experience.

## Answers to Concept Check Questions



1. Quickly
2. Full
3. Peer
4. Boolean operators refine search results by combining or excluding keywords, e.g., AND narrows, OR broadens, NOT excludes.
5. Bibliographic databases provide references, while full-text databases contain complete documents.
6. Criteria include author's credentials and accuracy of information.
7. *Basic response*: Use keywords, Boolean operators, and filters in OPAC or databases. *Value-added response*: Combine strategies, use advanced search features, and tailor searches to specific disciplines.
8. *Basic response*: ICT supports metadata, indexing, and search functions. *Value-added response*: ICT also ensures interoperability, integrates with other systems, and enhances user experience.

### Answers to Pilot Questions

**Pilot questions 3.1:** Quickly; Search engines; Refine; Nigerian; Time.

**Pilot questions 3.2:** Full; Download; Audio; Filters; Retrieval.

**Pilot questions 3.3:** Subscription; Open access; Trustworthiness; Needs; Peer.

### References and Attributions

- Course document: *LIS 212 Introduction to ICT in Library and Information Services* (syllabus provided).
- Suggested illustrations:
  - Figure 3.1: Student searching an online catalogue (AI prompt: "Create an illustration of a student searching an online catalogue on a library computer").
  - Box 3.1: Search strategies diagram (AI prompt: "Create a diagram showing keyword search, Boolean operators, and filters as search strategies").
  - Table 3.1: Types of databases (AI prompt: "Generate a table showing types of databases, their contents, and examples").
  - Box 3.2: ICT features in database retrieval (AI prompt: "Create a diagram showing keyword search, Boolean operators, and filters as ICT features in databases").



- Figure 3.3: Internet resources diagram (AI prompt: “Create a diagram showing e-books, journals, websites, and open access repositories as Internet resources”).
- Box 3.3: Checklist for evaluating online information (AI prompt: “Create a checklist diagram showing credibility criteria: author, date, accuracy, peer review”).

## LIS212 Introduction to ICT in Library and Information Services (2 Units)

### Series 4 Digital Libraries, Web Resources, and Intellectual Property

#### Series outline

- **Part 4.1: Concept of Digital Libraries**
  - Sub-Part 4.1.1: Definition and characteristics of digital libraries
  - Sub-Part 4.1.2: Advantages and challenges of digital libraries
- **Part 4.2: Web Resources in Library Services**
  - Sub-Part 4.2.1: Types of web resources (e-books, online journals, repositories)
  - Sub-Part 4.2.2: ICT tools for accessing and managing web resources
- **Part 4.3: Intellectual Property in the Digital Age**
  - Sub-Part 4.3.1: Concept of intellectual property (IP) in libraries
  - Sub-Part 4.3.2: Copyright, fair use, and open access considerations

#### Introduction

The rise of digital technologies has transformed the way libraries collect, manage, and disseminate information. **Digital libraries** provide electronic access to collections, enabling users to retrieve materials remotely and efficiently. At the same time, libraries increasingly rely on **web resources**, such as e-books, online journals, and repositories, to meet the diverse needs of their users.

However, the digital environment also raises important questions about **intellectual property**, including copyright, fair use, and open access. Understanding these issues is essential for librarians and users alike, ensuring that information is accessed legally and ethically.



The aim of this Series is to introduce you to the concept of digital libraries, explore the role of web resources in library services, and examine intellectual property considerations in the digital age.

We shall commence this Series by defining digital libraries and discussing their characteristics, advantages, and challenges. Next, we will explore web resources and the ICT tools used to access and manage them. Finally, we will conclude by examining intellectual property issues, focusing on copyright, fair use, and open access.

### Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 4.1** define the concept and characteristics of digital libraries,
- **SLO 4.2** explain the advantages and challenges of digital libraries,
- **SLO 4.3** identify types of web resources and describe ICT tools for accessing them,
- **SLO 4.4** analyse intellectual property issues in the digital age, including copyright, fair use, and open access.

## 4.1 Concept of Digital Libraries

### 4.1.1 Definition and Characteristics of Digital Libraries

A **digital library** is a collection of electronic resources and services that are accessible through ICT. Unlike traditional libraries, digital libraries store materials in digital formats such as e-books, journals, images, audio, and video. They provide remote access, advanced search capabilities, and multimedia integration.

Key characteristics of digital libraries include:

- Remote accessibility from anywhere with an Internet connection.
- Integration of diverse formats (text, audio, video, images).
- Advanced search and retrieval functions.
- Resource sharing across institutions.

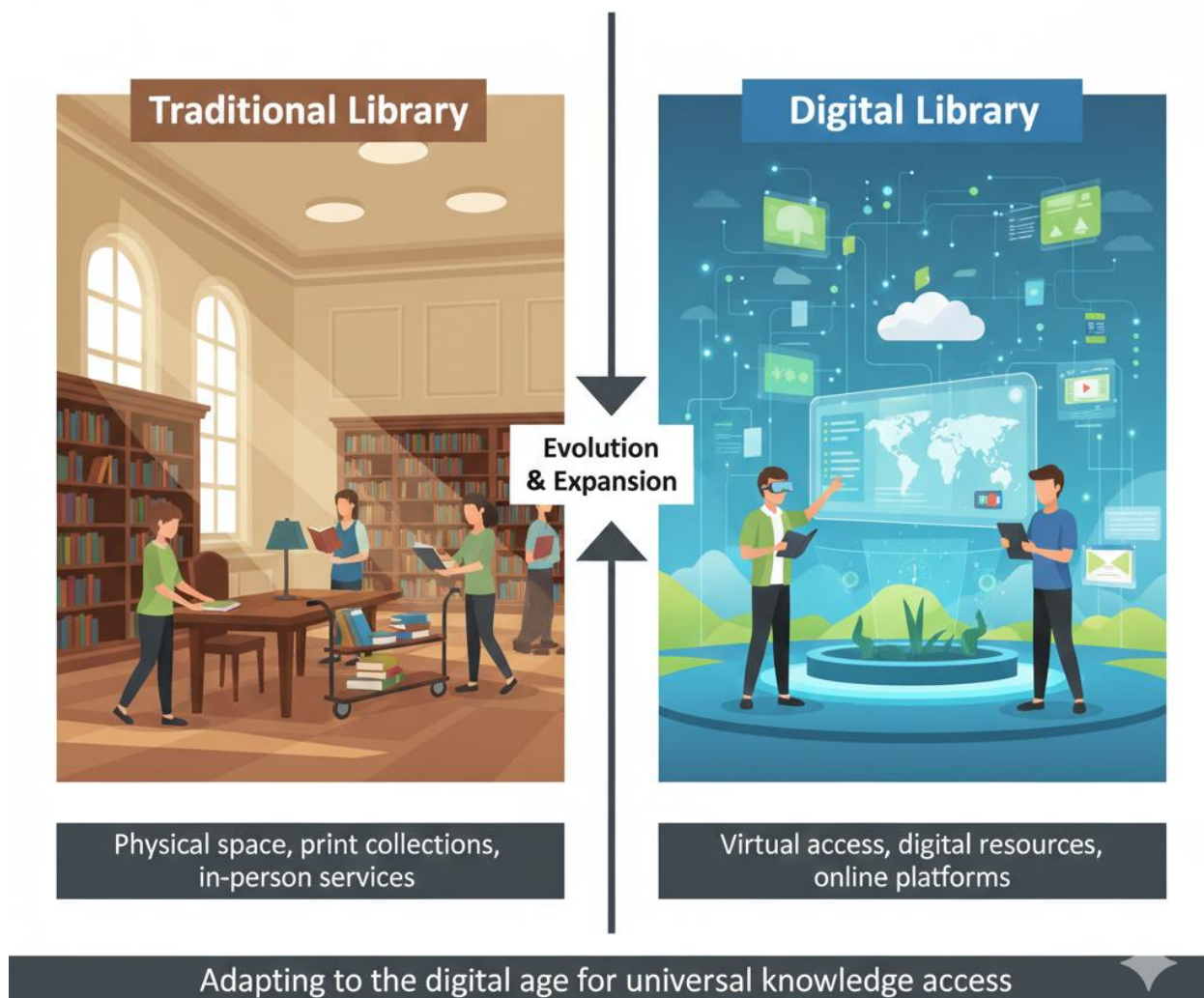
Fill in the blank: A digital library is a collection of \_\_\_\_\_ resources and services accessible through ICT.

**Figure 4.1:**



## Figure 4.1: Traditional Library vs Digital Library

Bridging the past and future of information access



### 4.1.2 Advantages and Challenges of Digital Libraries

Digital libraries offer several advantages:

- **Accessibility:** Users can access resources remotely at any time.
- **Efficiency:** Advanced search tools save time and improve precision.
- **Resource sharing:** Libraries can share collections across networks.
- **Preservation:** Digital formats help preserve rare and fragile materials.

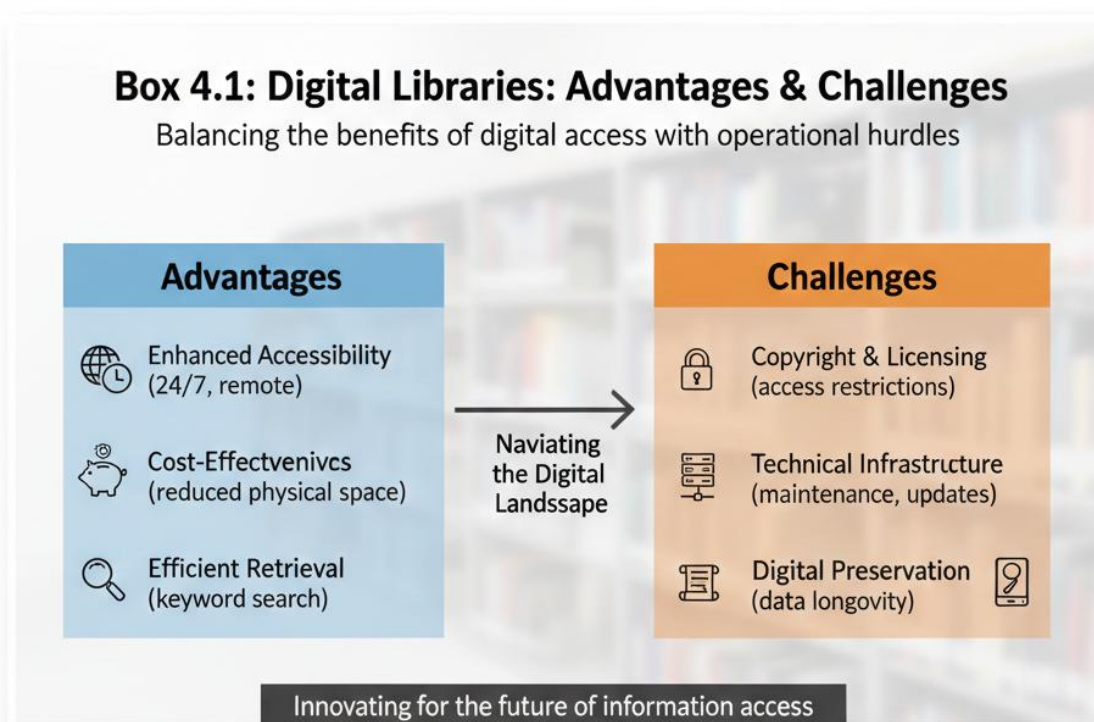


However, challenges include:

- **Technical issues:** Dependence on ICT infrastructure and Internet connectivity.
- **Copyright concerns:** Managing intellectual property rights in digital formats.
- **Digital divide:** Limited access for users without reliable technology.
- **Maintenance costs:** Continuous updates and system management.

Fill in the blank: One challenge of digital libraries is managing \_\_\_\_\_ property rights in digital formats.

**Box 4.1:**



## Pilot questions 4.1

1. A digital library is a collection of \_\_\_\_\_ resources and services accessible through ICT.
2. One characteristic of digital libraries is \_\_\_\_\_ accessibility from anywhere with an Internet connection.
3. Digital libraries integrate diverse formats such as text, audio, video, and \_\_\_\_\_.
4. One advantage of digital libraries is that they help preserve rare and \_\_\_\_\_ materials.
5. One challenge of digital libraries is managing \_\_\_\_\_ property rights in digital formats.

## 4.2 Web Resources in Library Services

### 4.2.1 Types of Web Resources

**Web resources** are digital materials available online that libraries use to support learning, teaching, and research. Common types include:

- **E-books:** Digital versions of printed books, accessible on computers or mobile devices.
- **Online journals:** Scholarly articles published electronically, often through subscription databases.
- **Repositories:** Collections of academic or institutional works, often open access.
- **Websites:** General information sources, ranging from government portals to educational platforms.

Fill in the blank: Online journals are scholarly articles published \_\_\_\_\_ through subscription databases.

### Figure 4.2:



## Figure 4.2: Types of Web Resources

Exploring fo diverse landssape of online information



### 4.2.2 ICT Tools for Accessing and Managing Web Resources

Libraries rely on ICT tools to access and manage web resources effectively. These include:

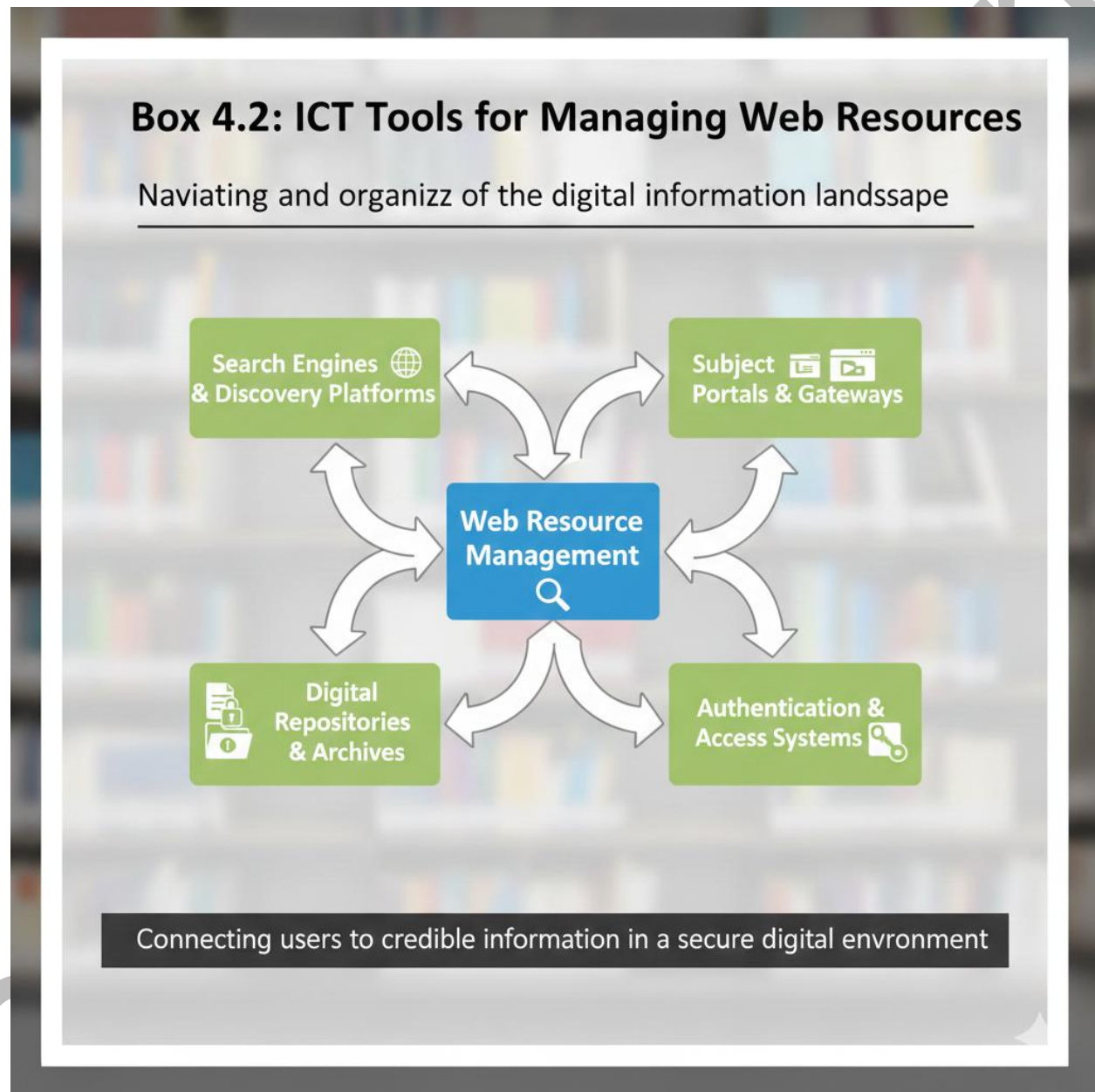
- **Search engines:** Tools like Google Scholar that help locate academic materials.
- **Library portals:** Platforms that provide access to subscribed resources and catalogues.
- **Digital repositories:** Systems that store and manage institutional publications.
- **Authentication systems:** Tools such as proxy servers that ensure secure access to licensed resources.



For example, a university library may use a portal to give students access to subscribed journals, while authentication systems ensure only authorised users can log in.

Fill in the blank: Authentication systems such as proxy servers ensure secure access to \_\_\_\_\_ resources.

**Box 4.2:**



**Pilot questions 4.2**

1. Online journals are scholarly articles published \_\_\_\_\_ through subscription databases.



2. Repositories are collections of academic or \_\_\_\_\_ works, often open access.
3. Search engines such as Google Scholar help locate \_\_\_\_\_ materials.
4. Library portals provide access to subscribed resources and \_\_\_\_\_.
5. Authentication systems such as proxy servers ensure secure access to \_\_\_\_\_ resources.

### 4.3 Intellectual Property in the Digital Age

#### 4.3.1 Concept of Intellectual Property (IP) in Libraries

**Intellectual property (IP)** refers to creations of the mind, such as literary works, music, inventions, and designs, which are legally protected. In the context of libraries, IP is particularly relevant to digital resources, as libraries must respect the rights of authors and publishers when providing access to materials.

Libraries play a dual role: they promote access to information while ensuring compliance with IP laws. This balance is crucial in the digital age, where copying and sharing materials is easier than ever.

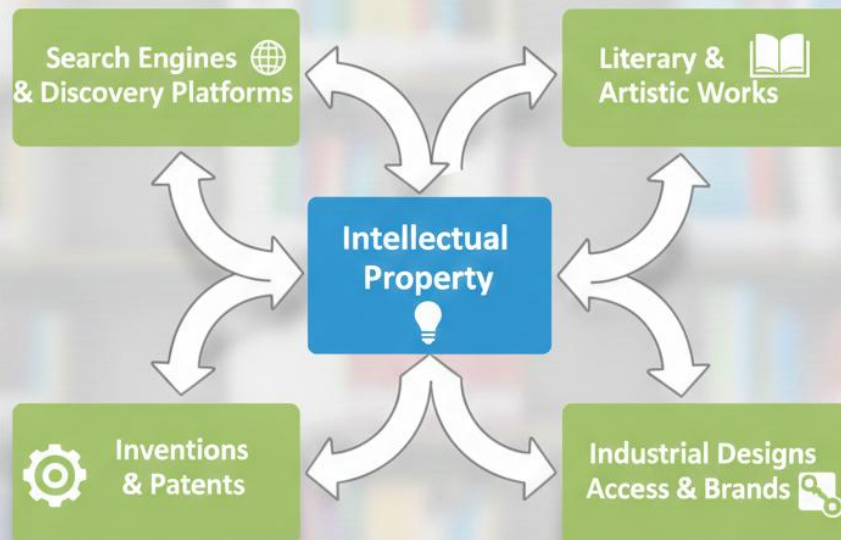
Fill in the blank: Intellectual property refers to creations of the \_\_\_\_\_ that are legally protected.

**Figure 4.3:**



## Figure 4.3: Examples of Intellectual Property

Protecting creativity and innovation in the digital age



Safeguarding human ingenuity for future digital prosperity

### 4.3.2 Copyright, Fair Use, and Open Access Considerations

**Copyright** grants authors exclusive rights to reproduce, distribute, and display their works. Libraries must respect copyright by ensuring that digital resources are accessed legally.

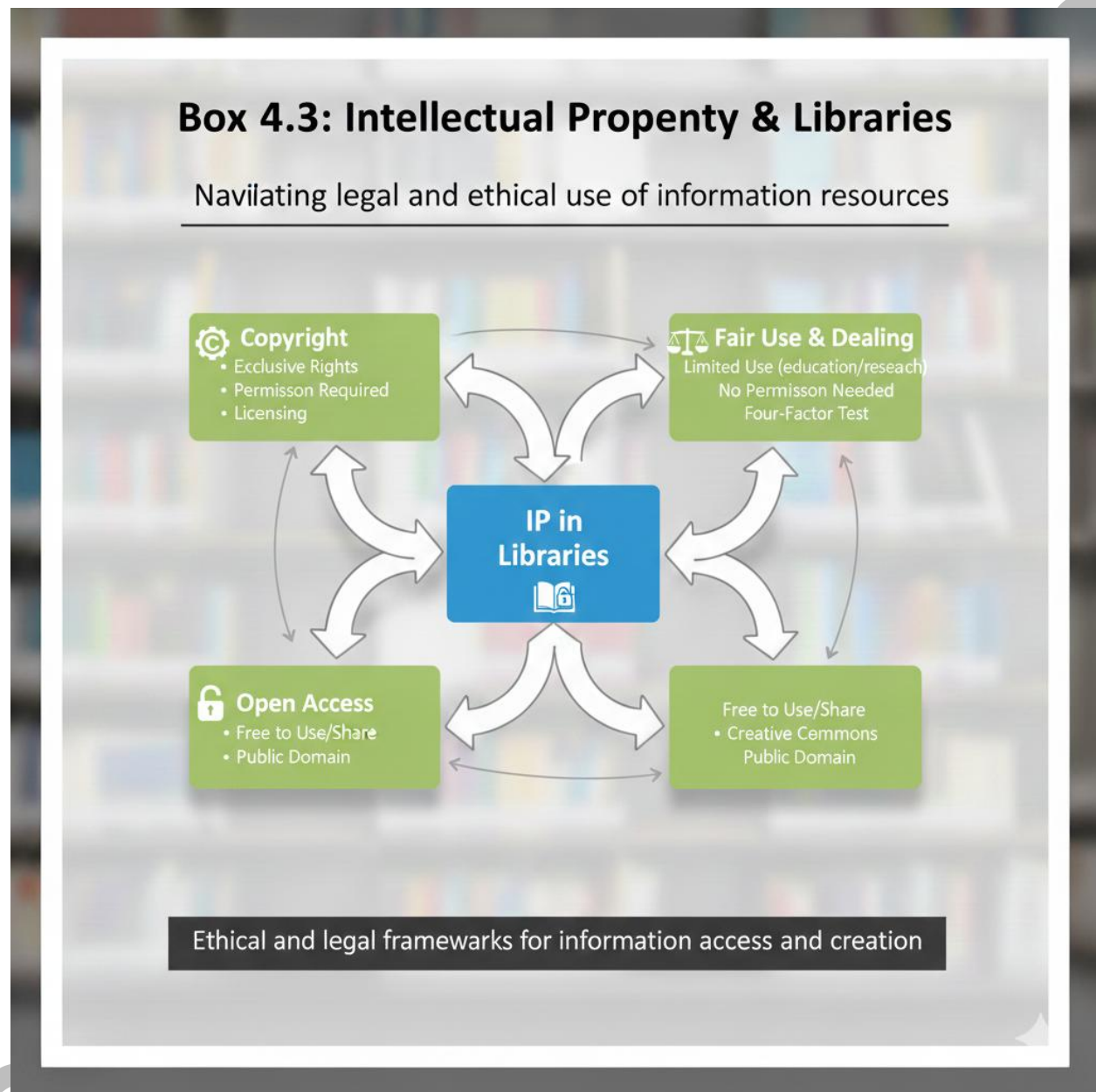
**Fair use** allows limited use of copyrighted materials without permission, typically for purposes such as education, research, or criticism. For example, quoting a short passage from a book for academic study may be considered fair use.

**Open access** refers to resources that are freely available online without copyright restrictions. Libraries increasingly promote open access repositories to expand access to scholarly materials.



Fill in the blank: Fair use allows limited use of copyrighted materials without \_\_\_\_\_ from the author.

**Box 4.3:**



**Pilot questions 4.3**

1. Intellectual property refers to creations of the \_\_\_\_\_ that are legally protected.
2. Copyright grants authors exclusive rights to reproduce, distribute, and \_\_\_\_\_ their works.



3. Fair use allows limited use of copyrighted materials without \_\_\_\_\_ from the author.
4. Open access refers to resources that are freely available online without \_\_\_\_\_ restrictions.
5. Libraries must balance promoting access to information with compliance to \_\_\_\_\_ laws.

### Series summary

This Series has explored how digital technologies reshape library services. We began by defining **digital libraries**, identifying their characteristics such as remote accessibility, multimedia integration, and advanced search functions, while also noting challenges like copyright concerns and technical limitations. We then examined **web resources**, including e-books, online journals, repositories, and websites, alongside ICT tools such as search engines, portals, and authentication systems that enable secure access. Finally, we considered **intellectual property in the digital age**, focusing on copyright, fair use, and open access, and how libraries balance promoting access with compliance to legal frameworks.

By engaging with these topics, you should now be able to define digital libraries, explain their advantages and challenges, identify types of web resources and ICT tools, and analyse intellectual property issues such as copyright and fair use, as outlined in the Series Learning Outcomes.

### Glossary of terms

- **Authentication systems:** ICT tools such as proxy servers that ensure secure access to licensed resources.
- **Copyright:** Legal rights granted to authors to reproduce, distribute, and display their works.
- **Digital library:** A collection of electronic resources and services accessible through ICT.
- **Fair use:** Limited use of copyrighted materials without permission, typically for education or research.
- **Intellectual property (IP):** Creations of the mind, such as literary works, inventions, and designs, that are legally protected.
- **Open access:** Resources freely available online without copyright restrictions.
- **Repositories:** Collections of academic or institutional works, often open access.
- **Web resources:** Digital materials available online, including e-books, journals, repositories, and websites.



## Concept check questions

### Objective questions

1. (Linked to SLO 4.1) A digital library is a collection of \_\_\_\_\_ resources and services accessible through ICT.
2. (Linked to SLO 4.2) One challenge of digital libraries is managing \_\_\_\_\_ property rights in digital formats.
3. (Linked to SLO 4.4) Fair use allows limited use of copyrighted materials without \_\_\_\_\_ from the author.

### Short-answer questions

4. (Linked to SLO 4.1) List two characteristics of digital libraries.
5. (Linked to SLO 4.3) Identify two types of web resources used in libraries.
6. (Linked to SLO 4.4) What is one way libraries promote open access?

### Long-answer questions

7. (Linked to SLO 4.2) Explain the advantages and challenges of digital libraries, giving examples.
  - *Basic response:* Advantages include accessibility and efficiency; challenges include copyright and technical issues.
  - *Value-added response:* Outstanding learners may discuss resource sharing, preservation, and the digital divide.
8. (Linked to SLO 4.4) Analyse how libraries balance intellectual property rights with promoting access to information.
  - *Basic response:* Libraries respect copyright while providing fair use access.
  - *Value-added response:* Outstanding learners may highlight open access initiatives, licensing agreements, and ethical considerations.

## Answers to Concept Check Questions

1. Electronic
2. Intellectual
3. Permission
4. Remote accessibility and multimedia integration.



5. E-books and online journals.
6. By supporting open access repositories.
7. *Basic response*: Digital libraries improve accessibility but face copyright and technical challenges. *Value-added response*: They also enable resource sharing and preservation, but the digital divide remains a challenge.
8. *Basic response*: Libraries respect copyright while allowing fair use. *Value-added response*: They also promote open access, negotiate licences, and educate users about ethical use.

### Answers to Pilot Questions

**Pilot questions 4.1:** Electronic; Remote; Images; Fragile; Intellectual.

**Pilot questions 4.2:** Electronically; Institutional; Academic; Catalogues; Licensed.

**Pilot questions 4.3:** Mind; Display; Permission; Copyright; IP.

### References and Attributions

- Course document: *LIS 212 Introduction to ICT in Library and Information Services* (syllabus provided).
- Suggested illustrations:
  - Figure 4.1: Traditional vs digital libraries (AI prompt: “Create a side-by-side infographic comparing traditional libraries with digital libraries”).
  - Box 4.1: Advantages and challenges of digital libraries (AI prompt: “Create a diagram listing advantages such as accessibility and efficiency, and challenges such as copyright and technical issues”).
  - Figure 4.2: Types of web resources (AI prompt: “Create a diagram showing e-books, online journals, repositories, and websites as web resources”).
  - Box 4.2: ICT tools for web resources (AI prompt: “Create a diagram showing search engines, portals, repositories, and authentication systems as ICT tools for web resources”).
  - Figure 4.3: Examples of intellectual property (AI prompt: “Create a diagram showing books, music, inventions, and designs as examples of intellectual property”).
  - Box 4.3: Copyright, fair use, and open access (AI prompt: “Create a diagram showing copyright, fair use, and open access as three aspects of intellectual property in libraries”).



## LIS212 Introduction to ICT in Library and Information Services (2 Units)

### Series 5 ICT Challenges and Prospects in Nigerian Libraries

#### Series outline

- **Part 5.1: ICT Challenges in Nigerian Libraries**
  - Sub-Part 5.1.1: Infrastructural and technical challenges
  - Sub-Part 5.1.2: Human resource and policy challenges
- **Part 5.2: Prospects of ICT in Nigerian Libraries**
  - Sub-Part 5.2.1: Opportunities for improved access and services
  - Sub-Part 5.2.2: Future directions and innovations

#### Introduction

Libraries in Nigeria, like those in many developing countries, face unique challenges in adopting ICT for information services. Issues such as inadequate infrastructure, unreliable power supply, limited funding, and insufficient ICT skills among staff hinder full automation and digital transformation. Despite these challenges, there are significant **prospects** for ICT in Nigerian libraries, including improved access to global information resources, enhanced service delivery, and opportunities for collaboration through digital networks.

The aim of this Series is to critically examine the challenges facing ICT adoption in Nigerian libraries and to highlight the prospects and future directions for overcoming these barriers.

We shall commence this Series by analysing infrastructural, technical, human resource, and policy challenges. Next, we will explore the prospects of ICT in Nigerian libraries, focusing on opportunities for improved access, service delivery, and innovations.

#### Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 5.1** identify infrastructural and technical challenges of ICT adoption in Nigerian libraries,
- **SLO 5.2** explain human resource and policy challenges affecting ICT use,
- **SLO 5.3** analyse the prospects of ICT for improved access and services in Nigerian libraries,
- **SLO 5.4** evaluate future directions and innovations for ICT in Nigerian libraries.



## 5.1 ICT Challenges in Nigerian Libraries

### 5.1.1 Infrastructural and Technical Challenges

Nigerian libraries face significant infrastructural and technical barriers to ICT adoption. These include:

- **Unreliable power supply:** Frequent outages disrupt ICT services and limit access to digital resources.
- **Poor Internet connectivity:** Slow or unstable Internet hinders access to online databases and resources.
- **Inadequate hardware and software:** Many libraries lack modern computers, servers, and licensed software.
- **Limited funding:** Insufficient budgets prevent investment in ICT infrastructure and maintenance.

For example, a university library may struggle to provide consistent access to e-resources due to unstable Internet and lack of backup power systems.

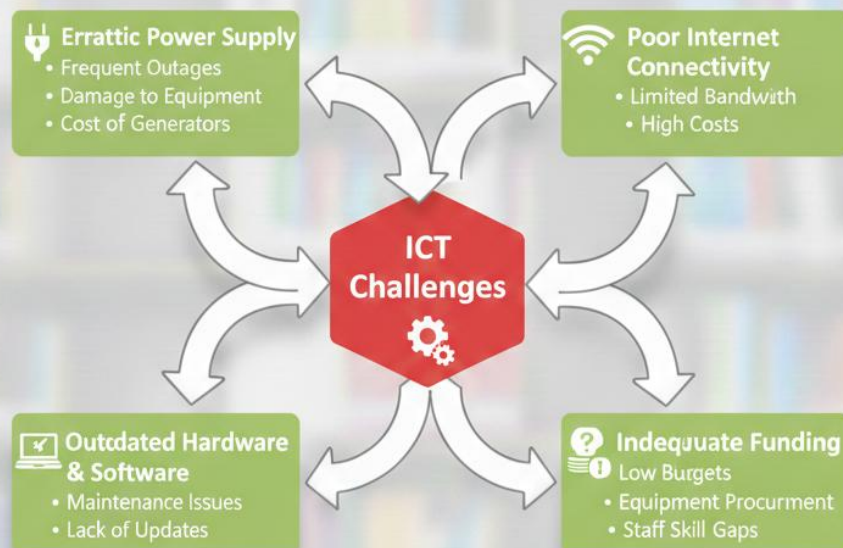
Fill in the blank: One major infrastructural challenge in Nigerian libraries is unreliable \_\_\_\_\_ supply.

**Figure 5.1:**



## Figure 5.1: ICT Challenges in Nigerian Libraries

Bridging the gap to digital information access



Overcoming infrastructural hurdles for digital library advancement

### 5.1.2 Human Resource and Policy Challenges

Beyond infrastructure, human resource and policy issues also affect ICT adoption:

- **Limited ICT skills:** Many library staff lack adequate training in ICT tools and systems.
- **Resistance to change:** Some staff prefer traditional methods, slowing digital transformation.
- **Policy gaps:** Lack of clear national or institutional ICT policies for libraries.



- **Inconsistent support:** Weak government and institutional commitment to ICT development.

For instance, without proper training, staff may be unable to manage digital catalogues or troubleshoot ICT systems, reducing efficiency.

Fill in the blank: One human resource challenge in Nigerian libraries is limited \_\_\_\_\_ skills among staff.

**Box 5.1:**



**Pilot questions 5.1**

1. One major infrastructural challenge in Nigerian libraries is unreliable \_\_\_\_\_ supply.



2. Poor Internet connectivity hinders access to online \_\_\_\_\_ and resources.
3. Many libraries lack modern computers, servers, and licensed \_\_\_\_\_.
4. One human resource challenge in Nigerian libraries is limited \_\_\_\_\_ skills among staff.
5. Weak government and institutional commitment reflects a \_\_\_\_\_ gap in ICT development.

## 5.2 Prospects of ICT in Nigerian Libraries

### 5.2.1 Opportunities for Improved Access and Services

Despite the challenges, ICT offers significant opportunities for Nigerian libraries:

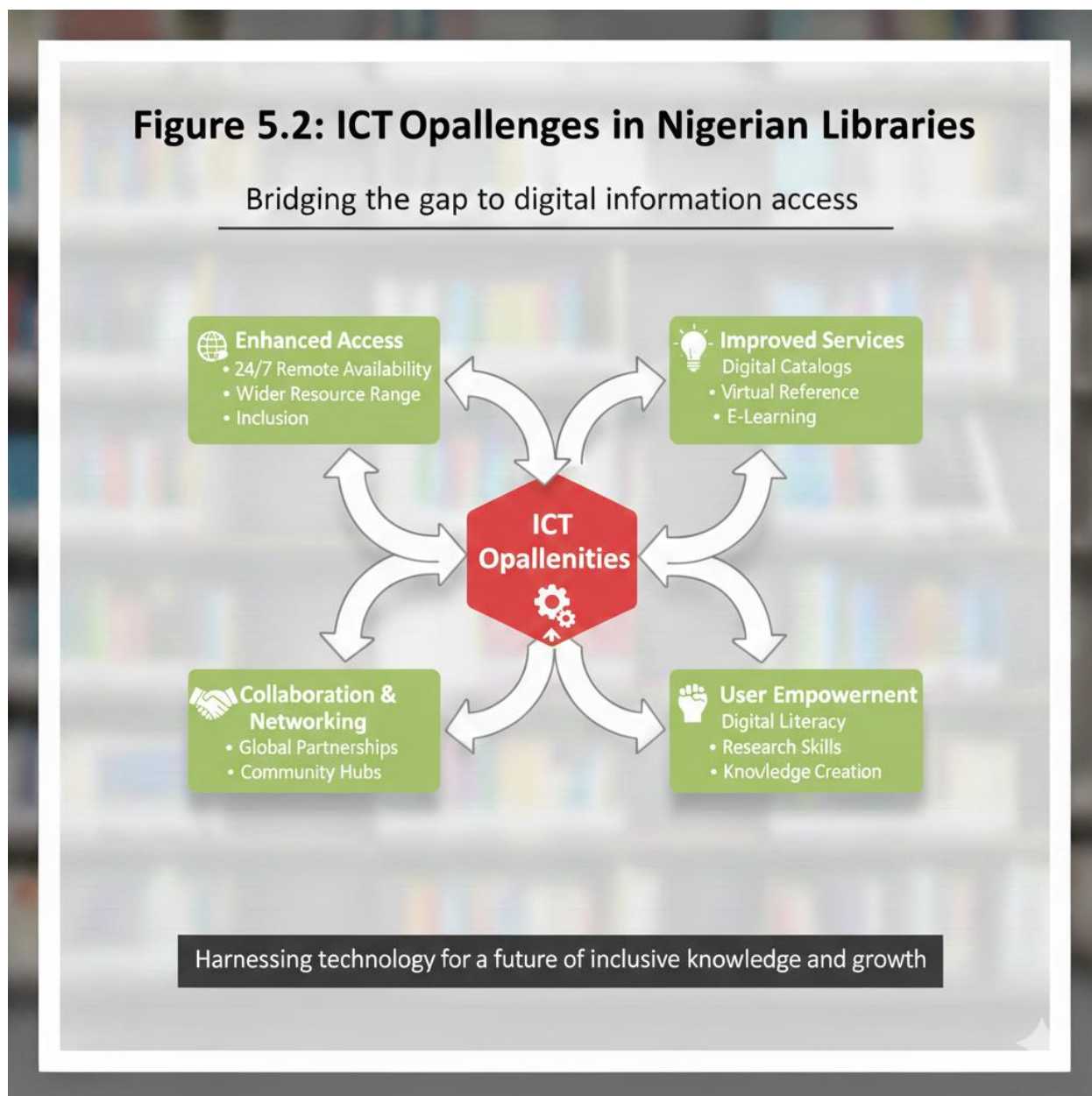
- **Enhanced access:** ICT enables users to access global information resources, including e-books, journals, and databases.
- **Improved service delivery:** Automated cataloguing, circulation, and reference services increase efficiency.
- **Collaboration:** ICT supports resource sharing among libraries through networks and consortia.
- **User empowerment:** Remote access and self-service tools give users greater independence.

For example, a Nigerian university library can join an international consortium to provide students access to thousands of scholarly journals.

Fill in the blank: ICT enables Nigerian libraries to access global information resources such as e-books, journals, and \_\_\_\_\_.

**Figure 5.2:**





#### 5.2.2 Future Directions and Innovations

Looking ahead, ICT adoption in Nigerian libraries can be strengthened through:

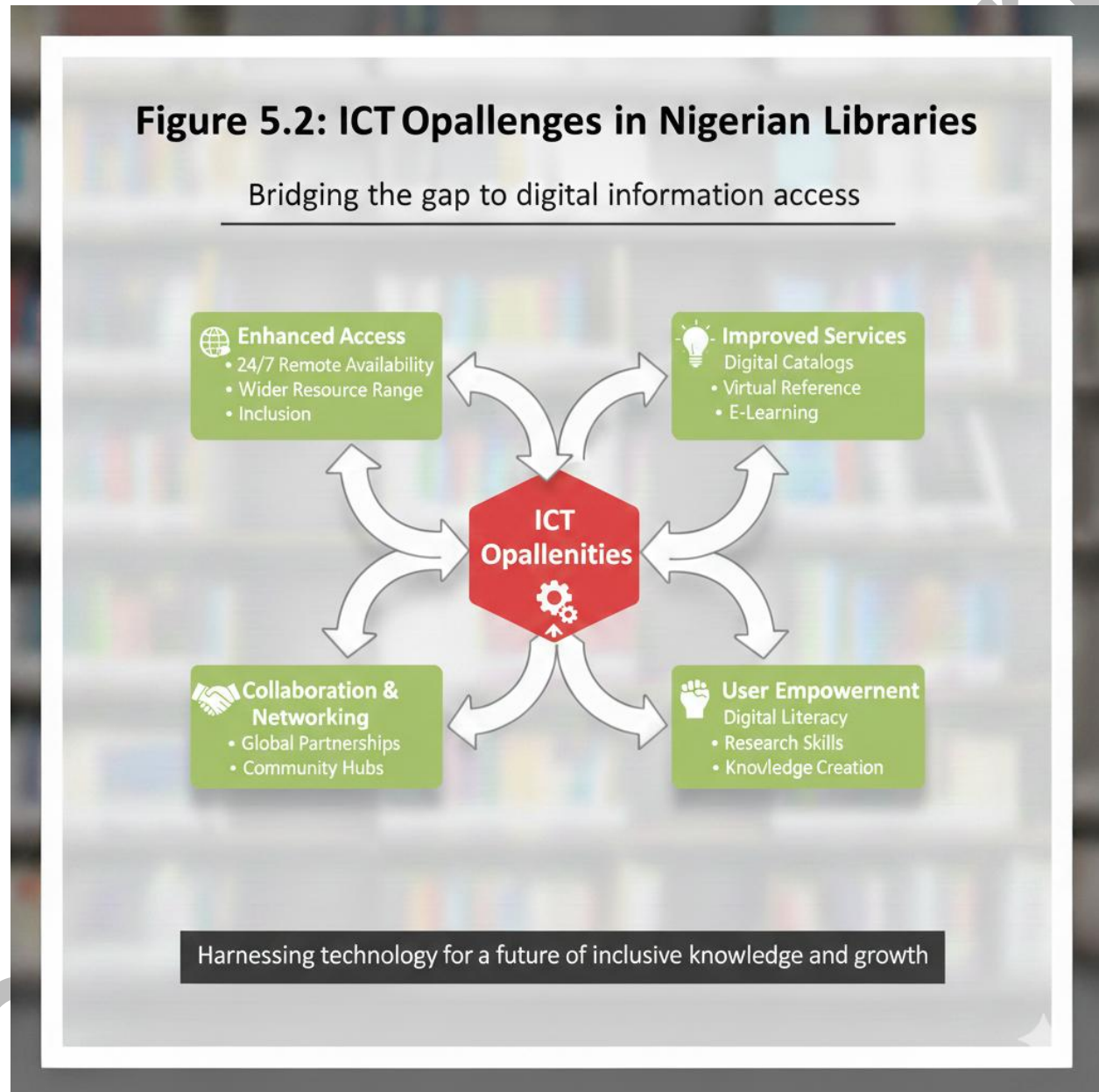
- **Digital repositories:** Establishing institutional repositories for research outputs.
- **Mobile technologies:** Using mobile apps to provide library services on smartphones.
- **Cloud computing:** Leveraging cloud platforms for storage and resource sharing.
- **Artificial intelligence (AI):** Applying AI for personalised information retrieval and recommendation systems.



- **Policy development:** Creating strong national and institutional ICT policies to guide implementation.

Fill in the blank: One future direction for ICT in Nigerian libraries is the use of \_\_\_\_\_ computing for storage and resource sharing.

**Box 5.2:**



**Pilot questions 5.2**

1. ICT enables Nigerian libraries to access global information resources such as e-books, journals, and \_\_\_\_\_.



2. Automated cataloguing and circulation improve library service \_\_\_\_\_.
3. ICT supports resource sharing among libraries through networks and \_\_\_\_\_.
4. One future direction for ICT in Nigerian libraries is the use of \_\_\_\_\_ computing for storage and resource sharing.
5. Applying AI in libraries can support personalised information \_\_\_\_\_ systems.

### Series summary

This Series examined the realities of ICT adoption in Nigerian libraries. We began with **infrastructural and technical challenges**, such as unreliable power supply, poor Internet connectivity, inadequate hardware/software, and limited funding. We then explored **human resource and policy challenges**, including limited ICT skills, resistance to change, policy gaps, and weak institutional support. Despite these barriers, we highlighted the **prospects of ICT**, such as enhanced access to global resources, improved service delivery, collaboration, and user empowerment. Finally, we looked at **future directions and innovations**, including digital repositories, mobile technologies, cloud computing, artificial intelligence, and stronger policy frameworks.

By engaging with these topics, you should now be able to identify challenges, explain human resource and policy issues, analyse prospects, and evaluate future directions for ICT in Nigerian libraries, as outlined in the Series Learning Outcomes.

### Glossary of terms

- **Artificial intelligence (AI):** ICT technology that enables machines to perform tasks such as personalised information retrieval.
- **Authentication systems:** ICT tools that ensure secure access to licensed resources.
- **Cloud computing:** Using remote servers and platforms to store and share resources.
- **Digital divide:** The gap between those who have access to ICT and those who do not.
- **Digital repository:** An online system for storing and managing institutional research outputs.
- **ICT skills:** Knowledge and ability to use ICT tools effectively.
- **Infrastructural challenges:** Barriers related to power, Internet, hardware, and funding.
- **Policy gaps:** Lack of clear national or institutional ICT policies guiding library development.



## Concept check questions

### Objective questions

1. (Linked to SLO 5.1) One major infrastructural challenge in Nigerian libraries is unreliable \_\_\_\_\_ supply.
2. (Linked to SLO 5.2) One human resource challenge in Nigerian libraries is limited \_\_\_\_\_ skills among staff.
3. (Linked to SLO 5.4) One future direction for ICT in Nigerian libraries is the use of \_\_\_\_\_ computing for storage and resource sharing.

### Short-answer questions

4. (Linked to SLO 5.1) List two infrastructural challenges facing Nigerian libraries.
5. (Linked to SLO 5.2) Explain one policy challenge affecting ICT adoption in Nigerian libraries.
6. (Linked to SLO 5.3) Identify two prospects of ICT in Nigerian libraries.

### Long-answer questions

7. (Linked to SLO 5.1 & 5.2) Analyse infrastructural and human resource challenges of ICT adoption in Nigerian libraries.
  - *Basic response:* Challenges include unreliable power, poor Internet, and limited ICT skills.
  - *Value-added response:* Outstanding learners may discuss funding shortages, resistance to change, and policy gaps.
8. (Linked to SLO 5.3 & 5.4) Evaluate the prospects and future directions of ICT in Nigerian libraries.
  - *Basic response:* ICT offers improved access, service delivery, and collaboration.
  - *Value-added response:* Outstanding learners may highlight innovations such as mobile apps, cloud computing, AI, and policy development.

## Answers to Concept Check Questions

1. Power
2. ICT
3. Cloud



4. Unreliable power supply and poor Internet connectivity.
5. Lack of clear national ICT policies guiding library development.
6. Enhanced access to global resources and improved service delivery.
7. *Basic response*: Nigerian libraries face unreliable power, poor Internet, and limited ICT skills. *Value-added response*: They also struggle with funding shortages, resistance to change, and policy gaps.
8. *Basic response*: ICT improves access, service delivery, and collaboration. *Value-added response*: Future directions include mobile apps, cloud computing, AI, and stronger policies.

### Answers to Pilot Questions

**Pilot questions 5.1:** Power; Databases; Software; ICT; Policy.

**Pilot questions 5.2:** Databases; Delivery; Consortia; Cloud; Retrieval.

### References and Attributions

- Course document: *LIS 212 Introduction to ICT in Library and Information Services* (syllabus provided).
- Suggested illustrations:
  - Figure 5.1: ICT challenges infographic (AI prompt: “Create an infographic showing power supply, Internet connectivity, hardware/software, and funding as ICT challenges in Nigerian libraries”).
  - Box 5.1: Human resource and policy challenges diagram (AI prompt: “Create a diagram listing ICT skills gaps, resistance to change, policy gaps, and weak institutional support as challenges”).
  - Figure 5.2: ICT opportunities infographic (AI prompt: “Create an infographic showing enhanced access, improved services, collaboration, and user empowerment as ICT prospects in Nigerian libraries”).
  - Box 5.2: Future innovations diagram (AI prompt: “Create a diagram showing digital repositories, mobile apps, cloud computing, AI, and policy development as future directions for ICT in Nigerian libraries”).



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