A Textbook on the

USE OF LIBRARY, STUDY SKILLS AND INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

Edited by

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FOREWORD

I consider it an honour to write the foreword to this highly detailed textbook on the *Use of Library, Study Skills and Information and Communication Technology* (ICT). This academic material provides students with the vast repertoire of the knowledge that libraries hold and enhances their ability to use the modern-day versions of these reference centres with assured expertise. Since information is crucial to all human endeavours, access to privileged information has overtime been reinstated to be capable of amplifying the chances of right decisions made by human beings. The result of this is an exponential experience of growth which breeds confidence in one's proficiency. The realisation of the importance of information to humans gives room to the incorporation of this course into the curriculum of the General Studies Unit of Chrisland University, Abeokuta.

An information centre such as the library is charged with the responsibility of providing facts that increase the progress of human activities within all societies. Libraries as main enhancers of effective researches hold pivotal position within the educational sector. For instance, libraries are instrumental in assisting researchers and students in writing papers, theses and treatises that shape society towards positive development. Therefore, becoming familiar with the resources in the library is one way students can attain resounding successes in their academic endeavours, thus making it pertinent for them not just to acquire information but also to acquire skills that help them access information beyond their immediate environment; and this is where the awareness of Information Technology (ICT) becomes necessary.

The content of this book is all-encompassing. Chapter one introduces the student to the concepts, history and types of libraries that are available in the contemporary Nigerian context. Chapters two and three explore the objectives and functions of the library, with particular emphasis on the different access available for use in the library, specifically naming distinct types of library reference materials. Meanwhile, chapters four and five familiarise the student with how to use the resources within the library, placing a little emphasis on catalogues and classification. Chapters six and seven explicate the need for acquiring study skills and copyright laws. Chapters eight and nine outline the risk associated with plagiarism and other dubious acts within the academia. Focusing attention on electronic database in educational libraries, the relationship between hardware and software technologies are established in chapters ten and eleven, in combination with a discussion on input, storage and output devices. Chapter twelve serves as the concluding chapter as it examines information and communication technology, and the internet. It gives a general appraisal of the need for functional internet facilities within library centres.

The topics are diverse and well researched and the contributors are seasoned intellectuals with proven academic records, a fact which makes this book an inestimable treasure that is highly recommended for use in any university and other tertiary institutions of learning.

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10th October, 2024

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CHAPTER 1
CONCEPTS, HISTORY, AND TYPES OF LIBRARIES
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Introduction

Information Literacy (IL) is one of the 21st-century skills undergraduates should acquire. Without such literacy, it will be difficult for any individual to function in the modern world, known as the Information Age. This is where the library comes in. Being the centre of information warehousing, processing, and dissemination, the ability to use the library is a key component of Information Literacy Skills (ILS). Acquiring this skill is thus essential for students' success in their academic journey and beyond. This is the central aim of this course, and this topic introduces the library. It is also aimed at familiarizing you with the concept of the library, its history, and the various types of libraries you could come across in the modern world.

Concept of Library

The term "Library" has been variously defined. However, there is a general belief that the word originates from the Latin word "Liber" which means "book." This origin reveals the relationship between the library and books from time immemorial. Nevertheless, the library has evolved beyond being a place where books are kept, and many of its definitions have expanded to encompass more robust details that reflect the significance of libraries as we have today.

At every institution of higher learning, libraries serve as a rallying point for academic activities. They collect and process information materials relevant to the programmes offered in their institutions and provide information services that connect library users to information materials.

As a fresh undergraduate, you may wonder why this course is compulsory. However, I am confident that the course will introduce you to lifelong learning skills that will make you information literate and instil in you the essential knowledge for using a library and other information access gateways – a skill you seriously need in today's world of Internet and information technology.

What is a Library?

Previous definitions of libraries have mostly been based on the functions or roles performed by libraries. Other individuals have defined libraries based on their perception of a library and how it should be described. Some of these definitions include:

(i)   UNESCO definition: A library is an organised collection of published books and other reading and audio-visual materials and the services of the staff who can provide and interpret such materials as required to meet the information, research, and recreational needs of its users.

(ii)   Aina (2004) defined a library as an institution "concerned with the collection, processing, storage, and dissemination of recorded information for reading, study, and consultation."

(iii)   Benjamin and Ifeka considered a library to be a system or sub-system that is used to store, process, and disseminate information-bearing materials

(iv)   The Merriam-Webster's dictionary defines a library as "a place in which literary, musical, artistic, or reference materials (such as books, manuscripts, recordings, or films) are kept for use but not for sale."

These definitions underscore the importance of the library as a place where people can access information materials. We can, therefore, for this course, define a library as:

> *a collection of information resources, such as books, databases, manuscripts, periodicals, reference materials, other sources of recorded knowledge, and associated technologies, that have been collected, processed, and organised for a specific group of users for reading, studying, and research.*

By now, you would have seen that libraries generally serve as the memory of societies by ensuring that knowledge is not lost from one generation to another due to the failure of human memory. Without libraries, it would have been difficult for people to learn about past events and discoveries. It would also be difficult to preserve today's knowledge for future generations.

As people interact with one another and their environment (the world), they generate knowledge and experience, written down in various information resources (books, parchment, maps, newspapers, etc.) that are then preserved in the library. Without

preservation of materials in the library, knowledge, discoveries and ideas would have been lost and untraceable, hindering the cumulative growth of human civilization and know-how.

Composition of Library

A library is made up of several elements. The basic elements that must be seen before a place can be regarded as a library in the true sense of the term include:

1.   **Space:** A library is primarily a space. Within the library space, many activities come up, including the acquisition, organization, and use of library resources and services. The library space is where all other elements of the library operate. A library space must be conducive, welcoming, and attractive. The space must contain other features of the library and not just exist as a vacuum. Without those elements, a space cannot be designated as a library – it may be a mere reading room. In modern times, library space can be virtual. That means, the library space may exist on the Internet, where users visit to access resources. Virtual libraries still comprise all other elements of libraries listed below, but the elements are usually less visible in this case. Internet users today use libraries from different parts of the world unknowingly.

2.   **Information resources/materials**: the existence of a library hinges on its ability to provide information resources for its users. These resources must be carefully selected and acquired to meet the needs of the library users. Information resources contain recorded or documented knowledge, such as textbooks, journals, atlas, dictionaries, newspapers, theses, dissertations, and biographies. They may be available in print or electronic versions and must be accessible to library users. The richness of a library in terms of information resources often determines its strength and prestige because a library with a robust amount of information resources will be invaluable to its users, who will constantly visit to utilize the library collections. You will learn more about information materials in subsequent classes in this course.

3.   **Library users:** the library users are important elements of a Library. They are also referred to as library patrons or clientele. They include students, lecturers, researchers and other readers. They are often treated like customers who have come to patronize library resources and services. The library users vary according to different types of libraries, as we will consider soon. A library is expected to understand the needs of its users and strive to meet them. On the other hand, the users are expected to patronize library resources and services and abide by the rules and regulations of the library. As an undergraduate, you are automatically a library user at your institution.

4.   Library personnel: a library can only function effectively when qualified personnel manage it. This is because the technical work involved in librarianship can only be successfully carried out by trained personnel. These are professionals who are certified in the field of librarianship and have adequate knowledge of library administration. Several categories of personnel may exist in your libraries, but usually, they will be categorized into professional, paraprofessional, and non-professional library staff. The professional library staff designs and implements library activities, while other staff categories support getting the work done. In university settings, librarians often lead the professional group and usually have certifications up to Master's and Doctoral levels in Library and Information Science.

5.   Collection Development and Organisation Systems: every library must have a system by which it obtains information resources to be added to its collection. This is what is referred to as the Collection Development system. Later in this course, you will be taught the various ways in which libraries acquire resources. In addition, library resources are organised following standardized schemes. There are several types of schemes used globally and are called *classification systems*. They enable the library to organise resources for easy access and retrieval. Without the use of a classification system for organizing library resources, it will be impossible to locate specific books in the library.

6.   Rules and regulations: libraries are guided by policies. Typically, libraries are community centres that people from various backgrounds visit. Without the necessary rules and regulations, it will be difficult to preserve library resources for future generations. Libraries often have rules on opening hours, collection types, user behaviour, loaning policy and so on.

History and Development of Libraries

As mentioned earlier, the term library comes from the word 'Libre', a Latin word that means 'book.' This word was chosen because in the early days, libraries were known as places for keeping books. At that time, books were the sole media for information or knowledge recording and dissemination. Library history can be traced back to the 3rd and 4th Centuries. The earliest sign of libraries was found around 3,500 B.C. within early civilizations in Egypt and Mesopotamia. Later civilizations, such as that of China in the 12th century, also impacted the development of libraries. Libraries began due to the inadequacy of preserving knowledge through oral means.

Before writing was invented, knowledge acquired by humans was disseminated from one person to another orally (word of mouth). This may be through storytelling, folk tales, and

many other avenues for oral communication. Nevertheless, oral preservation of knowledge was limited by language barriers, memory deficiencies, and even the sudden death of the knowledge bearer. This led to the invention of writing, whereby knowledge was documented on leaves, parchments, bones, etc. Such writing, which became very popular around 3,500 BC among the Egyptians, Phoenicians, Sumerians, the Romans, and the Greeks, served as the harbinger for what we know as libraries today. Because whatever is written needs to be kept and preserved, so that they do not become mutilated or damaged, libraries were invented to store and preserve the writings.

The Egyptians were well known for their hieroglyphic type of writing. The Egyptians utilized reeds grown along the River Nile to produce a material called papyrus, which was used as a book. The writings on papyrus are called hieroglyphics. As papyrus became large in number, they were initially kept as scrolls and later housed in a place that served as the library. In early Egypt, most of these records were kept in repositories in palaces and temples. The famous Alexandria Library in Egypt was later established during the reign of Ptolemy I (304 – 283 BC).

Aside from the Egyptians, the Sumerians (Babylonians) also came up with cuneiform, a type of writing that existed around 3,000 BC. This was done through inscriptions or impressions made on wet clay which are then baked to dryness. The Sumerian clay tablets were more durable than the Egyptian papyrus and were mostly preserved to be used by princes and kings.

In 1,500 BC, the Phoenicians invented the alphabet. They were commonly known as the Semitic people. The invention of the alphabet eased their documentation for business transactions. These alphabets were later expanded or modified to produce the different types of alphabets we have today.

While the Egyptian papyrus deteriorated fast, the Sumerian clay tablets were bulky, heavy, and prone to breaking when dropped. This led to the idea of paper production for writing. Paper was then invented in 105 A.D by a Chinese, Tsai Lun.

Besides the various types of writings invented by the Egyptians, Sumerians, Phoenicians, and Chinese, the Greeks, Romans, and the people of the Muslim world namely Damascus and Baghdad also significantly impacted the history and development of writing techniques, knowledge preservation and the development of libraries.

In Nigeria, among other factors, the Elliot Commission recommendations and the UNESCO Seminar of 1954 could be said to be the start of library practice. The establishment of missionaries in Nigeria between 1842 and 1945 introduced elite Nigerians to some form of libraries in schools. One such library was the Tom Jones Library, established in 1910. However, the UNESCO seminar gave the right footing for legal backing for establishing libraries. This led to the creation of three libraries: Municipal Library Lagos, Regional libraries in Enugu, Benin, Kaduna, and Ibadan, and foreign embassy libraries by the United States of America and the British Council. The establishment of universities and research institutes in Nigeria later promoted the development of libraries in the country.

Types of Libraries

Libraries are usually categorized according to the location where they are found, the type of users they serve, and the functions they perform. The different types of libraries have varying modes of operation and the community they serve. Let us briefly discuss some of the library types we have.

National Library

This is the apex library in any country. National libraries are established in every country to collect and organize all information resources published in or about the country. National libraries strive to acquire every information-bearing material published in a country. National libraries acquire materials published about their country from other countries. This makes the national library of any country the largest library in terms of collection. They are established by the federal/central government of the country through an act of parliament, which gives a national library the legal strength to demand a legal deposit – i.e., compulsory deposit – of all information materials published in the country. Thus, they serve as the official depository of knowledge in their country.

National libraries also serve as the centre for issuance of the International Standard Book Number (ISBN) and the International Standard Serial Number (ISSN), which may be understood as compulsory registration numbers for every book and serial publication respectively. If you publish a book today, you are required by law to deposit some copies at the National Library of Nigeria, or any other country where the book is published.

The National Library of Nigeria was established in the mid-1960s. It is headquartered in Abuja and has branches in every capital city of the Federation. The National Library welcomes all types of users. Every member of the society can use the services offered by the National Library since they are maintained through taxpayers' monies. The National Library

of Nigeria promotes literacy among the Nigerian public by organizing various activities to encourage reading and education among the citizens. The National Library of Nigeria is headed by a Chief Executive known as the National Librarian appointed by the President of the Federal Republic of Nigeria. The National Librarian is considered the number one Librarian in the country.

Academic Library

These libraries are found in tertiary institutions such as Polytechnics, Colleges of Education, and Universities. They are also referred to as post-secondary school libraries and can therefore, be found in universities, polytechnics, mono-technics, colleges, nursing schools, and other diploma awarding institutions. An academic library usually develops along with the development of its parent institution. In university systems, they have been regarded as the central structure around which teaching, learning, and research are developed. The information resource collection in an academic library is usually restricted to the programmes offered by the institution. Thus, a university library whose institution does not offer Architecture as a course of study should not be expected to have books on such discipline.

Academic libraries' services are usually designed to meet the curricular needs of their institutions. This means that their functions are often linked to the mission and vision of their parent institution. Users of these academic libraries are frequently restricted to staff members and students of the institution. However, based on inter-library cooperation, an academic library may arrange with the library of another institution to facilitate their library users' access to collections in the other library.

School Libraries

These are the types of libraries found in primary and secondary schools. They are often referred to as multi-media resource centres because their collection usually includes media resources that make learning fun and attractive for children. School libraries are very important in early childhood education. They expose children to reading at early stages in life to prepare them for lifelong learning and encourage the development of literate societies.

Librarians in school libraries are usually specialists in multimedia resources management. They ensure the library environment is colourful, attractive, and receptive to children. Most information resources in school libraries are acquired specifically for children and teenagers.

Such resources include flashcards, audio-visual recordings, filmstrips, computers, and so on, which facilitate multi-sensory learning among young library users.

Public Libraries

Public libraries are the type of libraries found within the community. They are established by the state or local government of a given location. They promote community literacy and encourage learning for every age group, gender, and race. By providing a service to all categories of people, public libraries maintain a collection of information resources that cover all subjects, unlike academic libraries, where the library focuses on the course or programmes offered by their parent institution.

Public libraries are funded by taxpayers' money, and they serve as community hubs where people in the community meet, unite, and learn. In Nigeria, almost every state has a public library located in its capital city; such libraries are open to the public and are important literacy and information dissemination avenues.

Special Libraries

These are libraries established for a specific group of people. They are often referred to as Information centres. They only service specialized users, such as workers in a company, research institute, agency, parliament, bank, etc. The collection of information resources in special libraries is also specialized to reflect the focus of their users. Issa (2003) explains that special libraries are established by businesses, professionals, and religious organisations.

Usually, special libraries keep a large amount of unpublished literature. This may include reports from the organisation, manuscripts, newspaper clippings, journals, notes, etc. Such materials are invaluable to workers in any organization as they ensure that organizational knowledge is not lost, and that information needed to function effectively and efficiently is readily available. Thus, they are not open to the public. Examples of special libraries in Nigeria include those at the Cocoa Research Institute of Nigeria, Ibadan, the National Assembly Library, Abuja, Central Bank of Nigeria, Tribune Newspaper Library, etc.

Private Libraries

These are libraries owned by individuals. Individual libraries often become recognized as a private library type when such an individual has acquired a large amount of book and non-book information resources. This library type is usually restricted to the owner and their immediate family members. The purpose is to ensure that the family remains knowledgeable in preparation for a knowledge economy or position of authority. Examples of such Libraries

include the Olusegun Obasanjo Presidential Library, Abeokuta, and the Library of the Emir Sanusi Lamido Sanusi, the former Emir of Kano.

In many cases, materials in private libraries are bequeathed to society – a public or academic library – when the owner passes on. This was the case with the former leader of Nigeria's Southwestern region, Chief Obafemi Awolowo, who bequeathed his private library – Sopulu Library, Ikenne – to Olabisi Onabanjo University.

Conclusion

Libraries are important institutions that preserve knowledge for society. Their existence ensures that people have access to the knowledge needed to grow and function towards the progress of their society. In modern times, libraries exist virtually, aside the physical libraries, but still comprise all other elements of a library. The ability to utilize library resources – physically and virtually – is an important skill in the 21st Century.

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CHAPTER 2
OBJECTIVES AND FUNCTIONS OF LIBRARIES
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Introduction

Libraries play a crucial role in society by serving as valuable repositories of information, knowledge, and culture. The objectives of libraries are multifaceted and often extend beyond simply providing a space for book storage. Here is an introduction to some key objectives and functions of libraries:

1. Access to Information

Libraries aim to provide access to information resources including books, journals, newspapers, and electronic databases. This supports the intellectual and educational needs of individuals, students, and their teachers. Below are some of the ways that libraries provide access to information to their user community:

***Diverse Collections*:** Libraries organised and maintain diverse collections of information resources, including books, journals, magazines, newspapers, audio-visual materials, and digital content. These collections cover a wide range of subjects and cater to the various informational needs of the community.

Open Shelves and Borrowing Services (Charging and Discharging): Many libraries have open shelves, allowing users to browse and access materials directly. Additionally, borrowing services enable users to check out materials for a specified period, promoting broader access to resources beyond the library's physical space.

Digital Resources: Libraries increasingly provide access to digital resources such as e-books, online databases, electronic journals, and multimedia content. This enhances access to materials, especially for those who prefer or require information in electronic formats.

***Reference Services*:** Libraries offer reference services to assist students and others in accessing information resources. Librarians and library staff are trained to help users navigate the catalogue, databases, and other resources effectively, ensuring they can locate the information they need.

***Interlibrary Loan Services*:** Interlibrary loan service is a service between libraries. This extends the reach of available resources and ensures that users have access to a broader

spectrum of information. For example, when a library does not have a book requested by a client, a loan request is made to another library that has the book. The library originating library borrows the book from a sister library and loans it out to the client. Students can request materials that are not available in the library and their request will be filled through interlibrary loan service.

Information Literacy Programmes: Libraries conduct information literacy programmes to empower users with the skills to critically evaluate, use, and navigate information resources. This includes teaching techniques for effective searching, source evaluation, and ethical use of information.

Public Computers and Internet Access: Many libraries provide public access to computers and the internet, enabling individuals who may not have these resources at home to connect with information online. This is particularly important for tasks such as job searching, online education, and communication.

Specialised Collections: Libraries often develop specialised collections in specific subject areas, catering to the unique needs of researchers, scholars, and enthusiasts. These collections can include rare books, archives, manuscripts, and other materials that contribute to in-depth research.

Cultural and Local Content: Libraries may collect and preserve materials related to the local community's history, culture, and heritage. This ensures that information about the community's past and present is accessible to current and future generations.

Promotion of Open Access: Some libraries actively support the principles of open access, advocating for the unrestricted availability of scholarly and research materials. This contributes to a more open and equitable dissemination of knowledge.

Overall, providing access to information is central to the mission of libraries, and they continually adapt their services to meet the evolving needs of their communities in the digital age.

2. Promoting Literacy

Promoting literacy is one of the objectives of libraries, and they undertake various initiatives to support literacy development in individuals of all ages. Libraries contribute to the promotion of literacy by offering a diverse collection of reading materials. They play a vital

role in fostering a reading culture and supporting lifelong learning among students. The other ways in which libraries promote literacy include:

Book Collections: Libraries maintain extensive collections of books for readers of all ages and interests. By offering a diverse range of reading materials, libraries encourage individuals to explore different genres, topics, and literary styles.

Access to E-books and Audiobooks: Many libraries, particularly those in the universities and other institutions of higher education, offer electronic resources, including e-books and audiobooks, which provide additional options for individuals to access reading materials in different formats.

Children's Programmes: Many public and school libraries host programmes specifically designed to promote literacy in children. These may include story hours, reading clubs, and other interactive activities that foster a love of reading from an early age.

Summer Reading Programmes: Some public and School libraries often organize summer reading programmes to prevent the "summer slide" and keep children engaged in reading during school vacations. These programmes include incentives to motivate participation.

Adult Literacy Programmes: Some public libraries provide adult literacy programmes to support individuals with low literacy skills. These programmes may offer one-on-one tutoring, group classes, or resources to improve reading, writing, and comprehension skills.

Digital Literacy Initiatives: In the digital age, libraries play a vital role in promoting digital literacy. They offer training programmes to help individuals navigate online resources, use digital tools, and develop critical thinking skills in the digital environment.

Literacy Workshops and Events: Libraries organize workshops, seminars, and events focusing on literacy development. These may cover topics such as effective reading strategies, writing skills, and the importance of literacy in everyday life.

Collaboration with Schools: Public libraries collaborate with schools to support literacy initiatives. This can include providing resources for classroom use, hosting author visits, and participating in school literacy events.

Reading Challenges: Libraries, especially, those that serve the public, organize reading challenges and contests to motivate individuals to set reading goals and explore a variety of books. These challenges often come with rewards or recognition for participants.

***Storytelling Sessions*:** Libraries host storytelling sessions, where trained storytellers or librarians read aloud to audiences. These sessions are particularly beneficial for young children and can instil a love for stories and language and this service is common in public libraries.

***Community Outreach*:** Libraries engage in community outreach programmes to reach individuals facing barriers to accessing traditional library services. This can involve bringing books and literacy programmes to community centres, schools, and other public spaces.

***Supporting Literacy for Newcomers*:** Some libraries offer programmes to support literacy among newcomers and non-native speakers of the language. This may include language learning resources and cultural integration initiatives.

By actively engaging in these initiatives, libraries contribute significantly to promoting literacy, enriching the lives of individuals, and fostering a culture of lifelong learning within their communities.

3. Education Support

Libraries are important for supporting formal and informal education. They provide resources for students, educators, and researchers, helping their academic pursuits. Libraries play an important role in supporting education at various levels, from early childhood to higher education. Here are ways in which libraries contribute to education support:

***Learning Resources*:** Libraries offer a wide range of learning resources, including textbooks, reference materials, and supplementary educational materials. These resources support formal education curricula and provide additional materials for independent study.

***Research Materials*:** Academic libraries are particularly valuable to students and researchers. They house extensive collections of scholarly books, journals, and databases, enabling individuals to access in-depth information for research projects and academic assignments.

***Study Spaces*:** Libraries provide quiet and conducive study spaces for students to focus on their studies. These spaces may include individual study carrels, group study rooms, and designated quiet areas, creating environments conducive to concentration and learning.

***Computer and Internet Access*:** Many libraries offer public computers with Internet access, supporting students who may not have access to these resources at home. This is crucial for research, online assignments, and communication.

*Interlibrary Loan Services***:** Libraries facilitate access to resources from other libraries for their clients. Interlibrary loan service becomes necessary when a particular material is not in a library's collection. This enables students to request books and articles from other libraries, expanding their access to relevant educational resources.

*Reference Services***:** Librarians and library staff provide reference services to assist students in locating and using information effectively. They help with research inquiries, teach information literacy skills, and guide students in navigating the library's resources.

Course Reserves: Libraries often maintain collections of materials placed on reserve by instructors for specific courses. This ensures students can access required reading materials and resources for their classes.

Homework Help and Tutoring: Some libraries offer homework help programmes or tutoring services. Trained staff or volunteers may assist students with homework, providing guidance and support in various subjects. This service is common in school libraries.

*Educational Programmes and Workshops***:** Libraries organize educational programmes and workshops on study skills, time management, and research techniques. These programmes aim to enhance students' academic and learning skills.

*Access to Educational Technology***:** Libraries may provide educational technology, such as multimedia resources, software applications, and other tools that support learning in diverse ways.

*Collaboration with Schools***:** Libraries often collaborate with schools to support educational initiatives. This may include joint programmes, library visits by school classes, and partnerships to enhance the experience.

*Special Collections for Education***:** Some libraries develop special collections focused on educational materials, including curriculum resources, teaching aids, and educational games. These collections cater to the needs of educators and students alike.

*Literacy Programmes***:** Libraries may run literacy programs that target specific educational needs, such as early literacy initiatives for young children or adult literacy programmes for those seeking to improve their reading and writing skills.

By providing these resources and services, libraries contribute significantly to the educational ecosystem, supporting students, educators, and researchers in pursuit of knowledge and academic success.

4. Cultural Preservation

Libraries often house collections of historical and cultural significance. Libraries play a crucial role in cultural preservation by collecting, archiving, and providing access to materials that reflect the cultural heritage of communities and societies. Listed below are how libraries contribute to cultural preservation:

*Archives and Special Collections***:** Libraries often maintain archives and special collections that house rare and unique materials, including manuscripts, letters, photographs, maps, and other artifacts. These collections help preserve the historical and cultural record.

*Local History Collections***:** Libraries collect materials related to the local history and culture of their communities. This can include books, documents, oral histories, and other resources that provide insights into the traditions, events, and people that have shaped the local area.

*Cultural Heritage Institutions***:** Some libraries function as cultural heritage institutions, working in collaboration with museums, historical societies, and other organizations to preserve and showcase cultural artifacts and heritage items.

*Digitisation Projects***:** Libraries engage in digitization projects to convert analog materials into digital formats. This not only helps in preserving fragile and deteriorating items but also makes cultural materials more widely accessible to a global audience.

*Oral History Programmes***:** Libraries may conduct oral history programmes to capture the voices and stories of community members. These recorded interviews provide a rich source of cultural information and perspectives. This type of programme is usually organised by public, and community, and academic libraries.

*Exhibitions and Displays***:** Libraries organize exhibitions and displays that showcase cultural artifacts, artworks, and historical items. These exhibits provide opportunities for the community to learn and appreciate its cultural heritage.

Folklore and Traditions: Libraries collect and preserve materials related to folklore, traditions, and cultural practices. This may include books, recordings, and other resources that document local customs, myths, and rituals.

Language Preservation: Libraries play a role in language preservation by collecting materials in different languages, including those that may be endangered or less widely spoken. This contributes to the documentation of linguistic diversity.

Collaboration with Indigenous Communities: In regions with indigenous populations, libraries often collaborate with indigenous communities to document and preserve their cultural heritage. This involves respecting community protocols and ensuring the materials are accessible to community members.

Cultural Events and Programs: Libraries organize cultural events, programmes, and workshops that celebrate and promote local traditions. These events may include storytelling sessions, music performances, dance programs, and art exhibitions.

Genealogy and Family History Resources: Libraries provide resources for individuals researching their genealogy and family history. This includes access to records, documents, and databases that help people trace their cultural and familial roots.

Educational Outreach: Libraries engage in educational outreach programmes, working with schools and community groups to raise awareness about the importance of cultural preservation. This includes teaching the value of preserving cultural heritage for future generations.

5. Research and Innovation

Academic and research libraries support the advancement of knowledge by providing resources for research and innovation. They are essential for researchers, scholars, and scientists to access the latest information in their fields.

Libraries play a significant role in supporting research and innovation by providing resources, services, and spaces that facilitate the creation and dissemination of knowledge. Here are ways in which libraries contribute to research and innovation:

Extensive Collections: Libraries house extensive collections of books, journals, and other print and electronic resources that support a wide range of research disciplines. These collections provide researchers with access to a diverse array of materials**.**

Online Databases and Journals: Libraries subscribe to online databases and academic journals, offering researchers access to the latest scholarly publications and research findings. This helps researchers stay current with developments in their fields.

Interlibrary Loan Services: If a library does not have a specific resource, interlibrary loan services enable researchers to request materials from other libraries, expanding the scope of available resources.

Reference and Research Assistance: Librarians and library staff provide reference services to assist researchers in locating relevant information, navigating databases, and refining their research questions. This support contributes to the efficiency and effectiveness of the research process.

Collaboration Spaces: Many libraries offer collaborative spaces where researchers can work together, share ideas, and engage in interdisciplinary collaboration. These spaces may include meeting rooms, group study areas, and collaborative technology resources.

Access to Special Collections: Libraries often have special collections of rare and unique materials, including manuscripts, archives, and primary sources. These collections can be valuable for researchers conducting in-depth studies and original research.

Workshops and Training Programmes: Libraries organize workshops and training programmes on research methodologies, information literacy, and the use of research tools and technologies. These programmes enhance researchers' skills and contribute to the quality of their work.

Data Services: Some libraries provide support for data management and analysis. This includes assistance with data collection, curation, and the use of statistical tools, contributing to the research process in fields that involve data-driven analysis.

Technology Access: Libraries offer access to computers, software, and other technological resources that researchers may need for their work. This is particularly valuable for those who may not have access to such resources elsewhere.

Open Access Initiatives: Libraries may be involved in promoting open access initiatives, advocating for the free and unrestricted sharing of research findings. This contributes to the global dissemination of knowledge and facilitates collaboration.

Conference and Event Hosting: Libraries may host conferences, seminars, and events that bring researchers together to share their work, discuss findings, and foster collaboration. This promotes a culture of scholarly exchange and innovation.

Patent and Intellectual Property Resources: Some libraries provide resources and services related to patents and intellectual property, supporting researchers in navigating legal aspects and protecting their innovations.

Research Funding Information: Libraries may offer information on research funding opportunities, helping researchers identify potential sources of financial support for their projects.

In summary, libraries serve as vital hubs for research and innovation by providing the infrastructure and resources needed for the advancement of knowledge across diverse disciplines. They play a central role in supporting the research community and contributing to intellectual and scientific progress.

6. Community Engagement

Public libraries play a role in fostering community engagement. They offer programmes, events, and services that bring people together, creating a sense of community and providing a space for social interaction.

Community engagement is a crucial aspect of the mission of many libraries. It involves actively involving and connecting with the local community to understand its needs, provide relevant services, and create a sense of belonging. Libraries contribute to community engagement in the following ways:

Public Programmes and Events: Libraries organize a variety of public programmes and events, including author talks, book clubs, workshops, and cultural performances. These activities bring community members together and provide opportunities for social interaction.

Children and Youth Programmes: Libraries offer programmes for children and youth, such as story hours, educational workshops, and summer reading programs. These activities support learning and literacy while fostering a sense of community among families.

Adult Education Classes: Libraries may host adult education classes, covering topics such as literacy, language learning, job skills, and technology. These classes address the educational needs of diverse community members. This service is common in public and community libraries.

***Community Meetings and Forums*:** Libraries provide space for community meetings, forums, and town hall events. This enables residents to discuss local issues, share information, and engage in civic dialogue.

***Partnerships with Local Organizations*:** Libraries collaborate with local organizations, schools, non-profits, and businesses to enhance community services. Partnerships can lead to joint programs, shared resources, and increased impact.

***Civic and Social Initiatives*:** Libraries engage in civic initiatives, promoting civic literacy and encouraging community members to participate in local governance. Social initiatives may include campaigns for social justice, environmental awareness, or community well-being.

***Outreach Programmes*:** Libraries conduct outreach programs to reach individuals who may face barriers to accessing library services. This can involve taking library resources and programs to community centres, schools, senior living facilities, and other locations.

***Cultural Celebrations*:** Libraries celebrate cultural diversity by organizing events and programs that highlight different cultural traditions within the community. This fosters an inclusive and welcoming environment.

***Local History and Heritage Programmes*:** Libraries contribute to preserving and sharing local history and heritage. This may include collecting oral histories, hosting exhibitions, and providing resources that showcase the community's unique identity.

***Technology Access and Training*:** Libraries offer public access to computers and the internet, addressing the digital divide. They may also provide technology training programs to empower community members with digital skills.

Mobile Libraries and Bookmobiles: In some areas, libraries operate mobile libraries or bookmobiles that bring library services directly to neighbourhoods, especially those with limited access to a physical library.

Community-Led Initiatives: Libraries involve community members in decision-making processes and programme development through community-led initiatives. This ensures that library services align with the specific needs and aspirations of the local population.

***Emergency Services and Support*:** Libraries may serve as community hubs during emergencies, providing information, resources, and support to residents. They can play a critical role in disaster preparedness and response.

Through these and other initiatives, libraries actively engage with their communities, fostering a sense of connection, shared knowledge, and mutual support. This engagement strengthens the library's role as a vital community resource and a space that reflects and serves the diverse needs and interests of its residents.

7. Technology Integration/Digital Access

With the advent of technology, libraries have expanded their services to include digital resources. This includes e-books, online databases, and other electronic materials, ensuring that patrons can access information in various formats.

Digital access in libraries refers to the availability and provision of digital resources, services, and technologies to the community. It encompasses a wide range of offerings aimed at ensuring that individuals have equitable access to information and technology in the digital age. Here are various ways in which libraries have integrated technology into various aspect of their services.

Internet Access: Libraries provide public access to the internet, allowing community members to connect online for research, communication, job searching, and other informational needs. This is particularly crucial for individuals who may not have internet access at home.

Computer Workstations: Libraries offer computer workstations with software applications for various purposes, including word processing, spreadsheet creation, and multimedia editing. These resources support digital literacy and skill development.

Wi-Fi Availability: Many libraries provide free Wi-Fi access, allowing individuals to connect their own devices, such as laptops, tablets, and smartphones, to the internet within the library premises.

E-books and Digital Collections: Libraries offer digital collections of e-books, audiobooks, and other electronic resources. This expands the availability of reading materials in digital formats, catering to diverse preferences and needs.

Online Databases: Libraries subscribe to online databases that cover a wide range of subjects, providing users with access to scholarly articles, research materials, and specialized information that may not be available through other means.

***Digital Learning Resources*:** Libraries curate digital learning resources, including online courses, tutorials, and educational websites. These resources support self-directed learning and skill acquisition in various domains.

***Digital Media Creation Spaces*:** Some libraries provide spaces equipped with technology for creating digital media, such as recording studios, video editing stations, and graphic design software. These spaces encourage creativity and digital content production.

***Assistive Technologies*:** Libraries may offer assistive technologies to support individuals with disabilities in accessing digital information. This can include screen readers, magnification software, and other adaptive tools.

***Tech Training and Workshops*:** Libraries organize training sessions and workshops to enhance digital literacy skills. These programs cover topics such as internet safety, online research, software applications, and cybersecurity.

***Online Catalogues and Services*:** Libraries have moved their catalogue systems and many services online, allowing users to search for materials, place holds, and access account information from the convenience of their devices.

***Digital Archives*:** Libraries contribute to the preservation of cultural heritage by digitizing and making historical materials available online. Digital archives allow users to explore historical documents, photographs, and other artifacts remotely.

***Virtual Programmes and Events*:** Especially during times when physical gatherings may be limited, libraries offer virtual programmes and events, including book discussions, author talks, and educational sessions, allowing community members to participate from anywhere.

***Technology Access for Remote Communities*:** In regions where physical libraries may be scarce, libraries extend digital access to remote communities through mobile libraries, bookmobiles, or other outreach initiatives.

By offering these digital access resources and services, libraries strive to bridge the digital divide, empower individuals with digital skills, and ensure that everyone in the community can benefit from the information age.

8. Information Literacy

Libraries often engage in activities and programs to enhance information literacy skills. This includes teaching individuals how to effectively find, evaluate, and use information in a critical and ethical manner.

Information literacy is the ability to recognize when information is needed, locate and evaluate information effectively, and use it ethically and responsibly. Libraries play a crucial role in promoting and enhancing information literacy among their patrons. Here are ways in which libraries contribute to information literacy:

Instructional Programmes: Libraries conduct information literacy programs that include workshops, classes, and seminars on topics such as effective research strategies, source evaluation, and citation methods. These programs help users develop critical information literacy skills.

One-on-One Assistance: Librarians and library staff offer one-on-one assistance to patrons, helping them with specific research inquiries, guiding them through the library's resources, and providing personalized instruction on information literacy.

Online Tutorials: Many libraries create and provide online tutorials and guides that cover various aspects of information literacy. These resources are accessible to users at their convenience and address topics such as database searching and source evaluation.

Library Orientation Sessions: Libraries conduct orientation sessions for new patrons, introducing them to the library's resources, services, and policies. These sessions often include guidance on how to navigate the library catalogue, locate materials, and use electronic databases.

Collaboration with Educational Institutions: Libraries collaborate with schools, colleges, and universities to integrate information literacy into the curriculum. Librarians may work with educators to develop assignments that emphasize information literacy skills.

Integration into Coursework: Some libraries integrate information literacy instruction directly into coursework. Librarians may partner with instructors to deliver sessions on research skills and information literacy tailored to specific courses.

Critical Thinking Development: Information literacy programs in libraries aim to foster critical thinking skills. Users are encouraged to question information, assess its reliability, and consider multiple perspectives, thereby becoming more discerning consumers of information.

Citation Management Support: Libraries provide assistance with citation management tools and offer guidance on proper citation formats. This helps

users understand and implement ethical practices in acknowledging and referencing information sources.

Digital Literacy Programmes: As part of information literacy initiatives, libraries often address digital literacy skills, including evaluating online sources, understanding privacy and security issues, and navigating digital platforms effectively.

Resource Guides: Libraries create resource guides or pathfinders that compile recommended sources and strategies for specific topics or subject areas. These guides serve as valuable aids for users conducting research in particular disciplines.

Hands-On Workshops: Libraries organize hands-on workshops where users can practice information literacy skills in a supervised setting. These workshops may involve searching databases, evaluating sources, and synthesizing information.

Assessment of Information Literacy Skills: Some libraries incorporate assessments to gauge the information literacy skills of users. This feedback helps libraries tailor their programs to address specific needs and areas for improvement.

By actively promoting information literacy, libraries empower individuals to navigate the complex information landscape, make informed decisions, and engage critically with information in various contexts. These skills are essential in academic, professional, and personal settings.

1.   *Support for Special Populations:* Libraries may have specific programs and services to support special populations, such as children, seniors, individuals with disabilities, and other groups with unique needs.

2.   *Intellectual Freedom:* Libraries uphold the principle of intellectual freedom, providing a space where individuals can access a wide range of ideas and perspectives. They resist censorship and aim to provide diverse viewpoints.

3.   *Technology Access:* Libraries often offer public access to computers and the internet, bridging the digital divide and ensuring people have the necessary technology to participate in the information age.

4.   *Lifelong Learning:* Libraries support lifelong learning by providing resources and programs for individuals of all ages. This aligns with the idea that learning is a continuous and lifelong process.

Libraries play a multifaceted role in society, and their objectives may vary based on factors such as their type (public, academic, special libraries) and the communities they serve.

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CHAPTER 3
TYPES OF LIBRARY MATERIALS
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Introduction

Library materials are collections of books and other sources of information that the library houses to support its users' different information needs. Library materials can be books or non-books. These are available in a variety of formats, including prints and non-prints.

1. Book materials

These are printed items that patrons can read and comprehend. A book is written, or printed work containing at least 49 pages, bound together along one side, and usually protected by a hardback or paperback cover. A book is a document that deals with a single subject, has continuous thinking content, and several parts such as binding, preliminary pages, text, and reference pages issued in a country and made available to the public. A book can be categorized as simple or composite, friction or non-frictional, single-volume or multi-volume, general, textbook, or a reference. It can be in either print or non-print format.

Simple Book

This type of book can have one or more authors dealing with a continuous subject. Simple books are written in language and structure that present stories in an easily digestible format. It uses a straightforward method to introduce new concepts, provides basic knowledge on a subject, and makes users enjoy reading. Simple books can span various genres, with a common identity of accessibility and clear presentation. It spans non-fiction guides and introductory texts to concise novels and children's literature e.g. "Wake Up" by Babara Baddo.

Composite Book

This is a book in which multiple authors contribute, and the subject covered may or may not be continuous. Each author's contribution to this type of book has its title and is self-contained. It is a unique type of publication that incorporates content from different sources into one cohesive work. This format allows diverse perspectives and expertise to be presented within a single volume. A composite book gives a comprehensive view of any subject and provides readers with a thorough understanding of the subject, creating a rich, multifaceted exploration of the chosen topic or theme. Composite books are common in

academic settings, anthologies, and collections of essays or short stories e.g., "Library Science Today". (c) Single-Volume Book

A single-volume book has only one volume. It is a standalone publication. It is a literary work that contains entirely within one physical book or edition. A single-volume book encapsulates its content within one physical volume. The format is mostly found in novels, non-fiction, and shorter reference textbooks. It offers readers the convenience to read from start to finish without interruption- it is an all-in-one package. They are typically designed to provide comprehensive information or storytelling within a compact format, making them accessible to readers who may not want to commit to a series. In academic contexts, single-volume books also known as monographs, are detailed studies on a specific topic authored by a single writer. These works are significant in scholarly communication, providing focused insights and research findings within a single book format., "The Personal MBA" by Josh Kaufman. (d) Multi-volume Book

A multi-volume book is a literary or scholarly work divided into several separate volumes, typically due to its extensive length or complex subject matter. Each volume has its title and focus, but they are usually interconnected with continuous pagination - the page numbers run consecutively across all the volumes allowing readers to progress through the entire work seamlessly. This format for writing is commonly used for encyclopedias, comprehensive histories, collected works of an author, and expansive scientific treatises. Multi-volume books offer the advantage of breaking down large amounts of information into more manageable segments, making it easier for readers to navigate and digest the content. They also allow for a more detailed exploration of topics that could be impractical to contain within a single binding e.g., "The History of England" in volumes 1-6 by David Hume.

General Book

A general book is not confined to a specific subject or topic. It covers a broad range of information, making it ideal for readers seeking a wide overview rather than in-depth coverage of any aspect. These books are often written in accessible language to cater to a wide audience, balancing the provision of information with being engaging and enjoyable to read. The content in a general book is varied, often including a mix of fact, anecdotes, personal insights, and general observations, making them informative and entertaining. Each chapter or section can stand alone, making the book easy to read in short bursts or out of sequence. This type of book appeals to readers who enjoy learning about different topics

without delving too deeply into any one subject, offering a versatile and engaging reading experience e.g., "Theories of Religion"

Textbook

A textbook is a book designed specifically to complement instructional programmes or serve as a core component of a course curriculum. Textbooks are typically structured to comprehensively cover a subject, organized into chapters that systematically introduce and build upon key concepts and information. Textbooks include summaries, review questions, and exercises to enhance understanding and retention of the material written by subject experts. Textbooks are essential tools in education, used by students and instructors alike to guide learning, support classroom instruction, and facilitate the achievement of academic objectives. These books are meticulously curated to align with educational standards and are regularly updated to reflect the latest knowledge and advancements in the subject matter e.g., "Longman Mathematics Textbook".

Reference Book

Reference books are specialized non-fiction works designed primarily for consultation rather than continuous reading. They serve as quick-access resources for specific facts and background information. These are books that are used to look up specific information. They respond to the questions What and Which? How and why? Etc. Common types of reference books include Atlas, Encyclopaedia, Dictionary, Yearbook, and Gazetteers. These books are typically housed in designated reference sections of libraries and are not available for loan, ensuring they remain accessible to all users. The writing style in reference works is generally informative, avoiding personal opinions, and they are often compiled by multiple contributors under the guidance of editors

2. Non-Book Materials (NBM)

Non-book materials are library resources that do not fall under the book definition. They are materials that are not in the traditional book format. NBM can be accessed in various formats and contains a wide range of data and significant information. They require special handling, do not fit into the standard book format, and are published differently. Periodicals, manuscripts, maps, audio-visuals, and electronic resources are examples of non-book materials.

Periodicals

Serials and journals are terms used to describe periodicals. These are publications with the same title distributed to individuals at regular or irregular intervals over an indefinite period. Periodicals might be published daily, weekly, monthly, bi-annually, or annually. Newspapers, journals, magazines, theses and dissertations, and past-question papers are examples of periodicals. Periodicals are characterized by their periodicity and differ from other publications that are issued once. The content of periodicals can vary significantly depending on their target audience. For instance, popular magazines often include articles on lifestyle, entertainment, and current events, and they may feature advertisements aimed at a general readership. In contrast, academic journals focus on scholarly research and are usually peer-reviewed, meaning that articles undergo a rigorous evaluation process by experts in the field before publication. This process ensures the credibility and quality of the research presented. Libraries often maintain extensive collections of periodicals, providing access to current and historical issues.

Audio-visual materials:

Audio-visual materials, often known as instructional media goods, are teaching aids that primarily use the senses of hearing and sight. Audio-visual materials refer to information content that is stored and communicated using pictures and sound instead of or in addition to text in media and forms. They are dynamic resources that combine auditory and visual elements to convey information, ideas, or stories. Integration of sound and images creates an engaging and immersive experience, making audio-visual materials invaluable in various contexts, including education, entertainment, and corporate communication. Examples of audio-visual materials are photographs, posters, film strips, music scores, images, motion pictures, videotapes, cassettes, microfilms, and microfiches are audio-visual materials.

The evolution of technology has further expanded the potential of audio-visual materials. Innovations such as virtual reality (VR) and augmented reality (AR) are transforming content delivery, allowing for interactive and participatory experiences. These advancements enhance engagement but also encourage collaboration and critical thinking among learners. Their ability to create emotional connections and facilitate deeper understanding underscores the significance of enhancement of teaching and learning experiences.

Electronic resources:

Electronic or digital resources refer to all the resources a library distributes over a computer network with distinct traits for users' convenience. These resources have become increasingly prevalent in the digital age, offering numerous advantages over traditional print materials. E-resources include online (bibliographic databases, electronic reference books, full-text search engines, and digital data collections) and offline resources (CD-ROMs). Students can access these materials 24/7 from various devices, including computers, tablets, and smartphones. E-resources also offer advanced search functionalities, enabling users to find specific information within large collections. They are updated frequently unlike print materials, which require new editions for updates, digital resources can be revised and expanded in real-time, ensuring that users have access to the most current information.

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CHAPTER 4
HOW TO USE LIBRARY MATERIALS
Violet Ikolo

Introduction

The aim of having a variety of information materials in the library is to meet the reading, learning and research needs of users. Use of library materials refers to several activities that help library users identify, locate and gain access to library materials, for the purpose of satisfying information needs. It also describes how users can easily have access to library materials through the help of library staff and the services that are rendered within the library at the right time. To use library materials, users must be familiar with the types of materials in the library's holdings and the search tools that can be employed to access library material.

Access Tools: To make use of library materials, it is important to know where to how to find them. Access tools are library equipment and resources that help users find needed library materials. Furthermore, access tools serve to ease accessibility to library materials by creating an enabling environment for locating and retrieving information from a library's collection. There are different access tools, those to access print collection and those to access electronic collection. Some common library search tools are:

1.   Library Catalogues: A library catalogue is a listing of materials available in a library. The catalogue is a key to the library collection and points users to the exact location of library materials. Usually, the catalogue contains bibliographical details of library materials, such as author(s)/editor(s), publisher, place of publication, date, imprint, physical description, class mark and subject(s) the item covers. The common types of catalogues found in libraries include:

•   *Author catalogues:* Authors are those responsible for the intellectual content of any information material and they could be individuals and corporate organizations. The author catalogue makes use of the names of the author (in instances of more than one author, the name of the first author is used) as heading for the entries in this type of catalogue.

•   *Title catalogue:* This catalogue has cards that the tile of the information material is used as entry point.

•   *Subject catalogues:* These catalogue cards have the subject of the material used as the entry point. These entries are arranged alphabetically, according to the subjects.

2.   Indexes: These are alphabetical list of terms usually at the end of a book along with the page number where the term appears in the book. They assist user's retrieval of information and make it easy for them to identify terms appropriate to their information need.

3.   Directories: The purpose of this tool is to enable the discovery of information about names, addresses, affiliations, etc. of individuals, organizations, or institutions. They can be used to verify and provide contact information to library users. There are general or subject specific directories.

4.   Shelve Lists: These are records kept by a library of the books and other materials in its holding arranged in the order in which the materials are stored on library shelves. It's the library's holding in one document directing users to the exact location of library materials on the shelves.

5.   Abstracts: Consist of summaries of publications, article or any other literary composition together with bibliographical details for identification of original document.

6.   Databases: Are collections of data or information organized in a structured form and allows for easy access to information materials. Databases are stored in computers for easy accessibility to information materials. They can be subject specific or general in nature and can contain full text or bibliographic information. Data in databases may be predominantly:

• Word oriented (e.g. bibliographic, full-text, factual);

• Numeric (e.g. statistics, experimental values);

• Image both fixed images (e.g. photographs, drawings and graphics)

• Sound (e.g. recording of the sound of a tornado, or an explosion).

7.   Online Public Access Catalogue (OPAC): Is a computer-based catalogue of a library's collection designed to be accessed via- terminals. By using OPACs, library users can easily search and retrieve print and non-print library materials. In addition, OPACs are often able to provide information about the availability or non-availability of a library material, thus enabling users to make quick decisions about using the material.

8.   Search engines: Are software programs designed to allow users to search for content via the World Wide Web (WWW). Library users can carry out searches using the library Internet facility and have access to many electronic resources whether belonging to the library or are freely accessible.

9.   Repositories: These consist of the intellectual outputs including journal articles, conference proceedings, reports and research data of an academic institution, and library users can access and use them.

Steps to Use of Library Materials

Using library materials require some basic steps are which include:

1.   Locate the library facility or building: Library buildings, or establishments are usually easy to find especially in academic environments.

2.   Library membership: To make use of library materials, potential users are often required to be registered card-carrying library members. This allows them to loan materials as well as enjoy other library services.

3.   Use of the library catalogue or other access tools: Explore the library catalogue, and other access tools which can either mean physically being in the library or accessing the material online materials available in the library, such as books, magazines, DVDs, CDs, and others.

4.   Check availability: Check if the needed material(s) is available.

5.   Taking library materials on loan: When materials are available, most often users must visit the library and use their library cards to check them out, adhering to the loaning and returning rules of the library.

6.   Renewals: If the need arises, users often have the privilege of renewing and extending the period of loan either in person or online.

7.   Return library materials when due: it is important to return borrowed materials by the due date stamped on them. Late returns may result in fines or fees.

8.   Use Online Library materials: With availability of online resources, the libraries offer access to digital resources through their websites. Users must visit the websites and follow instructions to have access to digital content.

9.   Ask for Help: Ask library staff for assistance if the need arises when trying to locate library materials.

10.   Respect Library Policies: It is always helpful when library users are familiar with their library's policies, such as circulations policies. Adhering to these policies ensures a positive experience when using the library and its materials.

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CHAPTER 5
LIBRARY CATALOGUE AND CLASSIFICATION
Joseph O. Olorusaye

Introduction

The Cataloguing and Classification field is changing rapidly but the principle has remained the same. This topic therefore introduces students to Library Cataloguing and Classification. Also, it will introduce students to new concepts and models in cataloguing such as linked data, identity management, and revision of Resources Description and Access (RDA). Resource description and access are changing how libraries provide access to their collections.

Fig. 1: A Catalogue

A. Cataloguing Basis

Definition of Cataloguing

The term *"cataloguing"* or *"cataloging"* has an interesting past. Its storyline can be traced back to the borrowed Greek word "*catalogus"* or "*katalogos*", which represents a list, an enrolment or a register. The etymology of *"catalogue"* involves the combination of two Greek elements:

*"Kata" (*meaning *"down"* or *"completely"*)* and *"Legein"* (meaning "*to say*" or "*count*"). Consequently, cataloguing in the library is referred to as a process that involves listing and describing items/materials systematically. It could also be known as the process of using standardized methods/tools to organise and describe books or library related materials for the use of library patrons.

Cataloguing is a process of listing bibliographic details of a library material according to the standardized rule. There are different types of catalogues that identifies concisely the library holdings in their characteristics.

In this digital age, cataloguing gained prominence in the realm of library science, where it refers to creating and maintaining metadata for various resources. This practice ensures efficient retrieval and management of books, serials, and electronic materials in libraries and archives.

Types of Cataloguing

In library science, there are two different types of cataloguing:

- **i.** Descriptive Cataloguing
- **ii.** Subject Cataloguing

Descriptive Cataloguing involves recording the essential features or bibliographic details of a library item such as books. These features include:

S/N	ESSENTIAL FEATURES	MEANING
1.	Author(s)	The name of the author or authors
2.	Title	The title of the work.
3.	Edition	Information about different editions(versions)
4.	Publisher	Details of the publisher or distributor
5.	Physical Characteristics	The physical appearance of the work (such as the number of pages, size, and name of the series

The purpose of descriptive cataloguing (bibliographic details) is to create accurate and informative bibliographic records of library holdings for the librarians and, enable users to find and identify a book based on book/items descriptive elements. There are three popular standards for descriptive cataloguing, and they are:

a). *Anglo-American Cataloguing Rules (AACR):* Developed in 1967 and updated regularly until 2005, AACR provides (rules) guidelines for creating metadata in library catalogue.

b). *Resource Description and Access (RDA):* Is the successor to AACR. RDA continues the tradition of descriptive cataloguing. Descriptive cataloguing ensures that users can locate resources efficiently based on author names, titles, and other relevant details.

c). *Machine-Readable Cataloguing* (MARC) This is a set of digital formats for describing items catalogued by libraries, such as books etc., in computer software.

Subject Cataloguing: Subject cataloguing focuses on organizing content of library materials by subject matter. It involves:

i.   *Subject Analysis:* Determining the main topics or subjects covered in a resource.

ii.   *Assigning Subject Headings:* This means applying standardized terms or phrases to represent these topics.

iii.   *Classification Numbers:* Placing resources within a classification system (such as the Dewey Decimal Classification (DDC) or Library of Congress Classification (LCC)). Subject cataloguing enhances discoverability by grouping related materials together based on content.

Library Catalogue

A library catalogue is referred to as a comprehensive list of the library resources in an alphabetical, authored, titled or definite order. It serves as a library information reserve, total access to the library holding, or an inventory or index to the library resources. Each entry or record bears the bibliographic details of the library resources. It is a very important tool used to organize human knowledge. It usually serves as a guide to library users.

A catalogue contains all the bibliographic entries of a card catalogues. An inventory of the library's content. It is a register or a box or boxes that contain all bibliographic items found in a library or group of libraries meant to help users locate specific resources within a library's collection. Similarly, a card catalogue is an essential tool usually positioned in a catalogue box at the entrance of a library for discovering and accessing the library's wealth of knowledge.

Types of Catalogues

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   Fig. 2a: Card Catalogue Box   Fig. 2b: Card Catalogues

  Source: https://www.bing.com/images/

Conventionally, there are seven types of catalogues namely:

i.   **Author catalogue:** Is formal catalogue alphabetically sorted according to the name or writer (authors, editors, illustrator, compiler etc.) of a work. It contains library bibliographic items arranged by authors names.

ii.   **Subject catalogue (classified):** This is a catalogue that is usually sorted alphabetically on the subject or notation. It contains library bibliographic items arranged by subject categories

iii.   **Title catalogue**: This is a formal catalogue sorted alphabetically according to the topics of the articles. It contains library bibliographic items arranged by titles of works.

iv.   **Shelf catalogue**: The shelf catalogue/list is a concept developed by S.R. Ranganathan. It is an essential tool for maintaining bibliographic control and ensuring efficient access to library resources. It is a formal catalogue with entries sorted in the same order as the bibliographic items shelved. In essence, it serves as a record that corresponds directly to the physical arrangement of books, journals, periodicals, and other materials on library shelves.

v.   **OPAC**: This means, Online Public Access Catalogue. It contains all library bibliographic items in an electronic format.

vi.   **Union catalogue**: A catalogue for a group of libraries, often spanning multiple locations.

vii.   **Dictionary catalogue** is a type of library catalogue that arranges entries for each item in alphabetical order by author, title, and subject. It is called a "dictionary" catalogue because it resembles a dictionary in its organization, with entries arranged in a single sequence rather than separated by class or category.

The video on library catalogue basics can also be viewed on YouTube at https://youtu.be/0dVr11seY70?si=UqdMDhqUbdfxuJyl

The two processes namely catalogue, and catalogue cards are done to enable a library patron to find the needed book when the author, title and the subject is known to him, to assist the choice of a book, to show what the library has in his holdings.

Fig. 3: Index cards

A library card catalogue, also known as a library catalogue or library catalogue, (Fig. 2 & 3) is a systematic and manual method of organizing and cataloguing information about the books and resources available in a library. It served as a vital tool for locating books within the library. It consists of index cards containing information about books and other library materials. The library catalogue cards are organized alphabetically by author, title, or subject and each card represents a specific book or resource in the library collection. However, the card catalogue is gradually being replaced by the Online Public Access Catalogue (OPAC) a digital library setting. Nonetheless, hybrid libraries still maintain their card catalogue and OPAC simultaneously while some libraries eliminate card catalogues to save space for other purposes.

3. Bibliographic Control

Bibliographic control is a fundamental concept in the field of library and information science. It's the process that ensures we can find and use information effectively. It ensures that accurate and comprehensive metadata (bibliographic records) are available for various materials, including books, journals, audio-visual media, and digital content.

Definition of Bibliographic Control

Bibliographic control is known as information organization or bibliographic organization and plays a crucial role in efficient collaboration between libraries and other data providers. Consequently, it is referred to as the process of creating, exchanging, preserving, and utilizing data about information resources.

Principles of Bibliographic control

As earlier noted, bibliographic controls enhance information organization, retrievals and utilization in the library consistently and there are five basic principles for its use. The basic principles for its use are as follows:

i.   To guarantee, resource description: This is essential for accurate and standardized description given on various library materials.

ii.   Universal accessibility for all published resources across the globe, to ensure efficient resources discovery and consistency.

iii.   Authority data, refers to following standardized information about entities such as authors, corporate bodies, subjects, and geographic locations.

iv.   Eliminating redundancy (i.e., any activity, role, or procedure that is duplicative, outdated, or otherwise unnecessary), this is crucial for optimizing performance and efficiency and leading to streamlined operations and better resource utilization.

v.   Adoption of standards promotes safety, quality and sustainability of bibliographic control.

Components and Functions of Bibliographic Control

Creation: Cataloguers create detailed records for each resource, capturing essential attributes such as authorship, titles, publication details, and physical characteristics.

Exchange: These records are shared among libraries, archives, and other data providers to facilitate resource discovery.

Preservation: Bibliographic data must be preserved to maintain access over time.

Use: Users rely on bibliographic records. For effective organization and access to information resources, it is important for students to know the functions of bibliographic controls listed below:

i.   It identifies the existence of information resources: Before any resource can be found, its existence and identity must be known. Bibliographic control ensures that all types of information resources are identified as they become available.

ii.   It identifies works within information resources: Bibliographic control involves identifying the individual works contained within information resources or as parts of them. For instance, a single book may be considered an information resource, or a collection of books could also be treated as one.

iii.   It systematically creates collections: Information resources are systematically gathered into collections within libraries, archives, museums, and digital repositories. This is done to acquire and organize library items so that they can be effectively used by patrons or clientele.

iv. **It produces citations and serves as retrieval aids:** Bibliographic control produces lists of information resources prepared according to standard rules for citation. For examples of retrieval aids include library catalogues, indexes, archival finding guides, and other tools that help users locate specific resources.

v. **It provides access points:** bibliographic control is to ensure that users have multiple ways to find an item. Such an access points include name, title, subject, and other useful data of data (metadata).

vi. **It helps with the location of information resources**: library patrons need means to locate each information resource or a copy of it. For instance, the Online Public Access Catalogue (OPAC) at the circulation section of the library provides the location of the material (such as call numbers) and indicates availability of items. In summary, these functions collectively contribute to organized information, making resources accessible to researchers, and students seeking information.
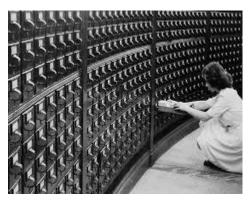
5. Current Trends and Development in Cataloguing

Fig. 4: Cataloguing

Cataloguing practice is experiencing big changes as new trends of multiple metadata, next-generation catalogues, digitization, batch processing outsourcing, standards, concepts for information organization and new standards emerge.

Cataloguing is the core of every library, a basic process to make available any document collection. A library without a cataloguer and catalogue cannot fulfil its functions efficiently. The practice of collecting written knowledge in some sort of repository in a certain order is as old as development itself. It is worthy of mention that some people are having the phobia that cataloguing would be phased out. But, with my professional experience, so far, I make it bold to say that this is just an allusion that would never stand the test of time. Cataloguing

will not lose its importance; it will be of great worth even as we strive now to retrieve some relevant information in the chaos of the internet.

Fig. 5: Metal Catalogue with 3x5 cards

Globally, cataloguing practice is evolving and experiencing a big change as human or the society is responding to the new trends of digitization, multiple metadata standards, outsourcing, batch processing, next-generation catalogues, and new standards and concepts for information organization. Essentially, due to the tremendous technological and cultural transformation impacting libraries and library work, the library cataloguing is undergoing a rapid change. The rapid change of technology is making more and more libraries to build up digital collections and shifting focus to online discovery environment. The age of physical materials processing and cataloguing is going down the drain globally. More and more resources are springing up daily in electronic formats. Thus, cataloguers now need to expand a set of competencies and skills to respond to the swift changes in this digital age to improve cataloguing processes and efficiency, and to enhance bibliographic access.

The need for constant training and retraining through webinars, workshop, in-house seminars and conferences cannot be over-emphasized. The necessity to re-purpose staff roles in cataloguing, overhaul the local policies and guidelines, operational modules, reorganization of cataloguing department, subscription to RDA toolkits is out rightly compulsory in order to reflect the latest development. Besides, the library schools will need to develop new curricula to prepare next generation cataloguing/metadata librarians in the library profession.

Studies in literature have shown that cataloguers are becoming increasingly involved in new projects and tasks, such as the use of non-MARC metadata schema in resource description, adopting next generation cataloguing or discovery systems, and starting to use linked data concepts in projects. They are also involved in institutional repository work, using batch

processing for some cataloguing tasks, conducting cooperative cataloguing, and performing programming/scripting work, such as macros and crosswalking. Additionally, they are engaged in the implementation of RDA and the Bibliographic Framework initiative (BIBFRAME) and are generally responding to new trends.

In conclusion, the importance of workforce planning should be taken into consideration due to personnel shortages, retirements, and the difficulty of finding trained staff. Additionally, the increasing complexity of the cataloguing process is a result of the growing number of online tools for cataloguers, the rapid emergence of new formats, an emphasis on indexing and metadata, cataloguing for diverse user environments and audiences, the growing need for multilingual cataloguing, and the increased rate of updates to cataloguing rules, subject headings, and MARC21. Furthermore, new types of presentations in OPACs, prompted by changes in user environments, mean cataloguers will need to include additional features in bibliographic records, such as book cover art, reader reviews, book summaries, etc. The application of new cataloguing rules in OPACs will also require cataloguers to create links between related records in the database, including the expressions and manifestations of the work. New standards and concepts, such as linked data, BIBFRAME, and IAM, are emerging and will influence how information is formatted and organised.

➤ **Linked Data**

Linked Data is a set of design principles for sharing machine-readable interlinked data on the Web. When combined with Open Data (data that can be freely used and distributed), it is called Linked Open Data (LOD). This principle enables collation of information from different sources to create a more valuable and helpful data set. The linking of information about the same person or entity from disparate sources allows, among other things, the construction of a chronological sequence of events. It is all about building blocks of information about a person, image or thing in a massive network information space. The move in the library becomes imperative to facilitate greater contextualization of information, make resources more discoverable, provide opportunities to improve workflows, and support easier integration of library data into other systems and services. It is all to have organised inventory of data sets in the library.

➤ **BIBFRAME**

BIBFRAME (Bibliographic Framework) is a data model for bibliographic description. BIBFRAME was designed to replace the MARC standards, and to use linked data principles to make bibliographic data more useful both within and outside the library community. The

BIBFRAME Model is a conceptual/practical model that balances the needs of those recording detailed bibliographic description, the needs of those describing other cultural materials, and those who do not require such a detailed level of description.

➢ **IdM/IAM**

Identity management (IdM), also known as identity and access management (IAM) ensures that authorized people – and only authorized people – have access to the technology resources they need to perform their job functions. This is to ensure that legitimate parties have the right access to the right information resources at the right time while keeping illegitimate parties out of systems. IAM components can be classified into four major categories: authentication, authorisation, user management, and central user repository. For example, authentication is the module through which a user provides who a user is and a sufficient credential to gain initial access to an application system of a particular resource. There is such an organization in Nigeria, i.e., National Identity Management Commission which has the mandate to establish, own, operate, maintain and manage the National Identity Database in Nigeria.

➢ **IFLA Library Reference Model (LRM)**

IFLA Library Reference Model (LRM) is a high-level conceptual reference model developed within an entity-relationship modelling framework. IFLA LRM was designed to be used in linked data environments and to support and promote the use of bibliographic data in linked data environments. It is the consolidation of the separately developed IFLA conceptual models: FRBR, FRAD, FRSAD. IFLA LRM was developed to resolve inconsistencies between the three separate models. Every user task, entity, attribute and relationship from the original three models was examined, definitions had to be revised, but also some remodelling was required to develop a meaningful consolidation. The result is a single, streamlined, and logically consistent model that covers all aspects of bibliographic data and that at the same time brings the modelling up to date with current conceptual modelling practices.

In summary, cataloguing practice is evolving to meet the challenges posed by digital resources, diverse metadata, and changing user expectations.

4. The Fundamentals of Resource Description Access (RDA)

The fundamentals of Resource Description and Access (RDA) are a crucial standard in the field of librarianship and information technology. It is the new standard for descriptive

cataloguing, providing data elements, instructions, and guidelines on recording the contents and formulating bibliographic metadata for description and access to information resources covering all types of content and media held in libraries and related cultural organizations, such as museums and archives. RDA stands for "Resource Description and Access". RDA is designed for the digital world. It serves as the successor to the AACR2 (Anglo-American Cataloguing Rules, second edition). RDA provides instructions and guidelines for descriptive cataloguing, aiding in the formulation of bibliographic data. It focuses on creating well-formed metadata for various types of content and media held in libraries, museums, and archives. RDA offers libraries the potential to change significantly how bibliographic data is created and used. RDA is a standard for resource description and access designed for the digital world.
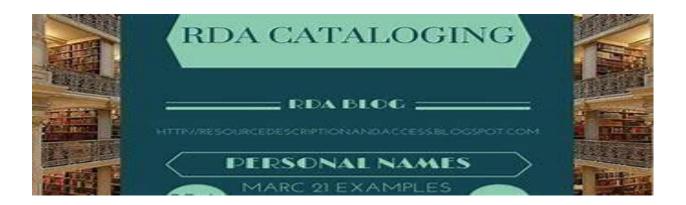

Fig. 6 RDA Cataloguing

Description of electronic formatting

Electronic formatting is done by adoption of MARC 21. It is a significant standard now used in the library. MARC 21 serves as the successor to the AACR2 (Anglo-American Cataloguing Rules, second edition). It provides instructions and guidelines for descriptive cataloguing, aiding in the formulation of bibliographic data. MARC 21 focuses on creating well-formed metadata for various types of content and media held in libraries, museums, and archives.

The fundamentals of RDA video can be located on **Video:** Resource Description and Access RDA (youtube.com); RDA: Resource Description and Access (youtube.com)

Classification

Classification is a powerful tool in the library for grouping, organizing information resources or content, and understanding the world around us. Classification is the arrangement of information materials into homogeneous (similar) groups according to their common characteristics.

Library Classification

Classification is defined as the systematic arrangement of books on the shelves, or description of them, in a manner that is most useful to those who need them with the ultimate aim of grouping them into subjects. This systematic arrangement of books, objects, or ideas into distinct groups or categories is based on specific criteria such as a useful sequence of subjects at all levels, a concise memorable notation, and a host of techniques and devices of number synthesis (Satija, 2015). It is a fundamental concept that helps organize and make sense of diverse information. When materials are classified, they are grouped based on their similarities and differences. This process allows the identification of patterns, understanding of relationships, and effective categorization of materials.

Purposes of Library Classification

Library classification play a crucial role in organizing and managing the vast array of resources housed in any library. Library classification is a system used within a library to organize materials, including books, journals, documents, and other resources. It ensures that these items are easily accessible to library users. Unlike scientific classification, which aims for the theoretical organization of knowledge, library classification focuses on the practical ordering of documents. thus, the need to delve into its purposes and needs. Mlinar (2021), noted that such library classification is meant to achieve the following purposes:

i. Ordering Fields of Knowledge: It systematically arranges subjects, making it easier to navigate and locate relevant materials.

ii. Grouping Related Items: By organizing similar items together, it facilitates efficient browsing and research.

iii. Providing Orderly Access on Shelves: Users can find books in a logical sequence.

iv. Assigning a Location for Each Item: Classification ensures that each resource has a designated place on the shelf.

Hierarchy in Library Classification

Library Classification (systematic arrangement) can be distinguished by type:

i. Natural, or fundamental - e.g., books by subject

ii. Accidental - e.g., chronological or geographic

iii. Artificial - e.g., alphabetical, linguistic base, form, size, or numerical order.

Thus, the concept of hierarchy refers to the systematic arrangement of materials based on their subject matter or content. Let's explore this further:

Levels of Hierarchy

The levels of hierarchy are categorized into three namely:

Broad Categories: At the highest level, materials are grouped into broad categories representing major fields of knowledge (e.g., Humanities and Social sciences, Natural Sciences, Formal Sciences, History).

Subdivisions: Within each broad category, there are further subdivisions. For example, under "Humanities and Social sciences," you might find subcategories like anthropology, linguistics archaeology, history and philosophy.

Specific Topics: The hierarchy continues to narrow down to specific topics. For instance, within the "Anthropology" subdivision, you'll find topics like cultural anthropology, linguistic anthropology and social anthropology.

Notation System

To represent this hierarchy, libraries use a notation system (such as the Dewey Decimal Classification or the Library of Congress Classification). Each level of the hierarchy is assigned a unique number or code. The notation allows users to locate materials on the shelves or in catalogues by following the hierarchical structure.

Example:

Let's say we're interested in a book about marine biology.
Using the Dewey Decimal Classification:
The broad category for science might be assigned the number 500.

The subdivision for biology could be 570.

Finally, marine biology might have a more specific code, such as 577.7.

So, the book on marine biology would be shelved under 500 - Natural Sciences & Mathematics > 570 - Life Sciences > 577.7 - Marine Biology.

Steps to Assigning Library Classification

There are several steps involved in library classification and systematic organization materials within a library. The steps are as follows:

a. **Understanding the context and content**:

➢ Purpose: Clarify the purpose of classification (e.g., organizing books, research papers, or digital resources).

➢ Scope: Define the scope of your classification (e.g., specific subject areas, types of materials).

b. **Analyse the Material**:

➢ Aboutness: Understand the content of the material. What is it primarily about?

➢ Form: Consider the format (e.g., book, journal, audiovisual) and the medium (print, digital).

c. Select a Classification System: Choose an appropriate classification system based on the library's context:

➢ Dewey Decimal Classification (DDC): Commonly used in public and school libraries.

➢ Library of Congress Classification (LCC): Used in academic and research libraries.

➢ Other specialized systems (e.g., Bliss Classification).

d. **Assign a Call Number**: Use the chosen classification system to create a unique call number for each item. The call number typically includes:

➢ Class Number: Represents the subject area (e.g., 500 for natural sciences).

➢ Cutter Number: Provides further specificity (e.g., author's name or title).

➢ Additional Information: Edition, volume, or year.

e. **Cataloguing and Record Creation**:

➢ Enter the call number, title, author, and other relevant details into the library catalog.

➢ Ensure consistency across records.

➢ Shelving and Arrangement:

➢ Place the item on the shelf according to its call number.

➢ Arrange items in a logical sequence (e.g., numerical order or alphabetical order).

f. **Maintenance and Update**:

Regularly review and update classification as new materials are added. Adjust call numbers if needed (e.g., due to revised editions or changes in subject focus).

In summary, library classification ensures efficient organization and access to knowledge within libraries. It is essential for efficient resource management, seamless access to knowledge, and supporting the needs of library users. It ensures that the wealth of information available in libraries is organized and readily available to those seeking it. The hierarchy in library classification ensures that materials are organized logically, making it easier for users to locate relevant resources within the vast sea of knowledge. Its natural, artificial and accidental types cannot but be mentioned.

Types of Library Classification Schemes

Library classification ensures that the wealth of information available in libraries is organized, accessible, and ready for exploration. They are essential for organizing and managing the vast array of resources in libraries. However, there are three different types of library classifications which we are going to look out in his discourse.

1. Universal schemes

This covers all subjects, e.g. the Dewey Decimal Classification (DDC), Universal Decimal Classification (UDC), Library of Congress Classification (LCC), and Colon Classification (CC).

2. Specific classification schemes

This covers subjects or types of materials, e.g. Icon class (art), British Catalogue of Music Classification, and Dickinson Classification (music), or the NLM Classification (medicine).

3. National schemes

This is specially created for certain countries, e. g. Swedish library classification system, SAB (Sveriges Allmänna Biblioteksförening). These schemes cover a wide range of subjects and are applicable to various types of libraries. Some notable universal classification systems include:

➤ **Dewey Decimal Classification** (DDC): Widely used globally, it organizes materials into ten main classes, each further subdivided.

➤ **Universal Decimal Classification** (UDC): A comprehensive system that combines decimal notation with facets, allowing for detailed subject representation.

➤ **Library of Congress Classification** (LCC): Developed by the Library of Congress, it categorizes materials based on subject areas and geographical regions.

➤ **Colon Classification** (CC): Designed by S. R. Ranganathan, it emphasizes facets and relationships between subjects.

➤ **Bliss Bibliographic Classification** (BC): Developed by Henry Evelyn Bliss, it focuses on systematic knowledge organization.

➤ **Cutter Expansive Classification**: Created by Charles Ammi Cutter, it emphasizes practicality and user-friendliness.

➤ **National Library of Medicine Classification Scheme** (NLMC): The National Library of Medicine (NLM) classification system is a library indexing system that covers the fields of medicine and preclinical basic sciences. The NLM classification system is patterned after the Library of Congress (LC) Classification system. The NLM classification system ensures efficient organization and access to medical literature in libraries worldwide the types are however based on three forms of usage, such as:

Natural Classification: Organises books by subject matter; Accidental Classification: Includes chronological or geographic arrangements and Artificial Classification: Involves alphabetical, linguistic, form-based, size-based, or numerical order. Essentially it is to facilitate access to knowledge and ensure orderly shelving.

Limitations of Library Classification

While library classification is essential for organizing and accessing information, it has limitations. Below are some of these limitations:

i. **Cultural Bias:** Many classification systems, including the Dewey Decimal Classification (DDC), were initially developed from a Western perspective. As a result, they may not fully represent the diversity of global knowledge or adequately address non-Western subjects.

ii. **Rigidity of Hierarchy**: Classification systems often follow a hierarchical structure with fixed categories. This rigidity can pose challenges when accommodating interdisciplinary subjects or emerging fields that do not neatly fit into predefined categories.

iii. **Limited Expandability**: Compared to systems like the Library of Congress Classification (LCC), the DDC is less easily expandable when new subjects or technologies emerge. The rigid structure of the DDC can make it difficult to adapt to rapidly evolving knowledge.

iv. **Maintenance and Updates**: Classification systems require regular updates to reflect new knowledge and changing terminology. These updates can lead to inconsistencies and compatibility issues between different editions.

v.   Complexity for Smaller Libraries: Smaller libraries or those with limited resources may find it challenging to implement and maintain complex classification systems.

Despite all these limitations, library classification remains indispensable for efficient organization and retrieval of information within libraries. Efforts continue to address shortcomings and improve adaptability.

Relationship between Cataloguing and Classification

Cataloguing and classification are closely related processes within library science. Their relationship is concisely discussed below:

i.   Cataloguing:

Purpose: Cataloguing involves creating descriptive records (catalogue entries) for library materials. These records serve as access points, allowing users to find and retrieve specific items.

Process: Cataloguers assign standardized metadata (title, author, subject, and call number) to each resource.

Outcome: Cataloguing results in a searchable catalogue or database that provides information about the library's holdings.

ii.   Classification:

Purpose: Classification organizes materials into logical categories based on subject matter or other criteria.

Process: Classifiers assign call numbers or codes to resources, placing them in specific classes or categories.

Outcome: Classification ensures that related items are grouped on library shelves or in digital collections.

iii.   Relationship:

Continuum: Cataloguing and classification represent a continuum in organizing library resources.

Interdependence: While they are separate processes, they rely on each other:

Cataloguing provides detailed descriptions and access points for individual items.

Classification ensures systematic arrangement and grouping of items based on subject or topic.

Mutual Support: Without effective cataloguing, classification would lack accurate metadata. Conversely, without classification, cataloguing would lack a coherent organizational structure.

In conclusion, cataloguing and classification work hand in hand to create an orderly and accessible library environment, allowing users to navigate the vast sea of knowledge effectively.

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CHAPTER 6

STUDY SKILLS

Joseph O. Olorusaye

Introduction

The word study means to learn something or to examine something carefully.

Strategic Capacity for Self-Management: Taking Control of your Studies.

This guide will help you to develop your study skills and get the most from your studies. However, your **WILL** is your strength. You are the determinant of the degree of your academic success, not your lecturer, colleagues or parents. The **PEAK** is in you. If you will, there will always be a way. If you make up your mind that you want to take control of your studies, then start NOW. Your destiny is in your hands. Remember, as you lay your bed, so you will lie on it. How do you want to take control of your studies?

The number one strategy for self-management and taking control of your studies is to:

a.   **Be ready to invest in yourself**, make better use of your time, be ready to learn and build your capacity for independent study.

b.   **Be a successful student you <u>must</u> use your intelligence**. It would help if you approached studying strategically and systematically.

c.   **Plan your time and set goals for your studies**. You have 24 hours in a day. Stream out how you want to use it. Be determined to adhere strictly to whatever you allot your time to do. Make it real. If unreal, try to adjust it till it becomes possible. Make sure you are sincere with yourself. Otherwise, you will have yourself to blame later! Surely, there would be distractions, distortions, and discouragement, but resonate your dominion over them. Be in control. You can if you give it a try and stick to it rigidly. Know that it is in the process of struggling or trying that learning starts to happen. Discomfort yourself a little to be an achiever. Your success will draw attention to you, but failure will demean you!

Studying is rewarding. Remember, the higher you go the more accountable you are for your progress. This is wrapped up in Kolb's reflective learning cycle, Fig.1 below.

Fig. 1: Kolb's reflecting learning cycle

Source: https://biznewske.com/david-kolb-learning-style-inventory

Kolb's Learning Styles

Kolb's learning style is explained based on two dimensions: they are how a person understands and processes the information. This perceived information is then classified as concrete experience or abstract conceptualization, and processed information as active experimentation or reflective observation.

Diverging: Individuals of this kind of learning style look at things in a different perspective. They prefer watching to doing, also they have strong imagination capacity, emotional, strong in arts, prefer to work in groups, open minded to take feedback and they have broad interests in different cultures and people. The learning characteristic is of concrete experience and reflective observation.

Assimilating: People of this kind of learning style prefer good clear information, they can logically format the given information and explore analytic models. They are more interested in concepts and abstracts than in people. Characteristics include abstract conceptualization and reflective observation.

Converging: Converging type of learners solve problems. They apply their learning to practical issues. Also, they prefer technical tasks, and they experiment with new ideas. They tend to be unemotional. The learning characteristics are abstract conceptualization and active experimentation.

Accommodating: Individuals with this kind of learning style prefer to do things practically. They are attracted to new challenges and solve problems intuitively. The learning characteristics are concrete experience and active experimentation.

2.   Critical principles of learning in academic discourse.

Plan to manage your progress through your course work (identify compulsory, elective, and borrowed courses, sketch the big picture & break big tasks into smaller specific tasks) Make a to-do list, and use your to-do list to help you steer your way through your work. Work out your to-do list based on your school timetable - Do a complete study plan and use it judiciously.

3.   Using a computer and off-shoot tools, handsets, and AI to study, write, and read. A computer can help you with your studies in many ways. You can do word processing with it. You can use a computer to store information, attend lectures and webinars online, and e-learning. You need one if you don't have one. Be careful not to strain yourself and take regular breaks from the screen.

4.   Developing skills for core study activities, researching online, and preparing for an examination.

a.   Sincerely no magic tricks or quick fixes will make you a skilful student overnight. Self-examination is key to accumulating practical know-how. Look inward for your strengths and weaknesses. What are the things that would obstruct your studies? Avoid or work around them. Practice and persistence will always make you perfect. Your study skills will gradually improve through picking up practical know-how, swapping ideas with other students, being creative in trying new approaches, and taking time to think about the progress you are making in your studies. File your class notes, do your assignments promptly, and do not procrastinate.

➢   Search or ask questions on where to get information about what your course expects from you (e.g., timetables, past exam papers, senior school colleagues, prospectus, ask the librarian); Don't be an introvert, rather an extrovert. Except when you are reading to internalize

➢   How much time do you allow for different tasks such as (going to the library or online to read or search for information, and do your class assignments)?

➢   Mastering essential skills in your area of study

➢   Knowing how to keep your spirits up. No entertainment of dull moments. Studying with full concentration and deep thoughts expands your mind.

b.   Reading for studying is a demanding activity. Therefore, take an interest in what the text is about, make a determined effort to understand the main argument, and work actively on the text you have read.

c.   Use a dictionary to tackle the challenge of unfamiliar words. Don't assume.

5. Preparing for examination. This is an aspect dreadful to many students due to myth taking rounds. Myths such as failing would ruin your life, the exam will expose you as a fool and a fraud, you must know the whole course in detail if you haven't understood everything it isn't worth taking the exam, exam questions are impossible to understand …and many others. Rather, it is not what you know but how you say it. Note key terms in the questions, which issue from the course is raised, critically analyse the argument, be objective, and arrive at a conclusion before you answer., use materials from the course, avoid poor presentation, use time wisely, revise before your examination.

In conclusion, the main reason for reading is to develop your thoughts, weave new understanding to what you have and develop a new point of view. Study skills for excellent academic performance entail, organizing and planning your work; working with others and utilizing resources and feedback; note-taking and reading; and preparing an assignment/project, which has a significant relationship with grades. No learning if you pass this bye.

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CHAPTER 7
COPYRIGHT AND ITS IMPLICATIONS
Dr. Grace A. Ajuwon

Introduction

Copyright is one of the Intellectual Property Rights (IPR). It protects the rights of authors, artists, inventors, and others who create knowledge in physical formats. Other examples of IPR include trade secrets, patents, trademarks, and moral rights, etc. In this chapter, we will discuss IPR with an emphasis on Copyright, and its importance on information use in teaching, learning, and research.

1. Intellectual Property Rights (IPR)

These are the legal rights or permission granted to authors, artists, sculptors, photographers, and others who discovered, designed, created, or produced goods and services out of their thinking process. It is the right granted to an individual or a corporate body for their product and/or services (World Trade Organization, 2024). The creator or inventor is given exclusive rights over the use of his/her creation/invention for a specific period. The two main areas of Intellectual Property Rights (IPRs) include Industrial Property and Copyright.

World International Property Organization (2004) reiterates that "literary, artistic, and scientific works belong to the copyright branch of intellectual property. Performances of performing artists, phonograms, and broadcasts are called "related rights," that is, rights related to copyright". Inventions, industrial designs, trademarks, service marks, and commercial names and designations, protection against unfair competition all constitute the industrial property branch of intellectual property.

In this chapter, we will focus our attention more on copyright. Like other types of properties or possessions, intellectual properties should have legal protection to determine the rightful owner of the asset.

a. **Industrial Property:** This is the protection of unique designs – examples are

i.   Trademarks

ii.   Trade Secrets

iii.   Patent

i.   Trademarks: These could be a word, abbreviations, shapes, signs, drawings, designs, a combination of words, or expressions that differentiate the goods, products, or services of a producer or enterprise from those of others. The aim of trademarks is to protect the good or services of a producer or an enterprise. According to the World Intellectual Property

Organisation (WIPO), "a trademark could be a logo, word, or sign that enables people to identify specific goods or services to be products of a certain person or organization". The forms of protection for trademarks include Standard Character Format and Special Form Formats. The format chosen affects the scope of protection for trademark registration (USPTO, 2024).

Trademarks are territorial base and producers of goods and services must register their trademarks in countries where they want to enjoy protection. The Nigerian Trademark Act of 1965, Section 23 (1) states that "a registered trademark is valid for an initial period of seven (7) years and could be renewed from time to time for 14 years". Some examples of trademarks include:

ii. ***Trade Secrets****:* These are confidential information that may be licensed or sold. It includes business information that is confidential and gives an organization or enterprise a competitive advantage over others. Trade secrets consist of commercial, industrial, and manufacturing secrets.

The information qualified for trade secrets:

• *Are those that are commercially valuable*

• *few groups of persons know it*

• The rightful holder takes reasonable steps to keep the information secret, (for example, confidentiality agreements between business partners and employees).

Coca-Cola's Syrup Formula, the recipe for the production of Coke is a good example of a trade secret. Only a few people know it and will not divulge the secret to the public. Other examples of commercial trade secrets include Google Search Engine Algorithms, customer profiles, sales and distribution methods of companies, contract forms, business schedules, advertising strategies, and lists of suppliers and agents.

iii. ***Patent:*** This is an exclusive right granted to someone who produced a new product. It is a limited right that is granted to an individual who invented a new product (for example, a machine for grinding beans or maize, etc.). It is also an exclusive right granted to an individual for his/her creation which could be a process for doing something better or a

solution to address a problem for the public good. The validity period for a patent is 20 years from the date of application (WIPO, 2004).

What is Copyright?

These are legal rights granted to authors of scholarly publications, and writers of literary and artistic works including books, poems, plays, novels, writings, musical compositions, drawings, photographs, paintings, sculptures, computer programs, and other works expressed in a "tangible form of expression". For a work to be copyrighted, it has to be original and fixed in a tangible or material form. For example, an author has legal rights over his book which he/she can print, publish, reproduce, etc., for a certain number of years depending on the country. The author may allow others to reuse the book when they ask for permission.

The three main purposes of copyright are to:

(1)   reward those who created original works

(2)   encourage and, to make the work available to the public

(3)   make access to copyrighted works easy for the public to use in certain circumstances (for example, fair use).

Copyright and Rights Related to Copyright:

In simple terms, copyright means the right granted to an intellectual property owner. It is an exclusive right granted by law to someone who created, wrote, or designed etc., any piece of original work to copy, distribute, perform, broadcast, or adapt the work (WIPO, 2004). This could be one person, a group of people, or a company. Copyright law allows the owner of copyrighted material to regulate how his/her work is used (Ojedokun, 2007). It is important to obtain permission from a copyright owner before using (reproducing, copying, distribution, etc.) his/or work. However, there are exceptions to the use of copyrighted material without permission from the copyright holder. These exceptions apply to the use of the material for educational purposes within limits available in the public domain.

Copyright and related rights also known as "neighbouring" rights are the rights given to performers such as (actors, singers, and musicians), producers of phonograms (sound recordings), and broadcasting organizations. The main purpose for the protection of

copyright and related rights is to encourage (moral rights) and reward (economic rights) creative works (WIPO).

The categories of works protected by copyright include the following:

1. *Literary works*: These include computer programs or code, instruction manuals, novels, poems, textbooks, and training manuals

2. *Musical works*: Examples are compositions, musical recordings, and songs.

3. *Artistic works*: Examples of this type of work are photographs, paintings, sculptures, and other forms of visual art

4. *Computer programs*: The technology industry is acknowledged through the protection of the   code or software that is developed.

5. *Original designs*: Examples include architectural designs, branding elements and logos

6. *Broadcasting and film*: These include podcasts, radio shows and traditional films

Copyright Law

This grants the author of a literary or artistic piece of work the exclusive right to reproduce, and prepare other copied or derived works, share and distribute, display, and perform the work publicly. The copyright law grants an author or creator of original intellectual material the exclusive right to use and copy that material for a given period depending on the type of material. Once the copyright expires, and is out of copyright, the item becomes freely available in the public domain for use by any interested person. Every country has its copyright law that may be different from one to another. In Nigeria, there is the Nigeria copyright law which is based on the Nigerian Copyright Act. There is no *World Copyright Law* that enables the creators to protect their work globally, (that is in all countries of the world).

Some African countries are members of both the Berne Convention and the Universal Copyright Convention (UCC). These are two international treaties that regulate the standard for member countries and ensure that each provides "national treatment" to nationals of member countries. Botswana, Cameroon, Ghana, Nigeria, United Kingdom, United States of America, and Zimbabwe are some of the countries that signed treaties that allow individual authors, artists, and others to protect their published and unpublished works outside their own countries.

Copyright Owner

This is the owner of the copyright in a literary or artistic work. It means the person who wrote the book, novel, poem, or a photographer, artist, sculptor, etc. An organization may employ an author to write a book, in that case, the employer is the copyright owner and not the author.

Period of Validity of Copyright

The validity period for copyrighted material takes effect on the date the copyright statement is out. The Berner convention (article 7) gave a validity period that lasts the lifetime of an author or creator of a material (for example, book, plays, poems, etc.) and 50 years after his/her death. The reason for this is to enable the successors or family of the author to benefit economically from the author's work after his/ her death.

In Nigeria, the copyright for artistic (excluding photographs), literary, and musical works lasts for 70 years at the end of the year in which the author dies. Where the author is a government or a corporate body, the copyright lasts 70 years from the end of the year in which the work was first published and 50 years for cinematographic works and photographs from the date the work was first created. Copyright protection for broadcasts and sound recordings lasts for 50 years after the end of the year in which the broadcast or the recording was first published.

Fair Use of Copyrighted Works

This legal principle clearly defines the limits of the exclusive rights of copyright holders. For example, fair use of a copyrighted book means that a certain percentage (15%) can be photocopied or reproduced for educational purposes such as teaching, learning, and research. It is allowed for copyrighted work to be used for comments, criticisms, news reporting, teaching, and research.

Fair use provision grants instructors and all those who teach, the privilege to reproduce or make copies of a copyrighted work (a book or journal article) for academic purposes without permission from the copyright owner. The teacher can use the material for preparing lesson notes, lectures, and research. To distribute a copyrighted work in class, a teacher will have to obtain permission from the copyright owner and the distribution should be one-off.

Under the principle of fair use, limited portions of copyrighted material can be reproduced for teaching and research for specific periods including

1.   A chapter of a book, not the entire book

2.   One or two articles published in an issue of a journal, not all the articles

3.   Photograph in a book, magazine, or newspaper,

4.   A drawing, diagram, graph, or chart in a book or journal article

Piracy

Piracy is the illegal copying or reproduction of a copyrighted work for money-making without permission of the copyright owner. This practice is a violation or breach of the rights of the copyright owner. Piracy of copyrighted works occurs when the purpose is for money-making from illegal use of the material. It revolves around the sale and distribution of copyrighted material by authorized persons. "Piracy involves the sharing, and distribution of movies, music, software, or video games through peer-to-peer networks, torrent sites, or another online platform by unauthorized persons" (Pal, 2024). Piracy is a form of infringement of copyright.

For example, there are many pirated primary and secondary school textbooks in various bookshops and other commercial outlets in various towns and cities in Nigeria. Also, pirated copies of movies are reproduced on CDs and DVDs, distributed, and sold at reduced prices for profit by those who do not own the copyright.

The advent of digital technology brought increased cases of piracy. Digital technology greatly impacts the Intellectual Property of copyright owners as it is very easy for an individual to pirate a copyrighted work without obtaining permission from the originator.

Copyright Infringement

This occurs when a person unlawfully copies, distributes, displays, or performs a copyrighted work without the permission of the copyright owner (Pal, 2024). It is the unauthorized, and unlicensed use of copyrighted work in a way that the right of the owner is seriously jeopardized (Nwogu, 2022). Copyright infringement is the violation of any of the exclusive rights granted by the Federal Copyright Act to an author, artist, photographer, illustrator, or producer. Copyright infringement could be intentional or unintentional. It is the unlawful use of other persons' copyrighted works without permission. There are two types of copyright infringements namely civil and criminal.

Importance of Copyright

Copyright is important for the following reasons:

1.   It helps to safeguard the worth of the creator of an original material or invention, by giving the owner the legal right to guard it from being used by unauthorized persons.

2.   It also prevents the original work of authors, artists, or creators from being reproduced, distributed, and used to the extent that they cannot sell it or receive a reward for it.

3.   Copyright promotes intellectual creativity and offers an incentive for an author, originator, or creator to work freely

4.   It also allows copyright owners to be recognized and known for their work as well as protecting their livelihood.

5.   Copyright is very important for small business entrepreneurs, and authors who have exclusive rights to display, distribute, reproduce, and distribute their work.

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CHAPTER 8
PLAGIARISM, BIBLIOGRAPHIC CITATION, AND REFERENCING
Dr. Grace A. Ajuwon

Plagiarism

It means submitting the original work of another person as your own. "Plagiarism" originates from "Plagarius," a Latin word, meaning "kidnapper" or a "literary thief" (Merriam-Webster Online Dictionary, 2024). According to Merriam-Webster Online Dictionary (2024), to plagiarize means to "steal or claim the ideas or words of another as your own, use the production of another person without acknowledgment; tweak an existing work as though it is original and new". It means stealing someone else's work (e.g., term papers, photographs, songs) and pretending that it is yours.

Plagiarism is simply using the work of someone without acknowledgment; that is, by citing the person or persons (authors) who own the copyright of the source of information (Cambridge Online Dictionary, 2024). It is the practice of using words, ideas, phrases, and passages of the text of other people as your own without acknowledging the person who owns it (Shin, 2019). Plagiarism could also be defined as "stealing of the ideas, processes, results, or words of an individual or groups without proper acknowledgement" (MSU, 2009).

While other thieves take personal items of their victims such as money, laptops, mobile devices, etc., a plagiarizer takes away the intellectual property of authors, creators, producers, and photographers among others. It is therefore essential to acknowledge by citing the authors whose words and ideas were used while writing your paper, or research project.

Why the Concern about Plagiarism?

➢ It is deceitful to claim ownership of someone else's work as your own
➢ It devalues the original work of authors, creators, or producers
➢ The plagiarizer takes an unfair advantage of those who worked hard to get the work done
➢ It is wrong to use the work of another without acknowledging the source
➢ Copyright violations can attract a fine/fines or compensation
➢ Plagiarism violates the "Code of Conduct" of the university, and students who are found to be guilty will face disciplinary action

Academics who are found to have plagiarized the work of their colleagues also face disciplinary action such as demotion from a higher to lower position and may not be promoted for two or more depending on the policy of the institution and the degree of misconduct.

Types of Plagiarism

Plagiarism is of two types, unintentional and intentional.

1. Intentional Plagiarism:

i.   Copying a friend's or someone's work and submitting it word for word, as your own. It is also known as **VERBATIM** plagiarism or **CLONE.**

ii.   **CTRL-C** is a type of plagiarism that occurs when a substantial part of a written work is from a single source without any modifications or revisions.

iii.   Buying or borrowing papers: This type of plagiarism occurs when a student outsources his /her assignment or research project to a third party. The third party may be a fellow student or a professional who provides such a service for a fee. Such commissioned papers usually have blocks of texts or entire texts plagiarized from other sources.

iv.   This represents a mix of copied material from several different sources without proper citation, it is called **MASH-UP** (www.turnitin.com). Some people access information from various sources and include it in their papers without citing the sources where they got the information, this is not right. It is a good practice to cite authors whose words, or ideas were used in one's paper. It is good practice to cite sources used in the text of one's research paper. All sources of information used in building one's research work or assignment should be acknowledged.

v.   **404 ERROR**: This is a type of plagiarism in which a written piece of work contains citations that do not exist or includes inaccurate information about the sources used. This is very bad, but some lazy people indulge in this act. Rather than keep accurate documentation of the sources of information used, or search for the full bibliographic details of sources used in the work, they cook up references that do not exist.

vi.   Another type of plagiarism that exists is known as **REMIX**. This is paraphrasing from other information sources with flawless content fitting together.

vii.   The act of combining two or more cited sources perfectly with copied passages without citing the sources of the information in the paper is known as **HYBRID**. It is another type of plagiarism.

viii.   **"Aggregator"** is a type of plagiarism in which citations are included in the work or paper but do not contain original work.

ix.   There is a type of plagiarism in which the paper includes proper citation, but the content and structure/wordings are like the original work where the information was obtained. The plagiarizer did not attempt to understand the text and write in his/her own words for their voice to be heard. This type of plagiarism is called **RE-TWEET**.

2. Unintentional Plagiarism

i.   **Not using your own "voice":** This is common with individuals who use AI tools such as ChatGPT to search for information. Most of the entire search results are copied and pasted into their work. The content reads so well but it is not their voice, words, or phrases.

ii.   **Poor Documentation:** When students are writing their assignments or preparing to start working on their research projects, they gather information from several sources including books, journals, magazines, and web-based resources, etc. Some students do not keep track of documents or the sources of information that they consulted. This makes it challenging for them to cite the sources or the authors whose words or phrases were used in their research work. Poor documentation usually results in unintentional plagiarism.

iii.   **Paraphrasing Plagiarism**: This type of plagiarism is also known as *FIND AND REPLACE*. It involves a change of keywords and phrases but keeps the important content of the original paper. This type of plagiarism occurs when an individual changes a few words or phrases in the original work of another writer. Many students are involved in this practice and are not aware that it is a form of plagiarism. So, if you use phrases, words, or ideas that are not yours in your research paper or assignment without citing the source of the information, it is regarded as plagiarism.

iv.   **Self-Plagiarism:** This involves using substantial portions from one's previous work without citation. This type of plagiarism is known as **RECYCLE** or **PLAGIARISM OF SELF**, it is common among authors some of whom do it unintentionally.

How to Prevent Plagiarism: Citing and Referencing?

Plagiarism can be prevented if you know:

1.   What to cite

•   Open a file or folder for all the information sources you have gathered and used for the study.

•   Avoid cutting and pasting information that you retrieved on the Internet in the text of your work or paper.

•   Do not cite information that is regarded as "common knowledge" (UAC, 2024).

2.   How to cite

•   You should make available enough information about the sources you used in your research paper or assignment so that your readers will be able to find them.

•   Make use of APA, Harvard, MLA, Vancouver, or other standard referencing styles.

•   Use your phrases, words, and ideas in the body of your work.

•   Enclose the words or phrases of other people with quotation marks and cite the source, if it is important use their exact words.

•   Do not effect changes on someone else's work and use it without citing or acknowledgment.

3.   When to cite

•   Facts or information that is not 'common knowledge'

•   Direct quotations

•   Paraphrased ideas

•   The source of information when you are not sure

Consequences of Plagiarism

•   **Receiving zero on the assignment:** A student who is found to have plagiarized may be awarded zero percent in their assignment by the teacher.

•   **Failing the course:** Student who plagiarizes may also be awarded no marks for their work as a disciplinary measure to deter them from repeating such in the future.

- **Rejection of Dissertation/Thesis:** A research project of students who are found to have plagiarized could be rejected by their supervisor or department as a deterrent to others.

- **Suspension:** Plagiarism is considered as one of the intellectual misconducts. Students who copy the entire work of other students and are caught could have their study suspended for some time by the institution to prevent them from repeating such acts in the future.

- **Expulsion:** Plagiarism is an offense that many institutions frown at and it attracts a penalty. Depending on the policy of the institution, the penalty could be outright expulsion from the institution

- **Scholarly reputation damage and loss of job:** There have been instances where lecturers who were found guilty of plagiarism were demoted from higher positions to lower grade.

- **Shame, Disgrace, and Loss of Joy:** A lecturer's reputation could be severely damaged if he/she is found guilty of plagiarism. This could lead to shame and disgrace.

Bibliographic Referencing and Citation

Referencing is a consistent way of acknowledging the sources of information and ideas used in a scholarly publication. It is a way of crediting authors whose words, ideas, and written materials are used in one's research work. Referencing or citation tells the reader where ideas from other sources have been used in a dissertation/thesis or journal article. It consists of following main parts:

- in-text citation
- reference list, and
- footnotes (e.g. Law)

What is Citation?

A citation could be words or numbers that show the reader that the author used some information from the writings of other authors in his/her work. It is a way of letting your readers know the information in your paper or research work that are from other sources and how to find them (Leonard Lief Library, 2024).

Citing the sources used in one's work is the only way to use other people's work. By citing the sources used, you are giving credit to the original owner. Using other people's words, phrases,

and blocks of text without citing the sources is regarded as plagiarism. Therefore, cite sources used in your research or other academic writing to avoid being accused of plagiarism (Limestone University, 2024).

Why do you need to cite/reference sources?

According to Lehman University Library, (2024) and Ajuwon et al., (2011), citing sources used in your work is important for the following reasons:

i. Acknowledge the authors who produced the information.

ii. It helps the readers to find information and know more about it.

iii. It enables those who will read the work to know more about the origin of your idea

iv. It helps the readers differentiate your thoughts and claims from those of your sources.

v. It shows that your information is from credible sources and makes your writing more convincing to the readers

vi. Help you get a good grade on a paper—or, in the real world, to protect you from being sued or damaging your reputation.

vii. Showcase with honesty, the extent of one's original contribution to a piece of work

viii. Cite the sources you used to show the amount of work you have done and the volume of papers you have read and synthesized

ix. Authenticate the points you made in your research work

x. showcase to your teachers the work that you have done

When do you need to cite?

Cite sources when you:

i. use words, thoughts, ideas, or information that were produced by someone other than yourself.

ii. *quote someone directly* (using quotation marks).

iii. *paraphrase* (change someone else's words but keep their meaning).

iv. use or reference an idea or thought that has already been expressed by someone else.

v. make any reference to another source.

vi. use another person's ideas, words, or thoughts to enhance your writing and research.

(Lehman College Library, 2024)

What should be Cited (Information to Cite)

To avoid plagiarism, the words, ideas, phrases, quotes, and summaries from other peoples' books, articles, conference proceedings, magazines, and reviews as well as all information from primary sources including government reports, almanacs among others; computer programs, music, movies, graphics, charts, TV broadcasts and other communication media, and websites (Ojedoku 2007; Lehman College Library, 2024).

Methods of Citing Sources

There are different methods of citing Sources. These include:

1.   In-text citation

2.   List of references

3.   Footnote

4.   Endnote

In-text Citation

In-text citations are made in the body or text of one's work. The writer acknowledges by citing the names of the authors whose ideas, words, phrases, or quotes were used. It is also known as a *parenthetical citation*. The bibliographic information or metadata for in-text citations are names of authors, editors, artists, etc. The list of authors whose works were used in writing one's research report will be arranged at the end of the paper as a *list of references*.

1.   In-text citations can be in a variety of forms. It could be a quotation in which the quote will be in block format ending with the name (s) or author creator, for example:

"The library is a growing organism" (Ranganathan, 1931)

2.   An in-text citation could also start with the author's name and year of publication before the statement. The author's name and year of publication could also appear at the end of the statement for which they are being acknowledged. For example:

Ranganathan (1931), in his first law of library science, states that books are for use

3.   Credit can be given to authors whose words, statements, or phrases or whose statements were paraphrased by putting their names at the end of the statement, for example:

"Libraries store the energy that fuels the imagination.

They open up windows to the world

and inspire us to explore and achieve, and   contribute to improving our quality of

life" (Sidney Sheldon, 1917-2007)

		Narrative Citation	Parenthetical Citation
DIRECT QUOTATION	**One author**	Kolawole (2017) opined that "information literacy is vital" (p. 5).	Clearly, "information literacy is vital" (Kolawole, 2017, p. 5).
	Two authors	According to Kolawole and Adeoye (2018), "skill acquisition is vital" (pp. 12-13).	It is true that "information literacy is vital" (Kolawole & Adeoye, 2018, pp. 12-13).
	Three+ authors	"Information literacy is vital," Kolawole et al., (2016) reflected (para. 5).	"Information literacy," however, "is vital," (Kolawole et al., 2016, para. 5).
	Group author, first reference	The Medical Library Association (MLA; 2020) has asserted that "information literacy is vital" (para. 3).	Perhaps "information literacy is vital" (Medical Library Association [MLA] 2020, para. 3).
	Group author, late reference	The MLA (2020) has insisted that "information is literacy is vital" (para. 4).	Perhaps "imagination is crucial" (MLA, 2020, para. 4).
	Author unknown	The author of "Introduction to Library Science" (2010) noted that "Information literacy is vital" (p. 7).	One article claimed that "Information literacy is vital" ("Introduction," 2010, p. 7).
PARAPHRASE	**One author**	Kolawole (2017) argued that students need to develop information literacy skills.	Students must develop and acquire information literacy skills (Kolawole, 2017).
	Two authors	Kolawole and Adeoye (2017) noted that students must develop information literacy skills.	Students must develop information literacy skills (Kolawole & Adeoye, 2017).

Three+ authors	Students need to develop information literacy skills, (Kolawole et al. (2017).	Students must develop information literacy skills (Kolawole et al., 2017).
Group author, first reference	Students need to develop imagination, the Medical Library Association (MLA, 2017) has explained.	Students need to develop information literacy skills (American Library Association [ALA], 2017).
Author unknown	In "Introduction to Library Science" (2017), the author suggested that must develop their skills in information literacy.	Students need to develop information literacy skills ("Feeding," 2017).

Table 1 above shows examples of in-text citations, both parenthetical and direct quotations.

Examples of In-text Citations using the 7th Edition of the APA Style, 2020

Should I Cite Everything?

• Do not cite when you are discussing your reactions, experiences or observations

• Don't cite when you are reporting original research or science experiments

• There is no need to cite information that is "*common knowledge*"

Referencing/Citation Styles

• A citation style is set up to give the reader immediate information about sources cited in the text

• There are two main citation/referencing styles:

• Author / Date: put the author's name inside the text of the dissertation or manuscript (e.g. APA, Harvard)

• Numbering: uses numbers in-text to refer to specific sources (e.g. Vancouver, IEEE)

• Each style has its features and rules for citing sources

List of Popular Referencing Styles

1. Chicago

2. Harvard

3.   American Psychological Association (APA)

4.   Institute of Electrical and Electronics Engineers (IEEE)

5.   Modern Language Association (MLA)

6.   American Medical Association (AMA)

7.   National Library of Medicine (NLM)

8.   Oxford

9.   Vancouver

Full Bibliographic Information for Writing Referencing Sources

Books

i.   Name of author (s) or editor (s)

ii.   Name of publisher

iii.   Place of publication

iv.   Page number

Journal Articles

i.   Title of research work

ii.   Journal title

iii.   Volume number

iv.   Issue number

v.   Page number

vi.   Digital Object Identifier (DOI), link to a specific journal article

vii.   Date accessed (for online material)

What is Reference/ Citation Management Tool/Software?

These are tools that enable scholars to create and manage references, organize, and tag citations and documents. They are used to generate bibliographies in different styles or formats. They can be used to create a personal citation database of articles on different topics, format papers with in-text citations, and bibliographies in standard formats. Citation or reference managers can also be used to share a database of citations/articles with one's colleagues or peers.

Types of Reference Management Tools

Fee-based Reference Managers: Endnote, Papers, Procite, Reference Manager, RefWorks, Papers

Free/Open-Source Reference Mangers: BibTex, Zotero, Mendeley, JabRef, Connoteau, CiteULike, SciSpace

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CHAPTER 9

ELECTRONIC DATABASES IN ACADEMIC LIBRARIES

Grace A. Ajuwon & Samuel A. Bello

Introduction

The advent of the Internet and advances in digital technology has redesigned how information is generated and accessed in academia. This transformation has affected the information-seeking behaviour of library users as many now prefer electronic resources to print. Users can access information remotely using the Internet. This development has pushed academic libraries to appreciate the value of electronic databases as the current means of providing information to meet users' needs.

Indeed, the emergence of digital technology has eradicated the challenge of accessing current literature and electronic database resources. It also has implications for research productivity and student learning in higher education. Electronic databases have increased the availability of electronic resources and removed the location bound in information access and utilization. Good databases are characterized by convenient use, availability of navigating links, and user instructions.

E-Databases

E-databases facilitate teaching, learning, and research activities in higher education institutions. Databases are identified as acceptable sources of up-to-date information for enhancing academic work in higher education institutions, e.g., universities. They enable faculty, researchers, and students to access print and non-print materials for learning, teaching, and research. In addition, they are equally used for data collection, transfer, incompatibility, and integration of digital resources (Fry, 2013). It is in connection with the usefulness of these databases that various studies have reported adoption, awareness, and usage of electronic databases, such as EBSCOHost, JSTOR, JAYPEE DIGITAL, RESEARCH4LIFE (HINARI, AGORA, OARE, GOALI and ARDI), in the academic libraries.

Overview of Electronic Databases

An electronic database is a computer-based searchable collection of structured data/information that can be retrieved or accessed as quickly as needed Kore and Samuel

(2023). Wiegand (2002), defines electronic databases as "a collection of electronic indexes and databases with their own interface and search engine".

A database can be defined simply as a collection of organized data, stored, and accessible electronically. Databases are used for storing and managing large amounts of structured and unstructured data. They can also be used to support a variety of activities, such as data analysis, data storage, and data management.

Bibliographic Databases

These are collections of organized online references to published literature (journal and newspaper articles, papers presented in conferences known as conference proceedings, reports, government and legal publications, patents, and books (Wikipedia, 2024)). Bibliographic database collections are in the paywall; they require libraries to pay subscription fees to access them. Access is through authentication (Username and Password).

There are different types of databases.

1.   Index/bibliographic databases.

Glanville (2019) defined Bibliographic Databases as a collection of records describing publications. For instance, Citation index databases, which are examples of bibliographic databases, provide the title, author, source information, and dates of each record (p. 74) They are also known as specialist bibliographic databases designed to provide essential electronic tools for researchers (Gasparyan et al., 2013). Most of these databases are multidisciplinary where information on various specialties is made available in a single database.

Bibliographic databases index publication information about specific subject areas found in the databases. Bibliographic databases are usually expensive to procure and accessible through purchase subscriptions. This is why academic libraries, or professional bodies purchase subscriptions and provide access to members of the communities or members of the professional bodies. However, some funded large bibliographic databases like PubMed may be accessible without paid subscriptions.

These are databases where a keyword search could be performed to retrieve relevant information from databases. Retrieving relevant information from databases requires various search terms and strategies. The content of these databases includes electronic journal

articles in specific disciplines, electronic books, conference proceedings, dissertations and theses, ongoing research, and grey literature.

Unlike library catalogue entries, records in bibliographic databases describe articles and conference papers rather than complete books and generally contain subject descriptions in the form of keywords, subject classification terms, or abstracts (Feather & Sturges, 2003).

A bibliographic database may cover different topics. There are multi-disciplinary databases such as Academic Search Premier, EBSCO Host, Emerald Library, ProQuest, Science Direct, Springer Link, GALE, JSTOR, Scopus, and Web of Science.

Some databases cover one academic field like the Health Sciences or agriculture. Examples of bibliographic databases in the health sciences include MEDLINE /PubMed, EMBASE, CINAHL, Lilacs, Science Direct, Scopus, Global Health, and Virtual Health.

There are other relevant information resources known as Clinical Decision Support Tools. These enable doctors and other healthcare providers to care for patients and make clinical decisions. UpToDate, Trip Database, Clinical Key, The Cochrane Library, and DynaMed are some examples of clinical decision support tools. Most bibliographic databases are marketed under a trading name such as "Science Direct", or "Proquest" by licensing agreement from vendors, or directly from their makers: the indexing and abstracting services.

Electronic databases that belong to the index/bibliographic class are Web of Science (this is the largest and most widely accessed database that provides detail bibliographic information on all disciplines. This Multidisciplinary database manages over 50 million database entries with relevant information). EBSCO Host and EBSCOHost are also multidisciplinary databases.

2.   Full-text databases.

These electronic resource databases grant access to the full text of research materials. Users can do an author search to retrieve specific articles written by the author or a keyword search to get information on a particular topic. Science Direct, EBSCO Host, Emerald Insight, Springer Link, JSTOR, ProQuest, and African Journals Online (AJOL) are full-text electronic databases.

3.   Subject-based databases.

These databases enable users to search for specific topics related to the field covered by the databases. Getting relevant information from these databases requires Boolean operators to

combine various keywords to search for a desired topic. The subject-based electronic databases include Hinari (Research for Health), AGORA (Research in Agriculture), OARE (Research in the Environment), GOALI (Research for Global Justice), and ARDI (Research for Innovation) all of which are available through Research4Life. MEDLINE/PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature).

How to Search Information in Electronic Databases?

Conducting a successful literature search using a database involves some basic steps. A searcher first reviews the descriptive information available to users in the database interface for effective searching. Searching and retrieving relevant information from electronic databases requires skills and knowledge. As much as it has been established that there is no known perfect or imperfect search, individual databases require varied and unique strategies to search for information. No wonder, Gasparyan, Ayvazyan, and Kitas (2013) emphasized that "Database searching has a lot to do with the skill informed by a knowledge of the design and content of individual databases and the facilities for searching provided by the interfaces to individual databases (p. 74)".

However, understanding various search strategies for available references is as important as searching the databases. Many databases provide author and topic/subject search, searching is therefore made to be less stressful and less cumbersome.

One can search for a specific known author. It only requires that a piece of bibliographic information about the author is provided in the search interface provided by the database. For instance, you may be interested in getting an article published by David John. All that is needed is to enter John David instead of David John (now transpose the author's name). Provide other details like the date the article was published, the title of the paper, and the journal where it was published. Click on search. The database processes this request and retrieves the paper for you. To avoid receipt of errors, such as "invalid", "author not found", and "author and year not compatible", to mention just a few, make sure all the information provided is accurate and precise.

For topic search, a searcher enters keywords of a topic into the search interface of the database. Based on the configurations of various databases, the chosen keywords are combined with Boolean operators (see below for the types and usage) to get relevant results. For a few of the databases, one may enter the entire topic (without breaking into keywords) and retrieve relevant information, this is not common.

With either of the two techniques (with or without Boolean operators), one strategy does not work with all the databases available in academia. A search strategy used to retrieve relevant information from say Web of Science may not be retrieve as many relevant results from EBSCO Host. This is why it is very important for a first time-searcher visiting a database to first read and understand the instructions provided in the search interface before searching the databases. Although many of these instructions are not displayed in easily accessible parts of the interface, checking the help page or navigating through the various links connected to "search the database" will help locate these instructions.

Boolean operators narrow or expand a search to a specific area of need in databases. The narrowing allows retrieving only the references of interest in a literature search. AND/OR/NOT are the Boolean operators used in searching the literature. While "AND" and "OR" narrows down searches, "Not" operator expands searches by excluding unwanted references. AND is also used to combine many terms/keywords in a search. For instance, one could search for "fever NOT malaria". While one could as well search for "malaria OR fever". The differences here are that, in the former, you have commanded the database to search for references on fever alone and excludes malaria. In the latter, you have queried the database to search for all the available references on malaria and fever. Another example is searching for "technology OR technology tools OR technology innovations OR emerging technology". Further, a search containing a combination of various keywords in a single search could be conducted as Technology adoption for service delivery in academic libraries in Africa (Technology adoption AND service delivery AND academic library AND Africa).

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CHAPTER 10
HARDWARE AND SOFTWARE TECHNOLOGIES
Saheed G. Hameed

Introduction

Information and Communications Technology (ICT) is an extensional term for information technology (IT) that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals) and computers, as well as necessary enterprise software, middleware, storage and audio-visual, that enable users to access, store, transmit, understand and manipulate information (Wikipedia, 2024). ICT is also used to refer to the convergence of audio-visual and telephone networks with computer networks through a single cabling or link system. There are great economic incentives in merging the telephone networks with the computer network system using a single unified system of cabling, signal distribution, and management.

ICT is an umbrella term that includes any communication device, encompassing radio, television, cell phones, computer and network hardware, satellite systems, and so on, as well as the various services and appliances with them such as video conferencing and distance learning. ICT also includes analogy technology, such as paper communication, and any other mode of communication transmission. ICT is a broad subject and the concepts are evolving. It covers any product that will store, retrieve, manipulate, process, transmit, or receive information electronically in a digital form (e.g., personal computers including smartphones, digital television, email, or robots). Skills framework for the information age is one of many models for describing and managing competencies for ICT professionals in the 21st century.

"ICT, or information and communications technology (or technologies), is the infrastructure and components that enable modern computing. Among the goals of ICTs, tools, and systems is to improve how humans create, process, and share data and information. Another is to help them improve their abilities in numerous areas, including business; education; medicine; real-world problem-solving; and even leisure activities related to sports, music, and movies. It is also said that there is no single, universal definition of ICT because the technologies, devices, and even ideas related to ICT are constantly evolving. However, the term is generally accepted to mean all devices, networking components, and applications. This equipment helps people and organizations interact in the digital world (Rahul & Mary, n.d.).

ICT is a generic term that refers to the technologies used to collect, store, edit, and communicate information in various formats. The use of ICT improves access to information in digital format. It narrows the digital divide and enhances the living standard of people. Adoption of ICT in libraries is a way of improving information services" (Raji, 2018).

Components of ICT Expected in a Library

Information and Communication Technology has changed how libraries function in the information age. Incorporating ICT into library systems has allowed libraries to improve their services, streamline operations, and reach a wider audience. Library ICT components include computer hardware, software, networking, and digital resources. These constituents have transformed how libraries acquire, organize, store, and provide access to information, enabling them to meet the changing needs of library users in the digital age. This write-up will enumerate the different hardware, software, and other components that need to be available in the libraries of the twenty-first Century and discuss their impact on library services and operations.

ICT Components Expected in a Library

The expected ICT devices that should be available in libraries are of various technologies, systems, and resources used to manage, store, and provide access to library materials and services.

These components evolve to meet library users' changing needs and keep pace with the rapid advancements in digital technology.

One of the most important components of ICT that should be in libraries is the **Library Management System (LMS).** This software application manages and organizes library materials, such as journals, books, and other materials. LMS enables librarians to catalogue and classify materials, track the charging and discharge of items, and manage inventory. This system will improve the efficiency of library functioning making it easier for librarians to manage their resources and provide better services to users.

Another important component of ICT to be available in the library is **digital resources**. Libraries are expected to provide a wide range of digital resources, such as e-books, online journals, and databases, which can be accessed remotely from anywhere. These resources will greatly expand the collection of materials available to users, making it easier for them to access information on a wide range of topics.

Networking (LAN) is also another important component of ICT that should be available in libraries. This will allow collaboration with other libraries and to share resources. This includes inter-library loans, where libraries borrow materials from each other to meet the needs of their users. Networking will make it easier for libraries to communicate with each other and exchange information.

Information retrieval systems are another important component of ICT that a library should have. These systems will enable users to search for and retrieve information from library resources. Examples include online catalogues and search engines, which provide users with easy access to information. Also, the library should acquire various hardware components, such as computers, printers, scanners, and barcode readers, to manage and provide access to materials. A library should have its website. A website is an important component of ICT in libraries, it provides users access to digital resources, library catalogues, and other services and is made available by the library on the website.

The components of ICT in Libraries are below:

1. Hardware components

Libraries have evolved a lot over the years. From just a place to borrow books, libraries have become a hub for digital resources, multimedia materials, and various other services. To support these activities, libraries require various hardware components to provide better services to their patrons. The following are some hardware that should be available in a library.

a.   Server Infrastructure: The foundation of library automation is a high-performance server.

The size and complexity of the library determine the quantity and type of servers. A robust Central Processing Unit (CPU), lots of Radom Access Memory (RAM), redundant power supplies, enough storage space, a Hard Disk Drive (HDD) for data storage, and a Solid-State Drive (SSD) for speed should all be included in server specifications. While tower servers may be preferred in smaller libraries, rack-mounted servers are frequently seen in data centre settings.

b.   Computers and Laptops: Computers and laptops are perhaps the essential hardware components in any library. These devices manage the library's catalogue, circulation system, and other administrative tasks. In addition, patrons can also use these devices to access digital resources, online catalogues, and research databases. Libraries can offer public access

computers and laptops for patrons to use in the library. Workstations for library staff should have high performance hardware to support library management software, digital resource management, and data processing tasks. Computers should have modern processors, sufficient RAM, and reliable storage (SSDs are preferable for faster performance)

c.   Storage Devices: Network-Attached Storage (NAS) or Storage Area Network (SAN) solutions are necessary for storing digital collections, backups, and archives. Utilize redundant storage arrays to protect against data loss. Consider cloud storage for off-site backup and disaster recovery.

d.   Environmental Controls: Climate control systems, including temperature and humidity monitoring, are vital to preserve physical materials, particularly rare books and manuscripts. Fire suppression systems and security alarms should also be in place to protect the physical collection.

e.   Printers: Printers are another crucial hardware component in libraries. Libraries need printers to print out overdue notices, hold notices, interlibrary loan forms, and other library-related documents. Libraries should be able to offer printing services to patrons, allowing them to print out research materials or other necessary documents.

f.   Scanners: Scanners are becoming increasingly popular; a library, especially academic ones, should provide a scanning facility. These devices are used to scan and digitize materials such as books, journals, and other print resources. Scanned materials can then be made available in digital formats, allowing patrons to access them remotely. Libraries can also use scanners to create digital archives of rare or valuable materials.

g.   Barcode Scanners: Barcode scanners are another component that should be available in a library. These can be used extensively to manage the circulation system. Each book in the library has a unique barcode, which can be scanned to check the book in or out of the library. Barcode scanners are also used for inventory management and to track library materials on hold or requested for interlibrary loans.

h.   RFID: RFID (Radio Frequency Identification) is a library technology that manages and tracks library materials. RFID tags are attached to library materials, which will allow the library to track the location of items, manage inventory, and provide self-checkout services. RFID technology is becoming increasingly popular in libraries due to its efficiency and accuracy in tracking and managing library materials.

i.   Audio Visual Equipment: Audio-visual equipment such as projectors, screens, and sound systems should also be available in a library. These devices will support library programming, presentations, and educational events. Also, multimedia resources such as DVDs, CDs, and audiobooks, which require specialized audio-visual equipment to access should be provided in a library.

j.   Security Cameras and Surveillance Systems: Surveillance cameras are essential for monitoring and safeguarding library facilities, particularly during non-operational hours. Implement a comprehensive surveillance system with both indoor and outdoor cameras.

k.   Uninterruptible Power Supplies (UPS): UPS units provide temporary power during outages, allowing servers and critical equipment to shut down safely. Ensure adequate UPS capacity to support essential equipment.

2. Software

Libraries must move away from just a book repository to a dynamic information centre. Libraries today are expected to provide a wide range of services that cater to the diverse needs of their patrons. To meet these requirements, libraries should provide software components that will help them to manage their collections, facilitate access to information, and provide administrative support.

The following are the software components that are expected to be available in a library today.

a.   Integrated Library System (ILS): An Integrated Library System is a software application that enables libraries to manage and organize their collections. It is supposed to be a core software component of any library and is to be used to catalogue and classify library materials, manage circulation, and maintain patron records. An ILS also allows libraries to manage their acquisition and ordering process, track inventory, and generate reports.

b.   Electronic Resource Management (ERM): Electronic Resource Management is a software application that enables libraries to manage their digital resources effectively. ERM helps libraries to acquire, track, and manage resources such as e-books, e-journals, databases, and other online resources. It also helps libraries to manage their licensing agreements and access rights to digital resources. This is also one of the software that should be in a library.

c.   OpenURL Resolver: OpenURL Resolver is a software application that enables patrons to access the full text of articles and other documents in the library catalogue or databases. When a patron clicks on a link to an article or a document, the OpenURL resolver redirects them to the appropriate full-text source, ensuring they have seamless access to the information they need.

d.   Content Management System (CMS): A CMS is a software application that enables one to create, manage, and publish digital content. It is used to create and manage library blogs, webpages, and other digital platforms. Also, it can help to manage digital collections and make them available to users. This is another software component that a library must have, examples are DSpace, Greenstone, etc.

3. Digital resources

In today's digital age, libraries must no longer just be a repository of physical books and journals. Libraries should be able to offer patrons various electronic books, electronic journals, databases, and other web resources. Digital resources must become essential to library services, allowing patrons to access information remotely and conveniently. Some of the digital resources that can be offered are:

a.   Electronic books: These are digital books that may be read on a computer, tablet, or other reading devices. or e-reader device. Libraries should be able to offer e-books to their patrons through various platforms such as Overdrive, Hoopla, and Libby. E-books are becoming increasingly popular due to their convenience and accessibility.

b.   E-journals: These are electronic versions of printed journals that are accessed online. Libraries should subscribe to e-journals on behalf of their patrons, providing access to thousands of academic and research journals from around the world. E-journals are an essential resource for students, researchers, and faculty members who need to keep up with the latest research in their field.

c.   Databases: Databases are collections of information that are organized and searchable. Libraries should subscribe to databases for their patrons, providing access to various resources such as academic journals, newspapers, magazines, and reference materials. Databases are an essential resource for students and researchers, allowing them to access reliable and up-to-date information for their research.

d.   Digital Archives: Digital archives are collections of digitized primary source materials such as manuscripts, photographs, maps, and audio-visual materials. Libraries

must create digital archives to preserve and provide access to valuable historical and cultural resources. Digital archives are an essential resource for researchers and scholars who must access primary materials for their research.

e.   Online Learning Platforms: Online learning platforms are web-based resources that provide access to courses and educational materials. Libraries should be able to offer access to online learning platforms such as Lynda.com and Udemy, allowing patrons to learn new skills and enhance their knowledge.

4. Networking Components

Networking components are important for the coherent functioning of libraries. These are necessary for managing collections, facilitating access to information, and providing administrative support for personnel. Network switches, routers, and firewalls are essential for connecting all library devices and providing internet access. Ensure sufficient bandwidth to handle simultaneous patron and staff usage, especially if digital resources and services are bandwidth intensive. Implement a secure and segmented network to protect sensitive library data

a.   Local Area Network (LAN): A Local Area Network is a computer network that connects devices within a limited geographic area, such as a library building. A LAN is essential for managing and sharing resources such as printers, scanners, and servers. A LAN can connect computers to the library's circulation desk, cataloguing, and administrative offices. This is also very important for a library.

b.   Wide Area Network (WAN): This is a computer network that connects systems and other devices across a large geographic area, such as library branches or institutions. A WAN can connect libraries and institutions, allowing them to share resources and collaborate on projects. A WAN can also connect libraries to the internet, providing patrons access to online resources.

c.   Wireless Network: A wireless network allows devices to connect to a LAN or WAN without physical cables. In a library, a wireless network can provide patrons with internet access, allowing them to use their laptops, tablets, and smartphones to access digital resources and online catalogue systems. Library staff can also use wireless networks to access resources and manage collections from mobile devices.

d.   Firewall: A firewall is a security system that protects computer networks from unauthorized access and threats. In a library, a firewall will protect the network from cyber

threats such as malware, viruses, and hacking attempts. Firewalls are essential for protecting sensitive patron records and financial information.

e.   Virtual Private Network (VPN): A Virtual Private Network is a secure network that connects devices over the internet. A VPN can provide remote access to library resources, allowing staff and patrons to access digital resources and online catalogue systems from outside the library. VPNs can also be used to connect multiple library branches and institutions securely.

Some examples of other new trending technologies that libraries can benefit from are below:

1.   Cloud Computing: Libraries should adopt cloud computing to make their services simpler and economical. Cloud computing will ensure the best use of library resources, services, infrastructure, human resources, etc. In addition, the technology can also be used for library automation and quick data search. In a digital library, cloud computing ensures that third-party services can manage servers, carry out upgrades, and create data backups.

Swapna et al., (2017), said cloud computing technologies use in libraries provides cost-saving, its easy on installation and maintenance, supports increased storage for library contents. Cloud computing is highly automated in function as regard software update which library can benefit from. It is flexible when requesting additional space on the servers. Cloud computing allows mobility. The staff and the users of the library can connect to the library servers from any location or from wherever they are, rather than having to be present at their desks by having a PC and Internet access. It also supports resource sharing. Cloud computing technology facilitates resource sharing through consortia; a group of libraries coming together and putting their resources in one place, which in turn will enable them to provide access to more resources for their end users. "

2.   Internet of Things: The best-integrated library software or LMS software started using the Internet of Things (IoT) to transfer data without human intervention. It said libraries can use IoT to control inventory, prevent theft, and identify users. It also helps in improving the quality and speed of circulation desk activities. Moreover, IoT can expedite the reservation of books, fire detection in the library and its prevention, and streamline e-library services (Algorhythms, n.d.)

3.   Big Data and Data Visualization: Big data and data visualization" is the method of displaying a large volume of data through charts, graphs, maps, and other visual forms. This makes the information more natural for the human mind to grasp and makes it easier to spot

trends, patterns, and outliers within large data sets (Algorhythms, n.d.). This technology is already helping digital libraries become more globalized while accessing a vast amount of data. It makes the libraries more easily accessible to readers who can find a plethora of information at their fingertips. This can be a real advantage for librarians as they have the relevant skills and knowledge to make the best use of these massive sources of information.

Hamad, Fakhuri, & Jabbar, (2020) submitted that "big data" can help libraries in better decision making, regarding demand-driven collection development, library space management and usage tracking. Big Data also helps in maintaining quality among regular & repetitive library works, viz cataloguing, indexing, archiving management, preservation and representation work. He concluded that big data can help libraries make more cost-effective, innovative and informed decisions or recommendations for users, in order to contribute toward a more user-oriented service.

4.   **Artificial Intelligence:** According to Algorhythms (n.d.), "artificial intelligence (AI)" uses the power of a robot or a computer that tries to do tasks that humans usually do. With Siri and Alexa available on everyone's devices nowadays, artificial intelligence is no longer a futuristic technology as it is gaining more and more traction in our everyday activities. The most common application of AI in a library is the Chabot which receives directional questions from users and resolves them. They can alert the user about their book submission due date, direct a user to the relevant library segment, and automatically schedule appointments.

5.   **Block Chain Technology:** Marc, (2017) said that Block chain technology represents a decentralized database that keeps records of pseudonymized digital transactions that are visible to anyone within the network. Therefore, it is a new way to collect and store data. He explained that Block chain technology has been one of the most discussed technologies in the past year, as Bitcoin has gained more and more power.

Marc, (2017) and Sue Alman, a teacher on emerging technologies highlights in an article that block chain technology "could be used to build an enhanced metadata system for libraries, to keep track of digital-first sale rights and ownership, to connect networks of libraries and universities, or even to support community-based borrowing and skill sharing programs."

Maryjane, Oseni, & David, (2023), stated that "the potential utilization of blockchain technology as a record-keeping system has the potential to enhance accuracy and reduce the

risk of information loss due to disasters or deliberate sabotage in a library. They opined that implementing blockchain would require not only adding new records to the network but also digitizing existing records for effective record-keeping of the library."

6.   **Mobile-Based Library Services:** According to Algorhythms (n.d.), "three main objectives of a library are to promote literacy, disseminate useful daily information to the people and encourage lifelong learning through its reading materials and resources. Mobile libraries bring resources outside of the library's fixed location to users who otherwise might not get an opportunity to profit from them. This is another component that libraries should subscribe to. With the help of mobile services like SMS and WhatsApp, libraries can produce new services and provide faster access to their collection. It also includes a learning management system (LMS), a software application that provides the framework that handles all aspects of the learning process and tracks your training content. An example of the best LMS software is Moodle. The OPAC mobile application is a classic example of mobile-based library services. The platform is operated by SLIM Software and aims at converting conventional libraries to digital libraries."

7.   **Intelligent Library Search & Federated Search:** Federated search and Intelligent Library Search are techniques to retrieve information from many different content locations with only one query and one search interface with federated search (Algorhythms, n.d.). The technology complements main libraries in retrieving information quickly and makes indexing seamless. Libraries can also use this technology for descriptive cataloguing, subject indexing, database searching, and collection development."

8.   **Augmented reality:** Augmented reality (AR) is the integration of digital information with the user's environment in real time. Unlike virtual reality (VR), which creates an artificial environment, AR users experience a real-world environment with generated perceptual information overlaid on top of it (Ellora, 2023). He said AR gained global fame with the release of the Pokémon Go game in 2016. This technology enables users to see and interact with virtual objects and information seamlessly, as if they were part of the real world. By overlaying images and text onto the user's view of the natural world or anchoring virtual objects to real-world locations, AR provides captivating and immersive experiences. It has found applications in interactive museum exhibits, mobile games utilising real-world locations, and training simulations.

AR technology can enhance libraries by providing interactive displays that offer additional information and multimedia content related to for example, an AR display in a library

exhibit on the history of a city can allow users to view virtual reconstructions of historical buildings. AR can also facilitate access to supplementary multimedia content related to specific e-books or articles. Additionally, AR can offer interactive tours of libraries, virtual maps showcasing the locations of different collections and resources, educational games, quizzes, and even act as a virtual assistant or Chabot, allowing users to ask questions and receive real-time answers.

Medical libraries can also utilise AR to create interactive exhibits, showcasing medical instruments or simulating medical procedures, thereby enhancing user engagement and providing a more immersive experience.

PressReader (2023) stated that "education has long been at the heart of libraries. In today's digital world, AR can be a potent tool to enhance the educational aspects of today's libraries, to create engaging learning opportunities and an interactive experience. It is said for instance, that AR can be used to create virtual laboratories, enabling students in disciplines such as astrophysics and medical sciences to conduct experiments safely and conveniently within a sandbox of sorts in the library."

Efficient access to medical resources: AR streamlines and simplifies access to very specific information about medical resources. By simply pointing their devices at a QR code on specific book or journal covers, users can instantly retrieve relevant information. Such access saves time and facilitates efficient research while benefiting both students and medical professionals.

9. Drones: The word "drone" has different meanings, and it originates from the old English word "dran" which means "male bee". In technological terms, drones are unpiloted aircraft or spacecraft that can fly autonomously or by remote control on the ground. It is formally known as Unmanned Aerial Vehicles (UAV) or Unmanned Aircraft System (UAS). Unmanned aircrafts are made of some composite materials that can increase the manoeuvrability while flying and reduce the weight. These are equipped with different state of the art technology including infrared camera, laser, GPS (Global Positioning System), navigator, sensor, different drone hardware and software etc. A drone is a kind of flying robot, and these are controlled by remote ground control system (GSC) and referred to as a ground cockpit. It works in conjunction with GPS and on-board sensors. Earlier these were used only for military purposes but at present, drones are used for different civilian purposes. "A drone can be defined as an Unmanned Aircraft System (UAS) which is controlled remotely either by a human operator or by an on-board computer" (Rouse, 2018).

Vysakh (2020), stated that "drone technology is one of the major upcoming technologies which finds tremendous applications in the days to come as traced by Futuristic Speaker (Frey, 2014). Many of the libraries abroad like Dubai Library, Rose Memorial Library, NY Public Library and Florida Library have started to use drones as an effective tool for delivering books from library to patrons and vice versa. Importance of having Library with standard ICT equipment in our higher Institutions

The library of the information age should strive to be up to date in using current technology to carry out its day-to-day services. This will make easy their job as well as been able to serve patron to their satisfaction. (Akidul, 2023) stated that Information and communication technology (ICT) has revolutionized the way libraries provide services. His analysis of benefits of ICT includes provision of value-added library services, including increased accessibility to information, improved search ability, and enhanced user experience.

According to Akidul (2023), the use of ICT in libraries has the following benefits:

1. Simple access to information resources: Information and communication technology (ICT) enables libraries to provide patrons with digital access to resources, like databases, online journals, and e-books, which they may access at any time and from any location.

2. Personalised services: Libraries may provide users with personalised services thanks to ICT. Examples of these services include personalised research support, email notifications of new resources, and suggestions based on user behaviour.

3. Improved teamwork: Information and communication technology (ICT) enables efficient teamwork among librarians, colleagues, and other entities. This can involve conducting virtual meetings, engaging in online communities, and exchanging resources.

4. Enhanced user engagement: ICT can provide consumers with interactive and captivating learning experiences, such as gamification, virtual

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CHAPTER 11
INPUT, STORAGE, AND OUTPUT DEVICES
Patrick Agwu

Input Devices

An input device is used to feed data into computers. They are capable of converting data into a form which can be recognized by computer. These are devices used to accept data and instructions from the user. Computers receive inputs (instructions and data) through input devices. The input device lets you communicate with a computer. You can use input devices to enter information and issue commands.

There are different input devices, namely: i. Keyboard ii. Mouse iii. Trackball iv. Joystick v. Scanner vi. Light pen vii. Bar Code Reader viii. Optical Character Recognition (OCR) ix. Optical Mark Reader (OMR) x. Magnetic Ink Character Recognition (MICR) etc.

1. Keyboard: The most common input device is the keyboard. It is used to enter both numerical and character-type data. It is like a mechanical typewriter with *alphanumeric* and *special keys, punctuation keys, and functional keys* to perform specific. The keyboards contain 101 keys or 104 keys. The keyboard detects the key pressed and generates the corresponding ASCII codes which can be recognized by the computer.

Types of Keyboards

a. **Standard keyboard:** The standard keyboards have their basic layout. The average number of keys on a regular keyboard is 105/108; QWERTY keyboards are the most common and have the six alphabets Q, W, E, R, T, and Y in the first row.

b. **Ergonomics**: It refers to the study of methods that can reduce stress on muscles to avoid repetitive strain injury. It mostly deals with optimizing posture and technique while working, so the work can be carried out most easily.

c. **Wireless keyboard:** It is a keyboard that does not need to connect to the computer via a wire. This makes the use of the keyboard very convenient and comfortable. Wireless keyboard uses Bluetooth, Infrared (IR) to connect to the computer.

d. **Virtual keyboard:** It is a software device that leads to use input data just like hardware keyboard. They open as an application and can be controlled by a mouse or wire touch screen.

e. **Compact keyboard:** These keyboards are slim and usually do not have the numerical keypad that is present on the right side of the keyboard. These are typically used in laptops.

2. **MOUSE:** This is an input device that controls the movement of the cursor on the display screen. MOUSE stands for "**M**echanically **O**perated **U**ser **S**erial **E**ngine". The Mouse is used as a pointing device. It is a small device; you can roll/navigate along a flat surface. A mouse has a small ball/IR ray is kept inside and touches the pad through a hole at the bottom of the mouse.

There are two types of MOUSE: Mechanical and Optical

a. Mechanical: This mouse has a small rubber ball underneath that moves against two rollers as it passes across a flat surface.

b. Optical: This mouse is more accurate and has no moving parts. It uses a laser to detect movement.

3. **Joystick:** This is an input device consisting of a stick that pivots on a base and reports its angle or direction to the device it is controlling. The joystick can be moved in all four directions. The function of the joystick is like that of a mouse however, it is mainly used in playing computer games.

Joysticks are also used for controlling machines such as cranes, trucks, underwater unmanned vehicles, surveillance cameras and zero turning radius lawn mowers.

4. **Scanner:** The scanner is an input device which works more like a photocopy machine. It is used when some information is available on a paper, and it is to be transferred to the computer for further manipulation. The scanner captures images from the source which are then converted into the digital form.

5. **Optical Mark Reading and Recognition (OMR):** Optical Mark Reader is a device that reads pencil marks and converts them into computer processed form. Special pre-printed forms are designed with boxes which can be marked with a dark pencil or ink. Such documents are read by a reader, which transcribes the marks into electrical pulses which are transmitted to the computer. They are widely used in applications like objective type answer papers evaluation in which large number of candidates appear etc.

6.   **Optical Character Recognition (OCR):** The main use of these devices is to recognize alphabetic and numeric characters printed on paper. The OCR technique permits the direct reading of any printed character without any special ink. With OCR, a user can scan a page from a book and the computer will recognize the characters in the page as letters and punctuations marks and stores and can be edited using a word processor the size (width, height and depth) of the scanned. OCRs are used in applications such as Credit Card billing and reading of pin code numbers in large post offices to sort mail geographically.

7.   **Magnetic Ink Character Recognition (MICR):** MICR is a form of character recognition that reads the text printed with magnetic charged ink. The shapes of the characters by sensing the magnetic charge in the ink and translates these shapes into computer processed format. MICR is widely used by banks to process cheques.

The cheque can be read using a special input unit, which recognizes magnetic ink characters. This method eliminates the manual errors. It also saves time and ensures security and accuracy of data.

Output Devices

•   When the data and instructions are fed into the computer and processed the next step is to get the desired output.

•   This output may be displayed on the monitor or printed on the computer.

•   The output displayed on the monitor is called **soft copy** output.

•   The output produced on a computer is called **hard copy** output.

Note: The device that displays output to the user is called the **output device**.

1.   **Monitor:** It is a commonly used output device sometimes called a display screen/VDU. Monitors connected to the computer are like a television set. Monitor display image and text. The smallest dot that can be displayed is called a **pixel**. The resolution of the monitor determines the quality of the display. Some popular resolutions are 640X480 pixels, 800X600 pixels, and 1024X768 pixels. The different size of the monitor is measured diagonally maybe 12", 14", 17", 19", 21". The different types of monitors: CRT (Cathode Ray Tube), LCD (Liquid Crystal Display), TFT (Thin Film Transistors), LED (Light Emitting Diode)

2.   **Printer:** Printer is an output device that prints text or images on paper. By printing you create a **'hard copy'** of data. There are different kinds of printers, which vary in their

speed and print quality. The two main types of printers namely. Impact Printers and Non-Impact Printers.

3.   Plotter: Plotter is an output device that draws shapes on paper based on commands from a computer. Plotter differs from printers in that they draw lines using a pen. As a result, they can produce continuous lines, whereas printers can only stimulate lines by printing a closely spaced series of dots. Multicolour plotters use different coloured pens to draw different colours. Plotters are more expensive than printers. They are used in engineering applications.

4.   Speakers: With speakers, the sound signals from analogue/ digital are converted into audible frequency in the speakers and produce voice output [audio data]. Using speakers with speech synthesizer software, the computer can provide voice output. Voice output has become very common in many places like airlines, banks, automatic telephone inquiry systems etc.

5.   Memory: is an essential component of any digital computer. It is a storage device. It stores programs and data, required by the CPU, and the results generated after processing. This storage enables us to use the stored data in the future. There are two kinds of memory that are commonly used in computers:

1.   Primary Memory (Semi-Conductor Memory)

2.   Secondary Memory (Magnetic Memory)

The storage capacity of a computer is measured in terms of **Bytes**. One byte includes a total of 8 individual units called **bits**. One bit can store either a 0 or 1 in it. The table below gives the storage capacities.

Unit	Symbol	Equal to
Byte	B	8 Bits
Kilobyte	KB	1,024 B
Megabyte	MB	1,024 KB
Gigabyte	GB	1,024 MB
Terabyte	TB	1,024 GB
Petabyte	PB	1,024 TB
Exabyte	EB	1,024 PB
Zettabyte	ZB	1,024 EB

Yottabyte	YB	1,024 ZB

Primary Memory

The primary memory is the main memory of the computer.

i.   It stores the programs and data, which are currently needed by the CPU.

ii. The size of the main memory is comparatively much smaller than that of the secondary memory because of its high cost.

iii. The CPU communicates directly only with the main memory.

iv. As the CPU works at very high speed, its matching memory must be very fast.

v.   Only primary memory devices can provide the matching speed.

vi. RAM and ROMs are used as the main memory of the computer.

vii. Primary memory is of two types. RAM (Random Access Memory) and ROM (Read Only Memory)

Random Access Memory (RAM)

•   RAM is also called as the main memory of a computer.

•   This is really the main store and is the place where the program gets stored temporary.

•   When the CPU runs a program, it fetches the program instructions from the RAM and carries them out.

•   If the CPU needs to store the results of the calculations it can store them in RAM.

•   When we switch off a computer, whatever is stored in the RAM gets erased.

•   It is a **volatile** form of memory.

•   Types of RAMS o EDO RAM (Extended data output RAM) o SRAM (Static RAM)

•   DDR RAM (Double Data Rate RAM)

EDO RAM:

•   EDO RAM stands for Extended Data Output RAM.

•   It improves the time to read from memory on faster microprocessor such as Intel Pentium.

•   EDO RAM was initially optimized for the 66 MHz Pentium

SRAM:

• SRAM stands for Static Random Access Memory.

• It is type of semiconductor memory that uses bi-stable latching circuitry to store each bit.

• Unlike dynamic RAM (DRAM), which stores bits in cells consisting of a capacitor and a transistor,
SRAM does not have to be periodically refreshed.

DDR RAM:

• DDRRAM stands for Double Data Rate Synchronous Dynamic Random Access Memory.

• It is a type of very fast computer memory.

• It is based on the same architecture as SDRAM but uses the clock signal differently to transfer twice the data in the same amount of time.

Read Only Memory (ROM)

• ROM stands for "**Read Only memory**".

• The information is pre-recorded into to ROM chip at manufacturing time.

• Once data has been written into a ROM Chip, it cannot be erased but you can read it.

• When we switch OFF the computer, the contents of ROM are not erased, but remain stored permanently.

• ROM is **non-volatile memory**.

• ROM stores critical programs such as the programs that boot the computer.

• Types of ROM: PROM (Programmable ROM), EPROM (Erasable Programmable ROM), and EEPROM (Electrically Erasable Programmable ROM).

• **Programmable ROM**: It is a memory on which data can be written only once. A variation of the PROM chip that is not burnt at the manufacturing time but can be programmed using PROM programmer or a PROM burner.

• **Erasable Programmable ROM**: The information can be erased and re-programmed using a special PROM – programmer. AN EPROM differs from a PROM in that PROM can

be written only once and cannot be erased. But ultraviolet light is used to erase the contents of EPROM.

• **Electrically Erasable Programmable ROM**: This is equivalent to EPROM but does not require ultraviolet light to erase its content. It can be erased by exposing it to an electrical charge.

Difference between RAM and ROM

RAM	ROM
RAM stands for Random Access Memory	ROM stands for Read-Only Memory
RAM allows the computer to read data quickly to run applications. It allows reading and writing.	ROM stores the program required to initially boot the computer. It only allows reading.
RAM is volatile i.e. its contents are lost when the device is powered off.	It is non-volatile i.e. its contents are retained even when the device is powered off.
The two main types of RAMS are static RAM and dynamic RAM.	The types of ROM include PROM, EPROM and EEPROM.

Secondary Memory

Since the storage capacity of the primary memory is not very large, it cannot hold a large amount of data, including programs, which may be needed for processing. Thus, secondary storage devices are necessary. The secondary memory is used as auxiliary memory. The secondary memory is used for bulk storage or mass storage of programs, data, and other information. It has a much larger capacity than main memory. The secondary memory retains the information once stored on it. Magnetic memory such as Hard Disk Drive (HDD), Compact Disk, Pen Drive, Memory cards is the most used secondary memory in the computer. The average time required to reach a storage location and obtain its contents is called its access time.

Magnetic Disks:

• Magnetic disks are thin circular plastic plates on which some magnetic material is coated.

• Magnetic disks come in various sizes and materials.

- They use the properties of magnetism to store the data on a magnetic surface.

- A disk pack normally consists of such disks mounted on a central shaft.

- The central shaft rotates at speeds of about 7200 revolutions per minute (RPM).

- In a disk plate information is stored on both surfaces. The surface is further divided into several invisible concentric circles called as tracks.

- The tracks are further divided into various sections called sectors.

- To store information, it is necessary for us to identify the track and sector where it must be stored.

- The stored information can be read any number of times without affecting the stored data. But when new data is written it erases the previously written data.

- Two types of magnetic disks are: Hard Disk and Floppy Disk

Hard Disk:

- The most common physical device for storing files on the hard disk.

- The hard disk typically contains several rotating disk plates, which are permanently encased in a hard disk.

- The surfaces of the plates are covered by metal oxide, electromagnetic recording heads.

- It performs read/write operation.

- There is one head for each surface, and all the heads move together.

- The disk rotates at around 7200 rpm.

- Modern disks typically hold 260 GB to 1000 GB (TB) of data.

- The surface of a plate is organized has several concentric tracks. Each track is divided into sectors. A set of matched tracks are called cylinders.

Floppy Disk:

- Floppy diskette contains a single flat piece of circular plate (the disk) coated with metal oxide and enclosed in a plastic cover.

- Floppy disks are small and portable.

- The three common sizes are 3.5", 5.25" and 8" diameter.

- Most used floppy disks are 3.5" in size with a storage capacity of 1.44 MB of data.

- Disk drives for floppy disks are called floppy drives.

- Floppy disks are slower to access than hard disks and have less storage capacity.

- It is less expensive.

Optical Disk

- Optical disk is a random access, removable disk on which data is written and read through a laser beam.

- Optical disk consists of a rotating disk, which is coated with highly reflective material.

- Data recording on the disk is done by focusing a laser beam on the surface of the spinning disk, which stores data as microscopic light and dark spots on the disk surface.

- The dark spots are called **pits**. The lighter, non-spitted surface areas of the disk are called **lands**.

- The process of recording data onto an optical disk is called burning.

- There are different types of optical laser disks.: CD ROM, DVD ROM and BD ROM

CD ROM

- CD-ROM stands for Compact Disk Read Only Memory.

- It is read only optical storage medium capable of holding up to 682 MB of data.

- Accessing data from CD ROM is quite a bit faster than a floppy disk but slower than a hard disk.

- To read a CD-ROM a device called CD-ROM drive is needed.

- CD technology uses a near-infrared laser.

- There are two types of CD-ROMs. CD-R: It is also called a Recordable CD, CD-RW: It is also called a Re-Writable CD

DVD

- DVD stands for "Digital Versatile Disk".

- It is an optical disk technology with a 4.7 GB storage capacity.

- DVD can be single or double-sided and can have two layers on each side.

- A double-sided, two-layer DVD will hold up to 17 GB of Video, Audio or other information.

- DVD technology uses a red laser.

- There are two types of DVDs. DVD-R: It is also called DVD Recordable and DVD-RW: It is also called DVD Re-Writable.

Blu-Ray Disk:

- Blu-ray Disk, referred to as BD.

- It is a high-capacity storage technology with 25 GB to 50 GB capacity to store HD movies and other information.

- The name Blu-ray is derived from the blue-violet colour laser, used to read data stored on disk.

Portable Storage Device:

- A Portable Storage Device (PSD) is a small hard drive designed to hold any kind of digital data.

- This is slightly different from a portable media player which stores and plays music and movies.

- Some are fixed-size hard drives of 256 GB, 320 GB, 500 GB and 1 TB.

- It may be a useful alternative to backing up or purging memory cards if a computer is unavailable for downloading.

Difference between Primary and Secondary Memory:

Primary Memory	Secondary Memory
Semiconductor memory.	Magnetic or Optical memory.
Volatile (Temporary)	Non-Volatile (Permanent)
Expensive	Less Expensive
Faster	Slower
Also called as Main Memory	Also called as Auxiliary Memory
Example: RAM, ROM	Example: HDD, Pen drive etc.

Cache Memory

- The cache memory (pronounced as cash) is placed in between the CPU and Main memory.

- It is much faster than the main memory.

- Its access time is much less compared to that of the main memory.

- The cache memory is an intermediate memory and not accessible to users.

- It stores instructions and data, which are to be immediately executed.

- It is used to reduce the average access time reading data, which is normally stored in the main memory.

- The cache memory increases the operating speed of the system. But it is much costlier than the main memory.

- There are two levels of cache memory L1 and L2.

- L1 cache memory will be present inside the CPU, whereas L2 cache will be present on the motherboard.

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CHAPTER 12
INFORMATION AND COMMUNICATION TECHNOLOGY AND INTERNET RESOURCES
Samuel A. Bello

Definition and Overview of ICT

Information and Communication Technology (ICT) has been defined as technologies that provide access to information through telecommunications (Tamilselvan, Sivakumar, & Sevukan, 2012). Information Technology consists of hardware and software for collecting, storing, processing, and presenting the information to the users. ICT tools are primarily communication technologies like the Internet, wireless networks, cell phones, and other media for communication. ICT consists of various technologies that can be applied in collecting, storing, and editing information. These tools are also applied in retrieving, sharing, or transferring information in different formats, such as portable document format (PDF), Microsoft Word (MSW), and even Hypertext Markup Language (HTML).

ICT has brought substantial transformation to human communication during the past two to three decades. People can now communicate with others from different countries and locations using technologies like Instant Messaging, Voice over Internet Protocol (VoIP)/Internet Protocol telephony, and Videoconferencing. Social Networking is also part of the advancement in the communication world. ICT has turned the world into a 'global village' where people can communicate with others across the globe as if they were living next door.

The components of Information and Communication Technology (ICT) as a concept would be analysed as 'Information' meaning communication; 'Communication Technology' refers to the technology tools used in the information communication or dissemination processes to meet human needs. A combination of these, according to Tamilselvan et al (2012), is known as ICT. Specifically, ICT covers tools that can transform information into a digital format for electronic usage.

In the context of academic libraries, ICT is defined as facilities such as computers, software, hardware, and other multimedia technologies designed for selecting, acquiring appropriate information resources, and disseminating such to the users (Dahiru, Oladokun, Grand, & Mutshewa, 2020). Just as the ICT has successfully transformed management processes in various organizations, the academic library management processes like acquisition, circulation, cataloguing, information retrieval, preservation, and selective dissemination of

information (SDI) have also been transformed with the application of ICT (Dahiru et al., 2020; Lindawati, Fernando, Deniswara, & Wahyuningtias, 2021).

ICT has forced the 21st-century library to go digital as users have turned to using virtual resources. Users now prefer to access library resources in the comfort of their classroom or bedroom. This advancement has challenged the library to cater to the ever-changing needs of the users who are 'techno-savvy' (users who have gained a mastery of technology use) Indeed, ICT has transformed the library institution with 'libraries without walls' (where users access information 24/7 without physical restriction) that are still emerging.

Use of ICT in Academic Libraries

The integration of Information and Communication Technology (ICT) in academic libraries has fundamentally transformed their functionality. ICT tools encompass both hardware and software services that enable the electronic capture, processing, display, and transmission of information (Tanloet & Tuamsuk, 2011). Academic libraries have leveraged these capabilities to streamline various aspects of their operations:

Cataloguing

ICT has revolutionized cataloguing in academic libraries, facilitating the creation of Online Public Access Catalogues (OPACs) and enabling online, copy, and union cataloguing. This technological advancement has eliminated the need for traditional print cataloguing tools like ACR2, speeding up placing materials on shelves for users to access.

Digital Preservation of Library Materials

ICT enables the electronic preservation of both digitized and born-digital library materials. Print materials, especially local content, can be converted into electronic formats and stored in Institutional Repositories (IRs). This ensures preservation, prevents physical damage, and facilitates convenient access to library resources.

Deployment of Information Literacy Skills

ICT facilitates the delivery of Information Literacy Skills (ILS) to library users through virtual communication and social networking tools. Libraries can distribute electronic guides on accessing resources step-by-step and engage users through platforms like WhatsApp and Zoom for online information literacy education, particularly significant during times like the Covid-19 pandemic when online education became necessary.

Automation and Computerisation

Globally, ICT enables the automation of key operations and services in academic libraries, including cataloguing, OPAC, acquisition, circulation, Selective Dissemination of Information (SDI), Current Awareness Service (CAS), and Document Delivery Service (DDS). An automated library ensures continuous availability of digital services irrespective of user location, enabling 24/7 access to library resources and services.

The 'Internet' or 'internet'

The concept of the internet, whether spelled with the capital "I" or not, has been subject to extensive debate regarding its grammatical classification and proper definition (Bay 2017). Some argue that capitalization aligns with the norms of proper nouns (McIntosh 2013), while others contend that it functions more as a common noun denoting a class or category. Despite its origins as a descriptor for a class rather than a specific entity, the term has evolved to represent the interconnected network of millions of computer networks spanning the globe. However, Bay (2017), argued that: "the first time it appeared as a noun, it was in the proper noun form, and when it returned to proper noun use in 1981 (p. 214), (D)ARPA/ARPANET[1] community settled on "*The Internet*" meaning to name an actual infrastructure that was emerging from attempts at connecting several separate networks" (p. 205). This is how 'the Internet' that is been used globally today came into being.

What is the Internet?

Bay (2017) asserts that "internet" should be treated as a proper noun due to its unique nature as a global network. This perspective emphasizes the distinction between the internet as a specific infrastructure, as opposed to a generic concept. The capitalization of the "Internet" signifies its evolution from a classifying adjective to a proper noun denoting a tangible entity, as evidenced by its adoption in technical and historical documents (p. 205). With this convincing argument, the word 'Internet' (with the first letter capitalized) is hereby accepted for discussion in this chapter. For further understanding of the term "Internet" or "internet" see also (Haigh, Russell, & Dutton, 2015; McIntosh, 2013).

The Internet has a history. Notably, the antecedent of the Internet made it difficult to get a straightforward definition of the term in the Internet literature. The coinage of the Internet metamorphosed from the various controversial debates and disputes arising from its

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[1] (D)ARPA meaning DoD's Advanced Research Project Agency created Advanced Research Projects Agency Network (ARPANET) both US-based funded Transmission Control Protocol (TCP) & Internet Protocol network of networks.

grammatical classification, and definition (D'Orazio, 2016; Russell, 2012). Due to the origin of the Internet, and the circumstances surrounding its coinage, there's a controversy about the appropriate and acceptable definition of the term. These series of arguments have created confusion about what exactly is the Internet. For instance, some of the early definitions of the term read:

> "[A] network of networks based on the Transmission Control
> Protocol/Internet Protocol (TCP/IP), a community of people who use and
> develop those networks and a collection of resources that can be reached from
> those networks" (Hoffman & Krol, 1993), p. 1).

> "The combination of computer facilities and electromagnetic transmission
> media, and related equipment and software, comprising the interconnected
> worldwide network of computer networks that employ the Transmission
> Control Protocol/Internet Protocol or any successor protocol to transmit
> information" (Speta, 2014, p. 113).

It means all the computers from around the world that are linked to the Internet network can communicate and share information. Understandably, the Internet originated from a 'network' and grew through 'interconnections' from which, what we have as, the Internet today, was coined. In this network, the problem of where or the distance of the location of any computer to be linked to the network to access the Internet does not arise. In other words, any computer (configured for Internet network access) located anywhere from around the world could be part of the network. This transformation accounts for a detailed definition emanated from Pallen (1995) who described the concept as the largest global computer network; a steadily growing collection of more than 100 million computers that communicate with one another using a shared set of standards and protocols.

In conclusion, while debates persist over the grammatical classification and precise definition of the internet, it remains clear that the Internet represents a transformative global network connecting diverse communities and resources across the world

The World Wide Web

The pivotal moment in the second phase of the Internet revolution occurred with the creation and widespread adoption of the World Wide Web (WWW) in 1989, pioneered by Tim Berners-Lee at CERN. This breakthrough led to the establishment of the first-ever website,

info.cern.ch, and its corresponding webpage in 1991. The WWW, often referred to simply as the 'web', constitutes a global network of interconnected documents and data accessible via the Internet. It functions as a worldwide information system comprised of linked computer networks, offering files formatted in HTML, XML, PDF, and DOC. These files can encompass text, images, and multimedia elements embedded in hyperlinks and hosted on various servers. This structure enables users to access specific information from the Internet according to their needs.

Understanding the distinction between the Internet and the Web is crucial. While the 'Internet' denotes an international network of communicating computers, the 'Web' represents a global network of information systems operating within the Internet environment to transmit or share data through specific web addresses. It's essential to recognize that the Web is a service provided by the Internet rather than synonymous with it. This differentiation rebuffs the notion that the two terms are interchangeable. This point is reinforced by arguments from Bay (2017) and Noruzi (2004), who emphasize that the Web is merely one of the many services available on the Internet. Merely utilizing the Internet as its transmission medium does not equate the Web with the Internet itself.

How the Internet and WWW Relate and Work Together

As previously outlined, the Internet and the World Wide Web (WWW) are interconnected but often misinterpreted as synonymous. Although they operate within the same framework, they serve distinct purposes. The Internet primarily functions for internetwork communication and information accessibility. These functions rely on Uniform Resource Locators (URLs), which were introduced by the WWW initiative to identify resources. The design of URLs adheres to the criteria outlined in the "Functional Requirements for Internet Resource Locators," established by the Uniform Resource Internet (URI) working group of the Internet Engineering Task Force (URI-WG) (Kunze, 1995). URLs, or web addresses, are generated using hyperlink programming language by the WWW, serving as crucial identifiers that unlock information resources on the Internet (Hahn, 1995).

Both the WWW and the Internet facilitate information access through web applications. For example, when a desired URL written in hypertext mark-up language is entered into the address bar of an Internet-based web browser, the browser interprets and converts the URL content into an interactive file through a process known as 'rendering.' Subsequently, it displays the content in a readable format (Hahn, 1995).

The internet Communication Tools

Internet communication tools are an integral part of online services provided by the Internet to facilitate efficient digital communication and information exchange. Some of these tools will be outlined below:

 a. Electronic Mail

Electronic Mail (Email) was one of the foremost Internet services, enabling users to send messages to individuals or groups simultaneously. Email has emerged as a highly convenient and widely used tool for digital interaction, information dissemination, and resource sharing in learning, teaching, research, and library services. Recognizing its effectiveness, numerous academic libraries worldwide have embraced email services for communication between patrons and librarians, inter-patron communication, and reference services.

Utilizing email is straightforward. To utilize its services, one needs the recipient's email address. Typically, email addresses comprise two components: a username and a domain name, with the latter representing the computer's Internet address where the recipient's email is stored, also referred to as the mail server. An "@" symbol separates these components. For instance: registrar@ui.edu.ng. Various email service providers exist, including Gmail, Yahoo Mail, and Microsoft Outlook. Common commands across these platforms include:

• Compose: Creating a message.

• Send: Dispatching the composed message.

• Reply: Responding to a received message.

• Forward: Transmitting a received message to another individual or group.

• Attach: Appending a document to the email message, either as text or a separate file.

Mailing List

A mailing list serves the purpose of distributing or sharing information among subscribers via email. Also referred to as a listserv, a mailing list, unlike individual user email accounts, is a collection of email addresses identified by a single name or ID. All members of the listserv, who must have subscribed to the mailing list with their email addresses, automatically receive any message sent to this ID or name using specialized software known as a "List Server" (Pujar, Manjunath, & Juttiyavar, 2003). Embracing this tool in academic libraries aids librarians in disseminating information regarding library products, newsletters, events, placements, and resource sharing, as well as marketing library services. Mailing lists or listservs also serve as valuable platforms for librarians to engage in professional discussion

groups, seek solutions to technical challenges, and importantly, share information about conferences and training programs.

Social Media

Social media, usually abbreviated as SM, serves as a platform for individuals to share information and engage in social interactions across different geographical locations. Despite its widespread use by both librarians and patrons, academia has yet to provide a precise definition for the concept and its contents (Vuori, 2011). Efforts have been made within academic discourse to address this lack of clarity, with only three definitions thus far considered useful in academic contexts (Ihejirika et al., 2021, p. 61):

1.   Social media refers to a collection of internet-based applications rooted in the principles and technologies of web 2.0, facilitating the creation and exchange of User Generated Content (Kaplan & Haenlein, 2010).

2.   Social media utilizes web and mobile technologies to establish interactive platforms for individuals and communities to share, co-create, discuss, and modify user-generated content (Kietzmann et al., 2011).

3.   Social media encompasses the technologies and actions enabled by web 2.0 applications (Vuori, 2011).

Various social media tools are employed in library settings, including Facebook, Myspace, Twitter, Delicious, blogs, and wikis. Among these, Facebook stands out as the most prevalent and heavily utilized tool in academic libraries (Dickson & Holley, 2010; Okoroma, 2018). In academic library settings, social media tools are leveraged to enhance library services such as announcements, current awareness, reference queries, obtaining feedback from patrons, and facilitating research consultations.

Classification of social media has proven challenging within academia. For instance, Vuori (2011) notes the multifaceted purposes of social media platforms, making a singular classification difficult. Consequently, the need for classification has arisen to clarify the distinction between social media and 'Social Networking Sites' (SNS), a misnomer attributed to the popularity and extensive usage of SNS. However, social media extends beyond SNS. To mitigate confusion, literature has classified social media types by platform names such as Facebook, Twitter, and Myspace (Ihejirika, 2021). Yet, for this module, Ngai's classification (as cited in Ihejirika 2021, p. 62) will be employed as it is considered more comprehensive:

Media Sharing Sites: These platforms facilitate the uploading, organization, and sharing of multimedia content with individuals or specific communities. Examples include YouTube,

Instagram, and Flickr. YouTube, established in 2005, has experienced exponential growth, while Flickr, launched in 2004, has been popular for users to share personal photographs. Similarly, Instagram, introduced in 2010, enables mobile users to apply filters to photos before sharing them across multiple social networks.

YouTube, Flickr, and Instagram have captured the attention of users and librarians for sharing photos and videos. In academic library contexts, these tools are specifically utilized to disseminate images of new library collections. For instance, librarians can utilize Flickr to share photos of new book arrivals with users and use YouTube to showcase events such as conferences, workshops, and highlights of inaugural lectures.

Types of Social Media

This platform offers authors the chance to share their content online. Examples include blogs, Twitter, and Tumblr. Tumblr, introduced in 2007, is a "microblogging platform," allowing quick sharing of text, images, audio, video links, and quotes within an online community. Twitter, launched in 2006, enables users to communicate via short messages called "tweets," utilizing hashtags to categorize topics and facilitate searches. Unlike traditional blogs, Tumblr blogs, or Tumbllogs, are frequently used for sharing content with minimal commentary, distinguishing them from standard blogs. The term "blog" originates from "weblog," indicating a dated log of posts by one or more authors, serving as a simple means for web authors to share thoughts and ideas.

In academic libraries, blogs facilitate information exchange, including book recommendations, library activities, news updates, workshop notices, and more. Librarians can use blogs to post messages and information on specific topics, receiving instant feedback from patrons, thus enhancing communication and service provision. Twitter also proves valuable in library settings, offering microblogging features for interacting with patrons. It serves as a platform for updating staff and patrons on library activities, new acquisitions, and database additions. Its free accessibility and efficient microblogging format make it an innovative tool for service communication in academic libraries.

Media Sharing Sites

These platforms facilitate the uploading, organizing, and sharing of various multimedia contents with individuals or selected communities. Examples include YouTube, Instagram, and Flickr. YouTube, established in 2005, has experienced significant growth. Flickr, established in 2004, has been popular for sharing personal photographs. Similarly, Instagram, launched in 2010, allows mobile users to capture photos, apply filters, and share them across

multiple social networks. These platforms have garnered attention from both users and librarians for sharing photos and videos. In academic libraries, they are utilized to showcase new library collections and events such as conferences and workshops.

Blogging and Microblogging

In the realm of online communication, this platform allows authors to share their content. Within this category are examples such as blogs, Twitter, and Tumblr. Launched in 2007, Tumblr functions as a "microblogging platform," facilitating quick posts of text, images, audio, video links, and quotes within an online community. Twitter, originating in 2006, serves as a microblogging platform where users exchange brief messages known as "tweets." Twitter utilizes "hashtags," denoted by the # symbol, to organize content and facilitate searching for specific topics. Tumblr blogs, or Tumblr blogs, stand out for the sharing of content without extensive commentary, distinguishing them from traditional blogs.

The term "blog" originates from "weblog," indicating a chronological record of posts by one or more authors. Blogs serve as online platforms for sharing thoughts and ideas with ease. In academic libraries, blogs facilitate information exchange, including book recommendations, library activities, news updates, workshop announcements, and more. Librarians utilize blogs to communicate messages and gather feedback from patrons on various topics in real-time.

In academic libraries, Twitter serves as an effective tool for engaging with patrons through its microblogging capabilities. Twitter updates staff and patrons on library activities, new acquisitions, and database additions. Twitter's suitability for academic libraries stems from its cost-effectiveness and efficiency in communication, particularly its microblogging feature, which saves time. These distinctive features make Twitter an innovative method for delivering library services and communicating with patrons.

Social Bookmarking Platforms

Social bookmarking refers to the act of gathering and labelling information sources for personal reference and for sharing with others (Dickson and Holley, 2010). These platforms enable users to tag, annotate, and categorize web content that they find interesting. Additionally, they facilitate collaboration among users.

Among these platforms are Delicious, Pinterest, Digg, and Foursquare. Foursquare is a mobile application based on location that combines elements of social networking and gaming. Pinterest allows users to create and manage collections of images based on themes by either uploading their photos or importing images from the web (referred to as "pinning"). Users can

explore and follow other users' pin boards for inspiration, as well as "like" or "re-pin" images to their collections. Digg permits users to vote on bookmarks submitted by others using virtual "thumbs up" buttons. Among these platforms, Delicious is the most popular and widely utilized in academic libraries, as it enables patrons to share information resources tagged with keywords. Tagging involves assigning descriptive keywords to bookmarked resources. This tagging feature facilitates the flexible organization of bookmarks and the development of shared vocabularies, known as "folksonomies".

Virtual/Online Communities

Interactive tools on websites like Lonely Planet and Yahoo Answers allow individuals to share specific information and interests. Lonely Planet serves as a platform for sharing travel experiences within a community.

Virtual Worlds

These tools create computer-simulated environments for users to inhabit virtually. Second Life, a Massive Multi-user Virtual Environment, allows users to engage in collaborative projects and online classes through 3D video and audio interactive environments.

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