COURSE GUIDE

LIS 105
INFORMATION SYSTEMS, RESOURCES & SERVICES

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INTRODUCTION

Welcome to **LIS 105: Information System, Resources and Services;** LIS 105 is a course with the duration of a minimum of one semester with (2) two-credit unit. It is a compulsory course for all undergraduates in the Department of Library and Information Science at the university. The course examined the definition, concepts, and types of Information Systems, Sources, Resources and Services. The relevance of information systems, resources and services in communication and information access, retrieval and transfer; The nature and characteristics of information systems, resources and services; Digital information systems, resources and services; Evaluation of Information systems, sources, resources and services; Information Access, Storage and Utilization; User Education; ICT application to information resources and services access and management; Factors affecting the Development of Information sources, Resources, services in Nigeria

This course is aimed at introducing you to the general knowledge on the concept of information systems, information resources, and services and how information systems can help in the management of information resources and services through information storage, access and utilization to satisfy information users. Also, to equip you with various methods and when you can use each in the evaluation of the information systems and programs carried out in the library and any other organizations.

In this course, LIS105, you will learn the concept of information systems; types of information systems, sources, resources and services; the relevance of information systems, resources and services in communication; information access, retrieval and transfer. Furthermore, the course covers the nature and characteristics of information systems, resources and services; digital information systems, resources and services; evaluation of Information systems, sources, resources and services. You are expected to learn the concept of Information access, storage and utilization; user education; ICT application to information resources and services access and management. You will also learn the factors affecting the development of Information sources, resources and services in Nigeria.

LEARNING OUTCOME(S)

At the end of this course, you should be able to discuss any topic in the area of business information systems and services. Specifically, you should be able to:

- Define of Information Systems
- Describe the components of information systems

- Explain the advantages and disadvantages information systems
- Explain various types of Information Systems and analyze the roles of information systems in information resources, services and retrieval
- Explain the concept of information service and information sources, identify the various types /categories of information sources
- Explain the meaning of digital information systems, its devices; advantages and disadvantages of digital information systems,
- Explain what is digital information services; merits and demerits of digital information services,
- Explain what evaluation is, its importance and various types of evaluation.
- Explain what evaluation of information systems are, types of evaluation use in evaluating information systems and why information systems should be evaluated
- Explain the Concept of Information Communication Technology (ICT) and how ICT can be applied to Information Resources, the Benefits of application of ICT to Information Resources and some of the challenges associated with the application of ICT to Information Resources (IR)
- Explain how ICT can be applied to information services and access and information management and advantages and challenges associated with the application of ICT to information Services, Access and Management
- Explain the concept of user education, objectives of user education, procedure in planning user education,
- Identify the group of people involved in user education and Competency Required for User Education Staff/ Instructor
- Explain the various methods of imparting user education, discuss the benefits and challenges encountered in the teaching user education
- Explain the Concept and components of Information Access and Utilization, methods of Information Access, the requirements for Online Search
- Explain the processes of information resources and services development
- Discuss factors affecting the development of information sources, resources, services in Nigeria.

WORKING THROUGH THIS COURSE

To successfully complete this course, you are to read the study units, strive to do all assignments, open the links, read and participate in forums

and discussion, read the recommended books and other materials provided, prepare well and participate in the facilitation online.

Every single study unit has introduction, intended learning outcomes, the main content, conclusion, summary and reference/ further readings. The intended learning outcomes (ILOs) tells you what you should do at the completion of each study unit. So, you can assess the extent of your learning at the end of each unit to ascertain whether you achieve the intended learning outcomes. In order for you to achieve the intended learning outcomes, the course is presented in text, video, and audio formats organized into modules and units. Click on links as instructed but in case you are reading offline, you will have to copy the links and paste on your browser. You can also download the audios and videos to view offline. You may also wish to download the PDF version of the course and save on your electronic devices such as mobile phone, computer, laptop and ipad. At the end of every unit, a summary is being presented in text and along with self-assessment, you are required to attempt all questions.

There are two main forms of assessments- assignments are given to you in this course and you are to do all assignments as instructed and submit same for grading.

You are to submit all TMAs to your tutor for grading on or before the stated deadline. If for any reason you cannot complete your assignment on time, contact your tutor before the due date to discuss the possibility of extension. TMAs constitute 30% of the total score for the course. A minimum of three computer-Based Test (CBT) will be given to you with one final examination at the end of the semester. It is compulsory that you take all the three-computer based tests and the final examination.

THE COURSE MATERIAL

Major components of the course are:

- Course guide
- Study units
- References and further readings

STUDY UNITS

The course has 13 study units in between the five modules. The modules and units are presented as follows:

MODULE 1 INFORMATION SYSTEMS

Unit 1 Concept of Information Systems and Components of Information systems
Unit 2 Function of Information Systems
Unit 3 Concept of Information Service and Sources

MODULE 2 CONCEPT OF DIGITAL INFORMATION SYSTEMS, RESOURCES AND SERVICES

Unit 1: Digital Information Systems
Unit 2: Digital Information Resources.
Unit 3: Digital Information Services

MODULE 3 EVALUATION OF INFORMATION SYSTEMS, SOURCES, RESOURCES AND SERVICES

Unit 1 Evaluation of Information Systems
Unit 2 Evaluation of Information Resources and Services

MODULE 4 ICT APPLICATION TO INFORMATION RESOURCES AND SERVICES ACCESS AND MANAGEMENT.

Unit 1 ICT Application to Information Resources
Unit 2 ICT application to information services; access and management

MODULE 5: USER EDUCATION AND INFORMATION ACCESS, STORAGE AND UTILIZATION

Unit 1 User Education
Unit 2 Information Access, Storage and Utilization
Unit 3 Factors Affecting the Development of Information Sources, Resources, Services in Nigeria**.**

PRESENTATION SCHEDULE

The presentation schedule included in your course material gives you the important dates of this year for the completion of tutor-marked assignments and for attending tutorial. Remember, you are required to submit all TMAs on the due date. You should guide against falling behind time in your work.

ASSESSMENT

There are two main forms of assessment in this course that will be scored. First is the set of Tutor-Marked Assignment (SAEs). You are advised to be sincere in attending to the exercises. The second is TMAs. This is the continuous assessment component which is graded. It accounts for 30% of the total scores. You are advised to take this with all seriousness, because it will assist you to pass the course. The TMAs will be given in accordance to the University calendar. Endeavor to strictly adhere to the slated calendar.

FINAL EXAMINATION AND GRADING

At the end of the course, you are required to take an examination which will last for a 2-hour duration. It has a value of 70% of the total course grade. The examination will consist of questions that will reflect the type of self-assessment, practice exercises carefully.

Try to use time between the finishing the last unit and sitting for the examination to revise the entire course. You may find it useful to review your Tutor-Marked Assignment or activities before the examination.

COURSE MARKING SCHEME

The following table lays out how the actual course marking is done

Assessment	30% (Undergraduate) 40% (Postgraduate)
Final Examination	70% (Undergraduate) 60% (Postgraduate)
Total	100% of Course work

COURSE OVERVIEW

HOW TO GET THE MOST FROM THE COURSE

In Open and Distance Learning (ODL), the study units replace the university lecture. This is one of the advantages of ODL. You can read and work through specially designed study materials at your own pace and at a time and place that is convenient for you. Just as a lecturer may give you classroom exercises, your study units provide exercises for you to do at a particular point in time.

Each of the study units follows a common format. The first item is an introduction to the subject matter of the study unit and how a specific study unit is integrated with the other study and the course as a whole. Following the introduction is the intended learning outcomes which helps

you to know what you should be able to do by the time you have completed the study unit. When you are through studying the unit, you should endeavour to go back and check if you have achieved the stated learning outcomes. If you consistently do this, you will improve your chances of passing the course. The main content of the study unit guides you through the required reading from recommended sources.

Tutor-Marked Assignment (SAEs) are found at the end of every study unit. Working through these SAEs will help you to achieve the objectives of the study units and prepare you for the examination.
You should do every SAE as you come to it in the study units. There will also be examples given in the study units. Work through these when you come to them too.

The following is a practical strategy for working through the course. If you encounter any problem, telephone your tutor immediately. Remember, that your tutor's job is to help you. When you need help, do not hesitate to call and ask your tutor to provide it.

1. The main body of the unit guides you through the required reading and directs you to other sources, if any.

- Your first assignment in this course is to read this course guide thoroughly.
- Organize a study schedule: Refer to the course overview for more details. You should note that it is expected of you to devote at least 2 hours per week for studying this course. Note important information such as details of your tutorials, dates for submission of TMAs, exams etc. and write it down in your diary.

- Once you have created your own study schedule, do everything to stay faithful to it. The major reason that students fail is that they get behind with their course work. If you get into difficulties with your schedule, please let your tutor know before itis too late to help.

- Turn to Unit 1, and read the introduction and the objectives for unit 1.

- Assemble the study materials. You will need your references and the unit you ate studying at any point in time.

- As you work through the unit, you will know the sources to consult for further readings.

- Visit your study centre whenever you need up to date information

- Well before the relevant due dates (about 4 weeks before the due dates), visit your study centre for your next required assignment. Keep in mind that you will learn a lot by doing the assignment carefully. They have been designed to help you meet the objectives of the course and, therefore, will help you pass the examination. Submit all assignments not later than the due date.

- Review the objectives for each study unit to confirm that you have achieved them. If you feel unsure about any of the objectives, review the study materials or consult your tutor. When you are confident that you have achieved a unit's objectives, you can start on the next unit. Proceed unit by unit through the course and try to space your study so that you can keep yourself on schedule.

- When you have submitted an assignment to your tutor for marking, do not wait for its return before starting on the next unit. Keep to your schedule. When the assignment is returned, pay particular attention to your tutor's comments, both on the tutor-marked assignment form and also the written comments on the ordinary assignments.

- After completing the last unit, review the course and prepare yourself for the final examination. Check that you have achieved the unit objectives (listed at the beginning of each unit) and the course objectives (listed in the Course Guide).

FACILITATORS/TUTORS AND TUTORIALS

There are 8 hours of tutorials provided in support of this course. You will be notified of dates, times, and location of these tutorials, as well as the names and phone numbers of your facilitator, as soon as you are allocated a tutorial group.

Your tutor or facilitator will mark and comment on your assignments, keep a close watch on your progress, and on difficulties you might encounter, he/she will provide assistance to you during the course. You must send your tutor-marked assignment to your tutor before the schedule date (at least two working days are required). They will be marked by your tutor and returned to you as soon as possible.

Do not hesitate to contact your facilitator by telephone or e-mail and discuss problems if you need assistance.
The following might be circumstances in which you would find help necessary. Contact your facilitator if:

- You do not understand any part of study units or assigned readings;
- You have difficulty with the self-test or exercise;
- You have a question or a problem with an assignment or with the grading of an assignment.

You should try your best to attend tutorials. This is the only chance to have face-to-face contact with your course facilitator and ask questions which are answered instantly. You can raise any problem encountered in the course of your study. To gain much benefit from course tutorials prepare a question list before attempting them. You will learn a lot from participating in active discussion.

SUMMARY

LIS 105 Information Systems, Resources & Services is intended to make you understand what is information systems and how you can use these systems (hardware, software, people, data and telecommunication network) in library operation for provision of information resources, sources and services for easy access, dissemination and transfer of library and information to desired users.

At the end of the course, you will achieve these objectives if you follow the instructions and do what you are asked to do. We wish you success as you adhere strictly to the instructions and advice given to you for this course.

MAIN COURSE

MODULE 1 INFORMATION SYSTEMS

This module introduces you to the concept of information systems, concept of information system and services and the different types of information system.

Unit 1 Concept of Information Systems
Unit 2 Types of Information Systems
Unit 3 Concept of Information Service and Sources

UNIT 1 CONCEPT OF INFORMATION SYSTEMS

Contents

1.1 Introduction

If you are reading this, you are most likely taking a course in information systems, but do you even know what the course is going to cover? When you tell your friends or your family that you are taking a course in information systems, can you explain what it is all about? This unit will help you to understand what information systems are and how they serve as vital tools to any organization especially libraries. You will also learn the components of an information systems.

1.2 Learning Outcomes

By the end of this unit, you should be able to;

- Define Information Systems
- Describe the components of information systems
- Explain the advantages and disadvantages of information systems

1.3 Definition of Information Systems

Information is a series of data that are arranged into a meaningful and useful form for the desired user. It can be seen as processed data. Example; "I am studying Library and Information Science at the National Open University of Nigeria". This tells your audience that you're a student of National Open University of Nigeria. This is a complete data which have been understood by your audience and is information. The system as defined by Oxford Dictionary as a (set of things working together as parts of a mechanism or an interconnecting network or complex whole". It can also mean an arrangement of sets of things that are related to form a whole.

Information system can be defined as a set of interdependent components working together to process data into unified meaningful information which can be useful to the user. Almost all organizations and establishment require *information systems* to function effectively. But what exactly does that term mean? Let's take a look at some of the more popular definitions;

According to Adejola (2009) Information systems (IS) are a man-made computer-based device that collects and transforms data into information for distribution to desired users using computer-based resources to achieve the task. Similarly, Valacich and Schneider (2010), submitted that Information systems are defined as the combinations of hardware, software, and telecommunications networks that people build and use in collecting, creating, and distribution of useful data, in organizational settings.

"Information systems are interrelated components working together to collect, process, store, and disseminate information to support decision making, coordination, control, analysis, and visualization in an organization (Laudon and Laudon 2012:15)." As you can see, these definitions focus on combination of systems that will help in the collection of data, process data into information, store and make such

information available for use to their relevant users for decision making and problems solving. Information systems can only work with computer-based **data** which are collected by **people** and fed into computer **hardware**. The computer hardware cannot process the data without instruction given to it by the **software** to follow a defined procedure or process in converting the data into useful information and using **telecommunication networks** to communicate and transfer or share the information to the users. The data, people, hardware, software and telecommunication networks are the components that make up an information system and they play vital roles in an organization. Now let's take a look at each of these components.

Self-Assessment Exercise 1:

- **This will take you 5 minutes to answer.**
- ---------- could be defined as a processed data that are meaningful and useful to the user
- Processed data
- Information system
- Information
- Information systems are ---------- working together to collect, process, store, and disseminate information to support decision making, coordination, control, analysis, and visualization in an organization.
- Telecommunication network

1.4 The Components of Information Systems

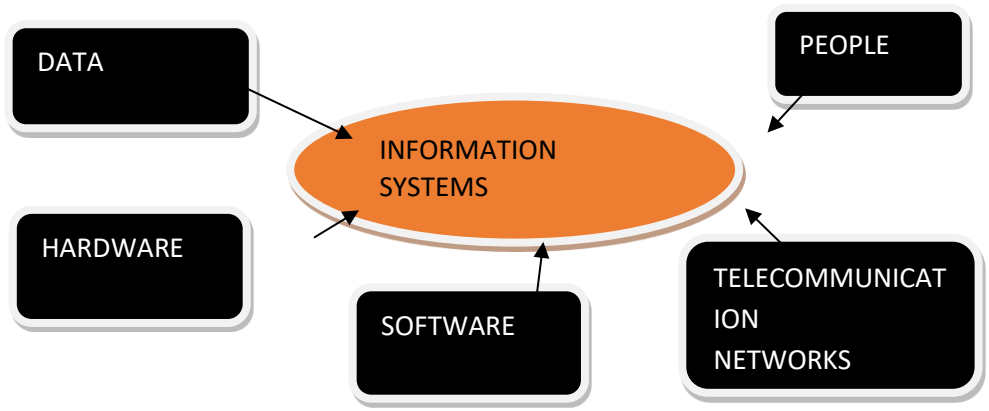

Figure 1: Components of Information Systems

The information systems are made up of five various components namely: hardware, software, data, telecommunication network and people. In order to fully understand information systems, you must understand how all of these components work together to bring value to an organization. Technology can be thought of as the application of scientific knowledge for practical purposes. Technology is a part of our lives in so many ways that we tend to take it for granted. As discussed before, the first three components of information systems – hardware, software, and data – all fall under the category of technology. Information systems today have continued to evolve with the improvement in the hardware and software components.

1.4.1 Hardware

Information systems hardware is the part of an information system you can touch with your hands – the physical components of the technology. Examples of information systems hardware are computers, keyboards, disk drives, ipads, and flash drives.

1.4.2 Software

Software is a set of instructions that tells the hardware what to do. Software is not tangible, it cannot be touched. They are the operating system and application software developed by programmers. What they are really doing is simply typing out lists of instructions that tell the hardware what to do. There are several categories of software, with the two main categories being operating-system software, which makes the

hardware usable, and application software, which does something useful. Examples of operating systems include Microsoft Windows on a personal computer and Google's Android on a mobile phone. Example of application software is Microsoft Excel.

1.4.3 Data

Data is another component of information systems defined as a collection of raw facts and figures. For example, your street address, the city you live in, and your phone number are all pieces of data. Like software, data is also intangible. By themselves, pieces of data are not really very useful. But aggregated, indexed, and organized together into a database, data can become a powerful tool for any business. Organizations collect all kinds of data and use it to make decisions. These decisions can then be analyzed as to their effectiveness and the organization can be improved.

1.4.5 Telecommunication Network

All the information systems components of hardware, software, and data, cannot function effectively without telecommunication networks. Telecommunications networks such as the internet, extranets and intranets, have become essential to the successful operations of all types of organizations and their computer-based information systems. Telecommunications networks examples are computers cables, hubs, routers, network cards and software such as data servers, web servers, and application servers. All these resources facilitate the flow of information in any organization.

1.4.6 People

People in information systems (IS) are the Information Specialists and End users. The information specialist is the people who develop and operate the information systems such the systems analysts, programmers, System analysts, chief information officer (CIO) and other managerial, technical Information Systems personnel. The end users are library users, accountants, engineers and managers. People involved with information systems are an essential element that must not be overlooked.

- ***Chief information officer*** (CIO) is the highest-ranked information manager that is responsible for strategic planning and the use of information system in the organization.
- ***Information System Director***: Manages all the system and day to day activities or operations in the organization.
- ***Information Centre Manager***: takes care of all the information system services like help desks, hotlines, training, consulting etc.
- ***Project manager***: responsible for managing a new system project

- ***System Manager***: responsible for managing an existing project.
- ***Programming Manager***: responsible for coordinating all application programming efforts
- ***Database Administrator:*** in charge of database and database management software use.
- ***Quality Assurance Manager***: develops and monitors standards and procedures making sure that every system in the firm are in good conduction and accurate
- ***Operations Manager***: supervises the day –to- day operations of data and/ or computer centre.

Therefore, for all these components of information systems to work effectively they have to follow a defined process to integrate the collected data into useful information. A process is a series of steps undertaken to achieve a desired outcome or goal. Information systems are becoming more and more integrated with organizational processes, bringing more productivity and better control to those processes. Any business and organization hoping to gain an advantage over their competitors should highly focus on this component of information systems in order to achieve their goal.

SELF-ASSESSMENT EXERCISE 2:

- **This will take you 5 minutes to answer.**

- The components of information system include the following except
- hardware
- software
- information
- telecommunication
- all except one is an example of hardware component
- keyboard
- google
- hard drive
- monitor

1.5 Advantages of Information Systems

Advantages of information systems are as follows;

Communication – with help of information technologies, instant messaging, emails, voice and video calls have becomes quicker, cheaper and much efficient.

Globalization and cultural gap – by implementing information systems we can bring down the linguistic, geographical and some cultural boundaries. Sharing the information, knowledge, communication and relationships between different countries, languages and cultures becomes much easier.

Availability – information systems have made it possible for libraries to be open 24x7 all over the globe. This means that a business can be open anytime anywhere, making purchases from different countries easier and more convenient. It also means that you can access information at your palm with a single muscle touch on the screen of your phone or a click on the computer screen.

Creation of new types of jobs **–** one of the best advantages of information systems is the creation of new and interesting jobs. Computer programmers, Systems analyzers, Hardware and Software developers and Web designers are just some of the many new employment opportunities created with the help of IT.

Cost-effectiveness and productivity – the IS application promotes more efficient operation of the company and improves the supply of information to decision-makers; applying such systems can also play an important role in helping companies like libraries and information centres to put greater emphasis on information technology in order to gain a competitive advantage.

1.6 Disadvantages of Information System

Information Systems have a positive impact on organizational productivity. It is not however without some frustrations such as lack of training and poor systems performance because of system spread. Disadvantages of information systems are as follows;

Unemployment and lack of job security – As technology improves, tasks that were formerly performed by human employees are now carried out by computer systems. For example, automated telephone answering systems have replaced live receptionists in many organizations. Industry experts believe that the internet has made job security a big issue as since technology keeps on changing with each day. This means that one has to be in a constant learning mode if he or she wishes for their job to be secure.

Dominant culture **–** while information technology may have made the world a global village, it has resulted in one culture dominating another weaker culture. For example, it is now argued that the US influences how most young teenagers all over the world are dressing, speaking and

behaves. Some languages too have become more prominent than others, for example English becoming the primary mode of communication for business and everything else.

Security issues – thieves and hackers get access to people's identities and internet fraud hackers target sensitive company data. Such data can include vendor information, bank records, intellectual property and personal data on company management. The hackers distribute the information over the Internet, sell it to rival companies or use it to damage the company's image.

Implementation expenses – to integrate the information system it requires a pretty good a mount of cost in a case of software, hardware and people. Software, hardware and some other services are rented, bought and supported. Employees need to be trained with unfamiliar information technology and software.

1.4 Summary

We have come to the end of Unit 1. I hope you found it interesting. In this unit, you have learnt the definition of an information system, components of information and the advantages and disadvantages of an information system. Information systems contribute to the efficient running of organizations. Today's information technology has tremendously improved the quality of life. Modern libraries and information science have benefited from information system using the latest information technology.

1.5 Reference/Further reading

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O'Brien, J.A. &Marakas, G.M. (2007). *Management information systems: a business unit.* McGraw-Hill/Irwin Companies, -10th ed.

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Valacich, J. and Schneider, C. (2010). Information Systems Today: Managing the Digital World, 4th Edition Boston: Pearson Prentice Hall

1.6 possible answers to Self-Assessment exercise within the content

Answer to SAE 1

(1) C.
(2) B

Answer to SAE 2

(1) C
(2) B

UNIT 2 TYPES OF INFORMATION SYSTEMS

Unit Structure

2.1 Introduction

Now you can explain what information system is and the components of information systems. You have also learnt about the disadvantages and advantages of using information systems in organizations. In this unit, you will learn the various types of information system and the functions information system plays in information resources and access**.**

2.2 Learning Outcomes

By the end of this unit, the learner should be able to:

- Explain various types of Information Systems
- Analyze the functions of information systems in information resources, services and retrieval.

2.3 Types of Information Systems

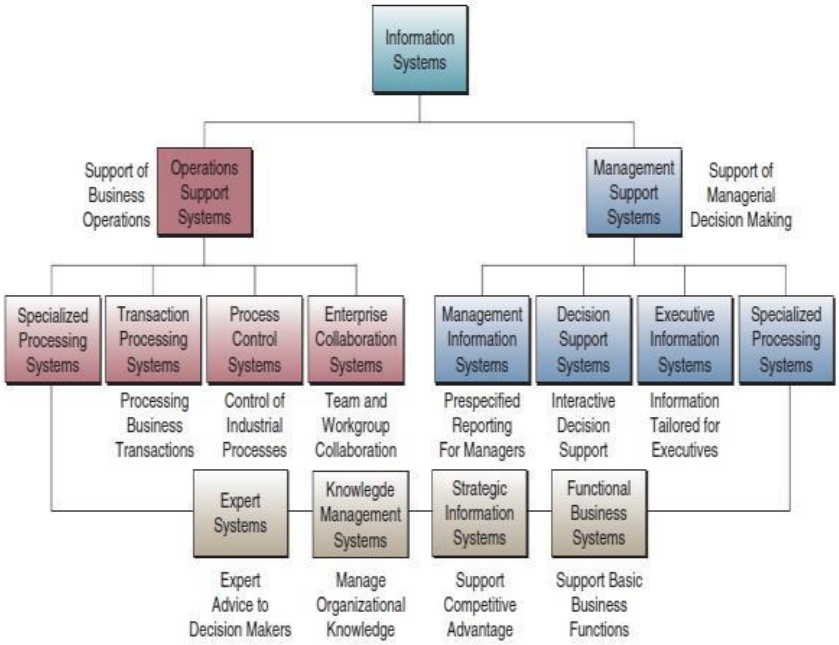

Figure 2: Operations and Management Classifications of Information Systems Adapted from O'Brien & Marakas (2007)

Information technology transmits, processes and/or stores information.

Information technology includes electronic databases, electromagnetic storage of data, and the networks that connect them. An information system is an integrated set of software directing information technologist, supporting individual, group, organizational, or societal goals.

Information Systems help in the processing, storage, and dissemination of information. Personal Digital Assistant (PDA), cellular phones, music players, and digital cameras are all examples of information systems.

These devices use multiple information technologies in creating personal information systems. Similarly, other information technologies, such as database, networks, and programming languages, are used in creating organizational systems. The following are some of the different types of information systems;

- Transaction Processing Systems
- Process Control Systems
- Enterprise Collaboration Systems (Office Automation Systems)
- Management Information Systems
- Decision Support Systems
- Executive Information Systems
- Expert Systems

- Knowledge Management Systems
- Functional Business Systems (Functional Area Information Systems)
- Electronic Commerce Systems
- Manufacturing and Production Information Systems
- Finance and Accounting Information Systems
- Human Resource Information Systems

- ***Transaction Processing Systems****:* Transaction processing systems (TPS) are used in organizations to record day to day activities or transactions of an institution or a company. The Transaction processing systems keep records of customer orders, bills, and inventories, check out the cash register and production output of the organization. A transaction processing system is a computerized system that performs and records the daily routine transactions carried out in a business or organization. These records are kept in the operational levels of the organization. Such operational levels in the libraries are the reader services unit of the library. Records are on the number of users that came to use the library and number of consulted books such data are typed into the computer system. Transaction processing systems can be regarded as Data Processing System (DPS) because it is use in answering routine question in a firm. Such questions as daily sales record, record of books on loan, airline booking system, accounts receivable, acquisitions, payroll and inventory.

- ***Process Control Systems****:* Process control systems are Monitor and control industrial or physical processes. Examples: petroleum refining, power generation, and steel production systems. For example, a petroleum refinery uses electronic sensors linked to computers to monitor chemical processes continually and make instant (real-time) adjustments that control the refinery process (O'Brien, 2007). A process control system comprises the whole range of equipment, computer programs, operating procedures (Ciortea, 2004).

- ***Enterprise Collaboration Systems (Office Automation Systems):*** Office automation systems are one of the most widely used types of information systems that will help managers control the flow of information in organizations (Heidarkhani, 2013). Enterprise collaboration systems (office automation systems) improve efficiency among employee and enhance team and workgroup communications. Examples of Office automation systems are Microsoft office XP and desktop publishing or any system that can allow you to do your work anywhere. The system centres on the management documents, scheduling and communication. Office

Information Systems are designed to support office tasks with information technology. It is use in sharing of information in a work place such systems are used of voice mail, multimedia system, electronic mail, video conferencing, Library 2.0, file transfer, and even group decisions can be achieved by office information systems. Office automation systems are one of the most widely used types of information systems that will help managers control the flow of information in organizations (Heidarkhani, 2013).

- ***Management Information Systems****:* Management information systems are computer- based information system which produces standard report in a summarized form. Here the details of all the data collected in the transaction processing systems are put into a standard report for middle – level manager for decision making. Examples are budget summaries, statistics of users and number of consulted information resources in a library. The transaction process systems create data for management information system while management information system integrates the database. The output of transaction process systems is the raw material or input used by the Management information systems. Management information systems are kinds of computer information systems that collect and process information from different sources in institute decision-making in the level of management (Heidarkhani, 2013). According to Hasan et. al (2013), a management information system is a type of information systems that take internal data from the system and summarized it to meaningful and useful forms as management reports to use it to support management activities and decision making.

- ***Decision Support Systems****:* A Decision Support System is a computer-based system used by senior manager or usually a group of managers at any organizational level in making a semi-structured decision and solving complex problems (Asemi et al, 2011). According to Khanore, et al. (2011) decision-support systems are specifically designed to help management make decisions in situations where there is uncertainty about the possible outcomes of those decisions. An example is when a librarian is faced the problem of "What will happen to our information resources and services if the library users do not come again to use the resources and services? This shows that there is a situation of uncertainty. Decision Support System is used in product forecasting system. DDS uses internally and externally generated data in decision making. Internal data from sales while external are information on the interest rate and current trend in a business.

- ***Executive Information Systems****:* Executive Information Systems are regarded as Executive Support System (ESS) or Enterprise Information Systems (EIS), which provide rapid access to both internal and external information in a much-summarized form to support executives in decision making. Executive information systems provide critical information from a wide variety of internal and external sources (from MIS, DSS, and other sources tailored to the information needs of executives) in easy-to-use displays to executives and managers (O'Brien, 2007). According to Patterson (2005), an EIS provides senior managers with a system to assist in making strategic and tactical decisions. Executive information system gives executives access to key internal and external data that describes the organization from the executive's point of view, not just data flow. These data are often presented in graphics making the data user- friendly.

- ***Expert Systems:*** Expert systems are information systems that mimic human expert in a particular area of business or organization and provides answers and advice to users' questions. According to Al-Mamary, Shamsuddin and Aziati (2014) expert systems are computer – based expert Knowledge systems which use artificial intelligence in solving problems and in providing expert advice to users. In summary, the expert system is a knowledge base and software modules that perform the task at the level of knowledge of a human expert and communicate answers to users' questions.

- ***Knowledge Management Systems***: Knowledge management systems are knowledge-based information systems that support the creation and share of information among the people in the organization. These systems allow people to communicate and collaborate with each other; example is the use of electronic mail system in sharing data and information.

- ***Strategic Information Systems:*** Strategic information systems are the application of information technology to a firm's products, services, or business processes to help it gain a strategic advantage over its competitors (O'Brien & Marakas 2007). Strategic information systems are organizational information system used in securing or sustaining competitive advantage in the market place.

- ***Functional Business Systems (Functional Area Information Systems):*** Functional business systems are also regarded as Function Area Information systems that focus on supporting the activities within a specific functional area of business. Functional Business Systems are information systems that support

applications in a particular area or specific functional area in a company. Examples are information systems that support personal training, sales and marketing system and accounting systems etc.

- ***Electronic Commerce Systems:*** Electronic Commerce systems are information systems responsible for selling the organization's product or service. Marketing is concerned with identifying the customers, determining what they need or want, planning and developing products and services to meet their needs. Also advertising and promoting these products and services. Sales are concerned with contacting customers, selling the products and services, taking orders, and following up on sales. Electronic Commerce Systems support these activities by allowing customers to buy goods and services from their business website. An example of such system are www.amazon, com. and https://jiji.ng/. that buys and sales anything in Nigeria.

- ***Manufacturing and Production Information Systems:*** The manufacturing and production information systems function is to produce the firm's goods and services. Manufacturing and production systems deal with the planning, development, and maintenance of production facilities. Manufacturing and production Information systems guide the actions of machines and equipment used in pharmaceutical and other types of firms in monitoring and controlling of the manufacturing process. The manufacturing and production information systems support these activities; product design and engineering; product scheduling, quality control and facilities planning, production costing, logistics and inventory subsystems. According to Shim (2000), the sole aim of a manufacturing information system is to apply computer technology to improve or enhance the process and the efficiency of a manufacturing system, thus increasing quality of products and lowering the manufacturing costs. In other words, a manufacturing system is a system that takes material, equipment, data, management, and information systems technology as the input and uses manufacturing and information process to generate better final products as output.

- ***Finance and Accounting Information Systems:*** The finance function is responsible for managing the firm`s financial assets, such as cash, stock, bonds, other investment. The accounting function is responsible for maintaining and managing the firm`s financial records such as receipts, order slips, payroll etc (Khanore et. al, 2011). The aim task of accounting software is to automate the routine activities of entering and posting accounting transactions in any firm. This information is organized in an

electronic format so as to produce financial statements and can be accessed immediately to assist in the management of the firm in decision making. A financial management information system provides financial information to all financial managers within an organization. Financial decisions are typically based on information generated from the accounting system.

- ***Human Resource Information Systems:*** Human Resources Information Systems are the process of producing, organizing, storing and distributing manpower information to help the organization managers at various levels, in proper decisions. Nowadays the majority of successful companies are using human resource information systems to support daily operations of human resources Khanore, et al., (2011). The human resources function is responsible for attracting, developing, and maintaining the firm's workforce. Human resources information systems support activities such as identifying potential employees, keeping and updating records on existing employees, and creating programs to develop employees' talents and skills (Laudon, 2006).

SELF-ASSESSMENT EXERCISE 1

- **This will take you 5 minutes to answer.**
- The acronyms PDA means
- Personal Digital Assistant
- Personnel Data Assistant
- Personal and Digital Assistant
- People’s Data Administration

- Briefly explain any three (3) types of information system

2.4 Nature and Characteristics of Information systems

- *Accuracy:* data generate or gather by the system should be free from error
- *Completeness:* the software should have a large capacity to accommodate much data
- *Satisfactory:* Information system must fulfill day today activities of the user and should satisfy the need of the user.
- *Heterogeneous*: must be heterogeneous based on different technology with user interface functionalities.
- *Simple to manipulate:* design should user friendly, easy to manipulate not complex.

2.6 Functions of Information System in Libraries

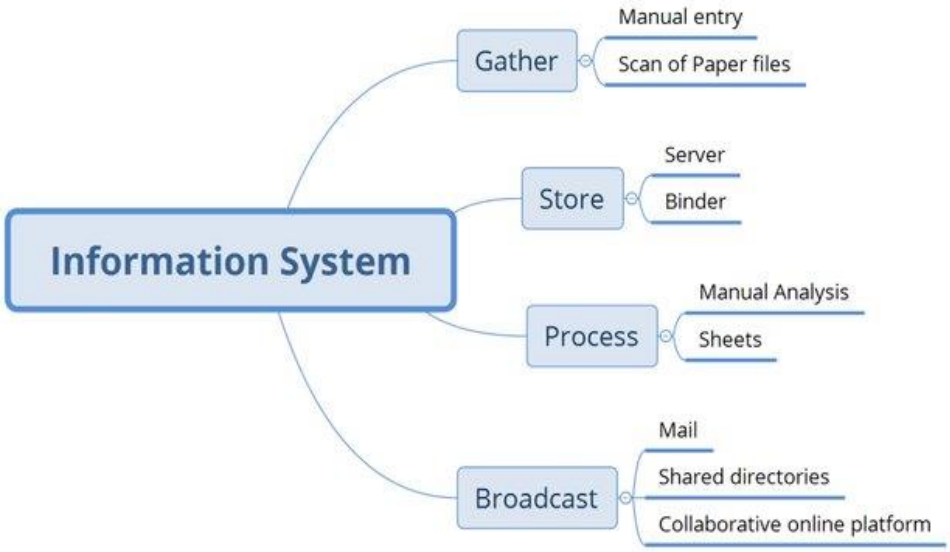

Figure 3: Main functions of the Information System. Adapted from Smart Construction Site(2019). Ontology of Information System Architecture**.**
https://www.researchgate.net/publication/334199613_Smart_Construction_Site_Ontology_of_Information_System_Architecture/figures?lo=1&utm_source=google&utm_mediu

Information system are used for storing (server and binder), processing (manual analysis and sheets) and broadcasting through mail shared directories and collaborative online platforms. Librarians are assigned the responsibility of the processing of information (i.e. selection, acquisition, processing organization, and dissemination of information). Librarians over the time defined and carry out such process within the framework of information systems. Essentially, the library itself is an information system that performs the variety of functions listed above within an integrated process, which is aimed at providing users with easy and quick access to information.

In this way, libraries and information centres take-action to create different systems ranging from listing of classification and cataloguing of resources through manual systems and computer-based information system known as the online catalogue and storing the information for dissemination or broadcasting to desired users. Information systems are used in libraries to carry out the following activities;

- ***Selection and acquisition of information resources***: Information systems help in the selection and acquisition of information resources to meet the needs of users. When the right information

system is used in selecting and acquiring relevant resources it will enhance the use of the information sources. This, in addition, saves the time of the users and increase access to useful and relevant information.

- ***Description and organization of information resources*:** Information systems also help in describing the acquired information resources. The descriptions of these resources help in their effective storage. In other words, most of the capabilities that add value to information are created at the stage of organization. Effective description of information sources in the library results in giving such resources effective searching terms to aid dissemination of such information. Access to information in a library depends on the quality of description and organization. Information system requires each information resources to be catalogued and organized before its publication (CIP= Cataloging In Publication). The "Cataloging In Publication" is a bibliographic records created for each item in a catalogue instead of repeatedly recreating the bibliographic record of the same item by cataloguers, the CIP will be copy and use. This gives uniformities description of each information source. In this way, it saves time and energy of the descriptors and minimizes cost. The information system has helped in the creation of electronic subject analysis, indexing and classification schemes for quick and easy retrieval and location of information sources.

- ***Storage and processing of information system:*** Information systems are used for the storage of bibliographic data in a standard format (such as MARC format and/or Dublin Core Metadata). Information systems allow the copying, exchange, and transfer of information records from one system to another and librarians, can now make copies of what they have retrieved on the web for free. They can forward it to others via email services.

- ***Integration of information:*** Information systems have help in linking / integrating components of the system to one another, using linking techniques and standards of data exchange. This is done in order to promote the exchange and sharing of data. For example, in a computerized library system, all units or sections (such as acquisitions, cataloguing, and loans) are linked making it possible for sharing and/or exchange of information across different files in the system. This will enable the librarian to use the same terminal to access information stored in any sections of the library, transfer data and carry out quality control (i.e., editing of records). This saves time and money there is no need to retype

or re-enter data already existing in one section to another in another section.

- ***Information search and retrieval:*** Information systems have help in easy retrieval of information which was impossible or difficult and time consuming using manual systems. These have benefitted librarians, information workers and end-users, in terms of accuracy as well as speed. For example, with regard to acquisitions and cataloguing, librarians use advanced and accurate search technique to retrieve desired records; thereby avoiding creating new records (i.e., doing original cataloguing) which is expensive and time-consuming. Examples of such techniques are the use Online Computer Library Centre which provides bibliographic and abstracts on information resources and the use of Library of Congress online Catalogue for cataloguing. Information on the title, subject; publisher, date of publication and author of particular information can be displayed at the time. This will make cataloguing easy and fast.

- ***Management of Information****:* Information systems help in keeping records of the activities happening in the library. Such records are records created, records in the database, transferred, items borrowed and returned by each user, overdue notice, fines; recorders of the compiler, translators, updated or information deleted. All these records are essential because the management uses them in decision making.

SELF-ASSESSMENT EXERCISE 2:

This will take you 5 minutes to answer.

- What is the full meaning of CIP
- Catalogue In Personnel
- Cataloging In Publication
- Computer Information Person
- Catalogue Integrated Publication

- Highlight any five (5) functions of information system

2.4 Summary

We have to the end of this unit. In this unit, you have learnt the various types of information system and the functions information systems play

in information resources, access and retrieval**.** The unit has exposed you to the different information systems you can use as a librarian to process, access and retrieve information.

Information systems are vital tools which you as a librarian should be knowledgeable on the functions they play in processing data and storage and giving access to information for easy retrieval of stored information by desired users. The types of information systems used in an organization or library are used in recording the daily routine and activities to help managers take important decision.

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2.6 Possible Answers to Self-Assessment Exercise(S) Within the Content

SAE 1

- **A**

- ***Process Control Systems****:* Process control systems are systems use in Monitoring and controling industrial or physical processes. Examples: petroleum refining, power generation, and steel production systems.

- ***Enterprise Collaboration Systems (Office Automation Systems):*** Office automation systems are one of the most widely used types of information systems that will help managers control the flow of information in organizations.
- ***Management Information Systems****:* Management information systems are computer- based information system which produces standard report in a summarized form.

- **SAE 2**
- **A**
-
- Selection and acquisition of Information resources
- Description and organization of information system
- Storage and processing of information system
- Integration of information system
- Information search and retrieval
- Management of information system

UNIT 3 CONCEPT OF INFORMATION SERVICE AND SOURCES

Unit Structure

3.1 Introduction

In the previous unit, we were introduced to the functions of information systems, advantages & disadvantages of Information Systems. In this unit, you will be taught the concept of information service, what information is all about, the various categories of information sources and the nature and characteristics of information sources.

3.2 Learning Outcomes

By the end of this unit, you should be able to:

- Explain the concept of information Service
- Define information sources
- Identify the various types /categories of information sources
- Explain the nature and characteristics of information sources

3.2 Concept of Information Services

Libraries are meant to provide information services to its clientele.

Modern libraries provide various library and information services to fulfill the information needs of the clientele. The information revolution is responsible for an increase in the variety and volume of information services. Electronic delivery of information has become a necessity. The Internet has opened new version of information service. Information service is provided through a variety of techniques, it takes a variety of forms' including direct personal assistance, directions, signs, exchange of information culled from a reference source, reader's advisory, dissemination of information and access to electronic information.

American Library Association stated that the main aim of information services is to provide the information sought by the user. Information service should base on meeting the information needs of users. The services should aim at creating user awareness on the information resources available in order to fulfill individual information needs. Based on this definition information services should be users' needs oriented. Stojanovski and Papić (2012:85) stated that "information services could be divided into two main categories: assurance of information needed by users and awareness of users about available information resources and ability to find the information appropriate to given needs by themselves".

Morealso, Katz Stojanovski and Papić (2012) classified information services into direct and indirect services; direct services are communication between the users and librarians using questions and answers in seeking for knowledge. The indirect services are activities carried out by librarians which the users are not aware off (behind scene) these activities include preparation and development of catalog both online and card catalogue, bibliography and all other tools which assure access to libraries' collections. All libraries and information centres should provide information service activities that are timely and accurate which will meet need of the users They also help teach users searching & browsing techniques' that will help look up for facts, sources and available bibliographic material.

3.3.1 Concept of Information Source

Information they say is power and has been seen as an essential ingredient in decision making, planning and forecasting. To obtain quality information to be used in decision making the nature of information sources available for use should be considered. Information available is packaged and stored in different formats or media, these formats determines the type of information source. Therefore, information sources are the platforms or media, on which information is documented with the intention to store or preserve, manage, disseminate or retrieve for easy utilization by its user.

In another word, an information source is where you got your information or knowledge from or where you were informed about something. This implies that one can get information from observations, documents, human sources such as speeches, and organizations. According to Hertzum, Andersen, Andersen and Hansen (2002) information source could be oral or written, human or virtual, in-house or external, lay or authoritative, easily accessible or hard to get. Adomi (2012) defined information sources are resources or materials from which people get ideas, meaningful messages, enlightenment and direction that enable them to accomplish a given task, make decisions and solve problems. This definition is line with Nnadozie, (2014) view on the definition of information source as the vehicle through which ideas, news, facts, symbols and sound are stored and transported across time and space appearing in various documents or record form that aid the dissemination of information and knowledge.

3.3.2 Types / Categories of Information Sources

- ***Primary Information Sources:*** Primary sources of information are first-hand words, images, objects spoken or created by a person directly involved in the activity or activities. It is known as a direct speech not reported speech these include personal letters, eyewitness testimony in a court trial, manuscripts, speeches, spoken stories, telephone conversations and email among others. Simply put, primary sources are original information materials from which other information sources are derived. They contain new and original idea or new interpretations of already known facts. According to Kumar (2010) a primary source of information as the first published record of original research and development or description of a new application or new interpretation of an old theme or idea. This implies that primary sources share new information and are the first to present the finding of a research or experiment. This type of information source could also appear in electronic form. Adomi (2012) and Nnadozie (2014) gave examples of primary information sources as first-hand information sources these include; theses, journals, letters and diaries, government publications research data, artefacts, photographs, video recordings, films, autobiographies, newspapers, magazine, memories, interviews, speeches, lecture notes, personal letters, audio recordings, and diaries among others.

- ***Secondary Information Sources****:* These are sources of information derived from an already existing primary source. Most times, they come from a further interpretation of an original source of information or a first-hand information source or document. Secondary documents analyze, comment on, describe, discuss,

evaluate, and interpret the evidence provided by primary sources or documents. Secondary sources cite primary sources of information as well as enable the user to locate a primary source of information. They are sources that provide commentary about evidence (primary sources). Examples of secondary information sources are bibliographies, biographical works written on someone, Conference proceedings, literature review, commentaries, treatises, indexes and textbooks.

- ***Tertiary Information Sources:*** Tertiary information sources are compiled from the secondary sources of information. They serve as pointers to the secondary sources of information. These are information sources born as a result of the distillation and collection of both primary and secondary sources. Tertiary sources compile, index and arrange citations to serve as aid or direct users to other sources. This type of source comes last among the three because its existence, functionality and relevance are drawn from the existence of the primary and secondary sources. Tertiary sources are not usually credited to a particular author and are not considered very acceptable to base academic research. At times, the nature of reference materials identified under secondary sources overlaps with the tertiary sources so that similar examples of sources are used to describe both tertiary and secondary which makes their distinction difficult. Some examples include encyclopedias, dictionaries, almanacs, manuals, chronologies, guidebooks and bibliographies.

SELF-ASSESSMENT EXERCISE 1:

This will take you 5 minutes to answer.

- In a reputable organization, the available information won't be used in planning and decision making without affirming the _____
- The Head of Department, Library and Information Science, National Open University of Nigeria conveyed a message to you as a student in the department through the class representative. What is the source of your message?
- All but one does not belong to Tertiary Source of Information.
- Encyclopedia
- Dictionary
- Directory
- Abstract

3.4 Classification of Information According to their Formats

This information derived from the primary, secondary and tertiary sources are stored for present and future use. The formats of their storage determine the type of information the resources will be. Information resources are classified into two major types namely the print and non-print materials.

- **Print** recourses are information recourses that are in their hard copy which are produced by applying ink on papers. Examples of print resources are almanac, dictionaries encyclopedia, magazines, yearbooks, government gazettes, text books, Maps, Atlas and directories etc.

- **Non - print** information resources are all electronically based information resources whether they are derived from the primary, secondary and tertiary sources of information provided they can only be accessed or read through a technological device such information resources are non-print or electronic resources because they do not appear on papers. Examples of electronic resources (non-print) are web sites, audio, visual, and/or text files, online databases, e-journals, e-books, and e-articles, e-books, online newspapers, online magazines. Some of the print resources can be converted into non-print through the use of computers, scanners and telecommunication network to enable such information resources to be accessed electronically by computer devices.

3.5 Nature and Characteristics of Information Sources

Data or facts when analysed and interpreted meaningful by the recipient such data becomes information. For such facts or data to become information it must possess the following characteristics namely;

- *Must have meaning* - understandable to the recipient
- *Complete*- Should contain all the necessary facts and figures needed in taking decisions.
- *Relevan*t- must be meaningful to solve the problem at hand.
- *Available*- should be made accessible to any individual who needs it.
- *Timely*- should be delivered at the right time when it is needed to avoid obsolete or outdated.
- *Concise*- should be simple worded not cumbersome, too much information become burdensome in using them in solving problems.

- *Cost – effective*- access to information should not be expensive. Money spent on information should not be higher than the problem it is expected to solve.
- *Reliable*- information should be factual, true, accurate and misleading or incorrect.

3.4 Summary

We have come to the end of this unit. In this unit you have learnt the classification of information by the source of it origin and the classification of information by format of storing them. Information sources are divided into three main classes namely the primary, secondary and tertiary information sources. There is a need for you to identify the type of information you are using in order to evaluate its currency and accuracy. The secondary and tertiary sources contain information in an organized form and can be used for research.

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3.6 possible answer to the self-assessment exercise(s) within the content SAE 1

- Information source
- Secondary source
- D. (Abstract)

MODULE 2 CONCEPT OF DIGITAL INFORMATION SYSTEMS, RESOURCES AND SERVICES

This module introduces you to the digital information systems and its concept, digital information resources, advantages and disadvantages of digital information, digital information services types and elements of digital information services.

Unit 1 Digital Information Systems
Unit 2 Digital Information Resources
Unit 3 Digital Information Services

UNIT 1 DIGITAL INFORMATION SYSTEMS

Unit Structure

1.1 Introduction

In module one, you have learnt the meaning of information systems and their components. Also, you learnt about functions the of information systems in processing data, storage, and giving access to information. In this unit, you will learn the concept of digital information systems and the devices used in digitalization of information, advantages and disadvantages of using these devices in producing digital information resources.

1.2 Learning Outcomes

By the end of this unit, you should be able to,

- explain the meaning of digital information systems,

- outline the digital information systems devices,
- understand the advantages of digital information systems,
- State the disadvantages of digital information systems**.**

1.3 Concept of Digital Information

Digital means electronic technology that generates, stores, and processes data into information. **Information** can be regarded as data or figures that have been interpreted into meaningful and useable form by the recipients. **Digital information** can be defined as electronic processed or interpreted data or figures into meaningful and useable information with the aid of electronic technological tools. This digital information is stored on the digital devices or web and could be access through the use of electronic devices or the Internet. For example, digital forms are **electronic** version of a paper **forms** that are filled online using your computer or mobile devices to eliminate the costs of printing, storing, and distributing the paper **forms**.

1.3.1 Digital Information Systems (DIS)

Digital Information Systems are electronic systems that combine software and hardware to enable communication and collaborative work. The explosion of information in this technological age necessitated the need to store information in a different format to promote information storage and information sharing. The uses of information system have increased the scope of knowledge sharing among information users in different locations. Digital Information uses digital devices in carrying out the process of converting the information sources that are in their print form to digital formats. The followings are the digital information system devices

- desktop computers
- input devices – keyboards, mouse, scanners
- output devices – printers and speakers
- mobile phones
- e-readers
- tablet computers
- storage devices – flash drives

All these digital information systems devices gave rise to the availability of digital information resources for knowledge sharing among users from their remote locations.

1.3.2 Advantages of Digital Information Systems

The digital revolution has brought dramatic changes to information storage, access and retrieving processes. The creations of digital information systems have made essential impacts on teaching, learning and research. Today's information environment is hybrid. This has been occasioned by the desire of library users to have access to unprecedented amounts of information in varying formats. Libraries are undergoing many changes due to digital information systems. The followings are the advantages of Digital information system;

- The use of automated transaction processing has shifted in the value placed on information resources to the establishment or development of internet-enabled flexible information
- The Digital Information System (DIS) has been a rapid development of vital information and communication technologies to reduce transaction cost.
- DIS has enabled extraction and exchange of knowledge across the globe.
- Also with the open standard in DIS architecture like UNIX, Linux and HML and Protocols (TCP/IP) organization or libraries can integrate their existing intranets and extranet on the internet which reduces the cost of multiple connectivity and yet extend access to information in the organizational boundaries and national borders.
- DIS uses wireless internet-based technologies to enhance the mobility in information knowledge exchange and information sharing across the firms.
- Digital Information System (DIS) gave rise to the creation of new job like system analysts, System Librarians, computer programmers etc.
- The application of Digital Information System (DIS) in library information resources brought about an increase in accessibility, utilization and patronage of libraries.
- It helps to reduce the time needed to transmit order slips, invoices, shipping notification during procurement.

1.3.3 Disadvantages of Digital Information System (DIS)

In as much as Digital Information Systems have improved sharing of knowledge across the globe but it is not free of challenges. There are some disadvantages of using Digital Information System (DIS) such as

- More bandwidths are required for the use of Digital Information System (DIS) for fast processing, storing and access to information.

- Digital Information System (DIS) requires electricity or charging of the information technologies for accessing and sharing of information, where it is not available the access and information exchange is hindered.
- The use of Digital Information System (DIS) in an organization creates unemployment and lack of job security since certain task performed by a human is carried out by computer systems. An example is the job of a receptionist which has been taken up by an automated telephone answering machine.
- The hardware and software change rapidly making the cost of DIS use high.

SELF-ASSESSMENT EXERCISE 1:

This will take you 5 minutes to answer.

- What are the most factors that enable DIS communication
- Highlight two (2) each of output and input devices of DSI
- List three (3) advantages and disadvantages of DIS

1.4 Summary

We have come to the end of this unit. In this unit, you have learnt about digital information systems and the roles they play in information storage and access using the digital information systems devices.

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1.6 Possible answers to the Self-Assessment within the content

SAE 1
Hardware and software

SAE 2
Input (keyboard, mouse, scanner)
Output (printer, Speaker)

SAE 3
Advantages of DIS

- The use of automated transaction processing has shifted in the value placed on information resources to the establishment or development of internet-enabled flexible information
- The Digital Information System (DIS) has been a rapid development of vital information and communication technologies to reduce transaction cost.
- Digital Information System (DIS) gave rise to the creation of new job like system analysts, System Librarians, computer programmers etc

Disadvantages of DIS

- More bandwidths are required for the use of Digital Information System (DIS) for fast processing, storing and access to information.
- The use of Digital Information System (DIS) in an organization creates unemployment and lack of job security since certain task performed by a human is carried out by computer systems. An example is the job of a receptionist which has been taken up by an automated telephone answering machine.
- The use of Digital Information System (DIS) in an organization creates unemployment and lack of job security since certain task performed by a human is carried out by computer systems. An example is the job of a receptionist which has been taken up by an automated telephone answering machine

UNIT 2 DIGITAL INFORMATION RESOURCES

Unit Structure

2.1 Introduction

In the previous unit, you have learnt about digital information systems and their advantages and disadvantages to information users. Today you will learn the products of digital information systems devices. Digital information system products are digital information resources and services that are available to you.

2.2 Learning Outcomes

By the end of this unit, you should be able to;

- Explain what is digital information resources
- Mention examples of digital information resources
- State some of the digital information services
- Explain the advantages and disadvantages of digital information resources and service

2.3 Digital Information Resources (Dir)

Digital Information Resources are information resources which were in print form (hard copy), but have been converted into non- print form (soft copy) and are accessible through computer machines and other corresponding ICT tools. These Digital Information Resources (DIR) includes published journals and books, pictures, music, cartographic materials, games, stories, articles from magazines, encyclopedias, pamphlets, and other published resources that are in hard copies but are

converted in electronic format using the digital information systems devices make it to be accessible through the web. Digital information resource can be accessed with the aid of a computer and other brand of ICTs such as phones, laptops, palmtops and Ipad. Also, Shariful (2012), defined electronic information resources (EIR) as those resources that are born electronically and digitized materials which can be either accessible from the library in house database or from the world-wide-web. The born electronically materials are e-books, e-journal, e-newspaper, e-magazine, e-projects, e-thesis, e-dissertations, e-reports, website, www-resources and other related materials which can be considered necessary by the users, researchers, and information professionals or even by the library management itself. The digitalized materials are printed resources or other formats which have been converted into electronic format.

Digital information resources such as E-books are commonly perceived as offering greater potential for teaching and research. Indeed, the digital format offers many opportunities for books to be developed as interactive learning resources and in some cases substituting for locally designed learning resources and experience. These Digital resources include a wide range of materials such as:

- Information Collections which contents are converted into a machine-readable form for online access. Examples are Scanned images, images of photographic or printed texts, etc
- Information in CD-ROMs, Online databases and interactive video components
- Databases accessible through the internet and other networks
- Digital audio, video clips or full-length movies.

Libraries have adopted digitization of information with the purpose of preserving information and dissemination knowledge to a wide audience. There are many reasons for libraries to go for digitization but the main aim is to preserve the rare and fragile objects; especially these items of high quality such as old manuscripts (Conway, 2010). As the material digitized can be easily accessed by anyone; libraries, institutions, individuals; from anywhere at any time without hindrances. Fabunmi (2006) recognizes three reasons for the digitization of information resources:

- Preservation of endangered library resources,
- The efficiency of information search mechanism,
- Improvement of access to library resources.

Digital information resources serve as a motivating factor to students as it provides the opportunity to transmit, acquire or download process and disseminate information on a subject of interest. Digital information

resources offer today's students and researchers greater opportunities that are quite different from their predecessors that consulted only printed forms. Day and Bartle, (2003) asserted that access to digital information resources is often faster than consulting print indexes, especially when searching retrospectively, and using keywords in searching. This is because the use of digital information by students of today enhances their performance in academic activities. Information resources and systems are being made available in various formats such as portable document format (PDF), Hyper Text Mark-up Language (HTML), image audio and video. In this changing world, librarians and academic libraries should have a major role in managing these digital information resources and systems (Dhanavandan, in Okiki and Dourodolu 2018). Information communication technology has made it possible to provide and make information more accessible than it used to be.

2.4 Advantage of Digital Information Resources

Digital Information Resources, in reality, have become the backbones of the preservation and dissemination of archival information resources found in their printed format and also for other printed books, journals, magazines and artefacts. These information sources are converted to electronic readable resources some appear as images, pictures accompanied by audio recordings. The followings are some advantages of digital information in libraries;

- They serve as a motivating factor to students for their research and learning because users of information can now access, transmit, acquire or download and disseminate digitalized information on any subject of interest.

.0 It exposure library users to current and archival information resource in their respective subject fields, in contrast with print media which are not regularly updated like the electronic ones.

- Digital information resources are available 24 hours and give wider access to users than printed format.
- Provision of information in digital formats, such as e-journals, e-books, reference work published online and CD-ROM, bibliographic databases, and other web-based services on the Internet. This allows for easy access from any location.
- The provision of DIR has promoted better, faster, easier access to information to, increase usability and effectiveness.
- Digital information resources do not require separate space in a library because they are stored and accessed using computers and other handheld technological devices can be accessed remotely.
- Digital information resources allow library users to search multiple files at the same time; this reduces the incessant hardship faced by libraries in the acquisition of information in print.

- It will help to reduce the cost of buying multiple copies of one title since one copy on the web will serve numerous users at the same time in different locations.
- It helps in solving the problem of physical space for storage of information since information can be scanned into CD-ROMs, flash drives and uploaded into the library website (Ekwueme, 2018)

2.5 Disadvantages of Digital Information Resources

Digital information resources are designed for the information seekers (patrons) as well as for professional staff to satisfy their informational needs. These processes of converting printed in electronic readable resources have some disadvantages associated with it. The following are some of the disadvantages:

- Copyright and intellectual property rights infringements; some users download information resources and use them for profit reason without the consent of the author or the publishers. Also major administrative challenge is in complying with the copyright and intellectual property rights issues. The information provider (library) authorities have to discuss seriously with publishers on this aspect. The process of securing an approval from, publishers and authors may take a long time.
- Users are charged directly or indirectly for each access or download from severs, or each kind of digital library collection; the user can not afford such charges user is denied access to the needed information.
- Some organization lack technical support staff for the manipulation and maintenance of digital information systems devices such as the hardware and software devices. So digital knowledge of hard and software are required for the digitization of information.
- Low bandwidth is another challenge that affects the utilization of digital information resources because some the digital resources contain structured text, sound graphics, pictures, photographs and video clips which require intensive use of bandwidth. The increased use of the network for transferring data by more people increases the load on the network traffic. The delay in the access to digital information resources is worse when the size of transferred or download resources include full-text multimedia document. Indeed, the simple text takes up only small amount of space, picture and graphics take up more; video and sound files are really space-hungry demanding much more space and transmission time (Anunobi & Ezeani, 2011:307).

- Technological and associated internet and web technologies are in a continuous flux of change. New standards and protocols are being defined on a regular basis for file formats, compression techniques, hardware components, network interface storage and devices (Tzoc& Millard, 2011:12). Digital information resources stored in an obsolete format face the problem of constant migration and conversion to the new technology format to ensure compatibility for the products with the current technology. This is to ensure that valuable digital objects are not left behind in obsolete system which eventually breaks down rendering data inaccessible.
- Requires a lot of money to execute. The process of conversing printed-text into digital objects is so expensive and requires a lot of manpower and resources for the migration (Chowdhury, 2010).
- Inadequate funding affects the use of new technologies for institutional development. Funding is necessary to develop digital information resources collection where the fund is not adequate for the process of producing digital resources will end the half. Also, money is needed to re-bind the printed resources torn during the processes of scanning them. It takes a lot of money.

SELF-ASSESSMENT EXERCISE 1

This will take you 5 minutes to answer.

- State benefits of Digital Information Resources
- List four (4) formats in which DIR could be found

2.4 Summary

Digital Information Resources has given easy access to computer-held information including sound and video. Digital technology is not without challenges, so libraries need to plan for costs of hardware and software and training of human resources. The cost of maintaining international standards of digital formats is expensive because there is always a need to pay for upgrades since technology is in constant changes. So in this unit, you have learnt what digital information resources are. Its positive and negative roles in the processing, storage, access to information transfer or dissemination. Then you can now attempt the following assessment exercise.

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2.6 possible answers to Self-Assessment exercise(s) within the content

- **SAE 1**
- It reduces time and cost
- It grants easy access to the adequate and relevant information materials
- It provides opportunities for students and researchers to acquire, download and disseminate current and relevant information materials within themselves
- **SAE 2**
- PDF, HTML, Image, Audio, video

UNIT 3 DIGITAL INFORMATION SERVICES

Unit Structure:

3.1 Introduction

In the previous unit, you have learnt about digital information resources and their advantages and disadvantages to information users. Today you will learn the information services rendered with digital information systems devices. Digital information services are digital services that are available for you through the provision of digital resources. In this unit, you concentrate on digital information services.

3.2 Learning Outcomes

By the end of this unit you should be able to;

- explain what is digital information services,
- state some of the digital information services,
- explain the advantages of digital information services,
- outline the disadvantages of digital information services

3.3 Digital Information Services

A digital information services are the provision of information services to library users, regardless of time and place. Major benefits of digital

information services include storing resources in digital forms, which allows online access to library users at numerous locations at anytime and anywhere, at home, in class, and laboratories, among others. "Digital information services provide various search techniques to access digitized resources (Matusiak, 2012:138)". Digital information services containing representations of original works provide opportunities for students and scholars to conduct research from their personal computers and workstations wherever users are.

Digital information services are all the information services provided to users of information that can be accessed from a computer –based system. Examples of such services are online reference services, uploading of materials into websites and online library tours etc. Digital information services are digital library services which are delivered or conducted online such as digital computer-based reference services. The system has unique challenges and opportunities because it requires interactive interfaces, digital document, digital images, distributed database management, hypertext information retrieval, enforcement of intellectual property rights, integration of multimedia information services, management of multilingual collection, information mining, electronic reference service, electronic document delivery and selective dissemination of information (Radford, 2006).

3.3.1 Elements Of Digital Information Services

The following elements must be put in places for effective digital information services;

- The digitalized information resources (electronic or CD-based resources, web resources),
- The interface (web form, video, chat, e-mail etc),
- The information professional (librarian, information scientist or analyst)
- The User

Digital information services facilitate access to all human knowledge anytime and anywhere in a friendly, multi-modal, efficient and effective way by overcoming barriers of distance, language and culture using multiple internets connected devices (Sukula, 2013).

3.3.2 Types of Digital Information Services

Digital information services are all services accessed or provided through the digital transaction which includes the provision of online tools, virtual space for collaboration, sharing of content to online reference services, electronic document delivery Service; virtual library tours and digitized

local archive collections which are uploaded into the web for remote access. The following are some of the digital information services available for you;

These services are classified into two; based on their mode of transactions namely

- Asynchronous (Correspondence service)
- synchronous (Real-Time Digital Service)

- ***Asynchronous (Correspondence service):*** In this type of digital information reference services there is always a time delay between the information seeker and the provider of answers to queries asked by the information seeker. Examples are E-mail reference service and filling of Web form.

- *E-mail reference service:* the information seeker (User) sends query as a message to an information provider and receives an answer to the query on a later time or day. The questions can be asked anytime, the feedback will be sent when the representative of the organization/library is/are available (not immediate). The reply could be sent through the available e-mail, phones or fax. Some of the e-mail sites available for your use are http://www.inforocket.com, http://www.allexperts.com http://www.askme.com.

- **The advantages of using E-mail reference services**

  - it does not require extra training, it is user-friendly,
  - users who are shy in asking face to face question is favoured;
  - it is useful to users with poor oral communication,
  - users can ask questions anytime,
  - Mode of sending and receiving answers is cheap
  - Reference Librarian takes time to research in order to provide the right answer

- **The Disadvantage of E-Mail Reference Services**

  - There is no face to face interaction between the sender and the librarian, where there are doubts the clarification becomes difficult to come by.
  - Time of sending and receiving the question depends on the speed of internet connectivity.
  - The receiver of the questions may not know the urgency of the information sought as such may not deliver on time.

- *Web Forms Reference Service***:** a structured web form is provided by the information provider like the "Ask – A- Librarian web page" where the user fills in their questions and sent to the librarian through an e-mail. This web form can also be accessed through your library website. The web forms should be written with simple English so as not to confuse the users. The answers to web forms are provided through phone /post and e-mails.

- ***Synchronous (Real-Time Digital Information Service):*** Here the reference services are live services because there is an instance or immediate response to your questions. That makes it Real-Time Digital information services (Reference Service). They are text-based chat/instant messaging, video conferencing or webcam services, digital reference robots and collaborative digital reference services.

- *Text-Based Chat/Instant Messaging:* The exchange of questions and answers
- between the librarian and the user is a live programme (real-time Activity). The instant messaging requires both the user and the librarian to download the AOL (America Online Web Portal) software products to allow the librarian and the patron to communicate in real-time. Just as the use of e-mail, the questions are typed for the answers to be provided by the reference librarian. The advantage here is that your questions are solved in real-time, and the speed of receiving respond is faster than using e-mail, any confuse on about the question is verified instantly online, the service is offered any day and anytime. The reference librarian can use voice over Internet Protocol (VoIP) to communicate to you while attending to your questions. The disadvantages are that it consumes energy and it is stressful since the user has to wait for answers every time. When users and the librarian are typing the questions and answer the typing speed and errors may constitute a problem in communication.

- *Video Conferencing or Webcam services:* These methods have remedied the problem of speed and errors in typing questions and answers. This involves visual digital elements, here users and librarians use text and speeches as in face to face interviews, and they hear each other while sharing digital resources available for the asking and answering questions.
- *Digital Reference Robots:* Artificial intelligence is used in responding to users questions when the reference librarian is not available. The artificial intelligence is known as Digital Robots.
- *Virtual Reference Desk*: it does not answer questions but sends links to experts that will offer these services to you. It allows co-

web browsing, web page sending and sharing of links. (http://www.vrd.org.)

The access provider in the digital library also establishes links to other public information providers for sharing societal goals such as lifelong learning and health and wellbeing, across education, health and the arts. (Buchanan & McMenemy, 2010:42).

3.6 Advantages Of Digital Information Services

Major benefits of Digital Information Services are;

- Digital information services include storing resources in digital forms, which allows online access to library users at numerous locations at anytime and anywhere, at their homes, in class, and laboratories, among others.
- Digital information services provide various search techniques used in accessing digitized resources (Matusiak, 2012:138).
- Digital information services containing representations of original works provide opportunities for students and scholars to conduct research from their personal computers and workstations wherever users are.
- Digital information services facilitate information services for library users, independent of time and place. “This is much needed especially if active learning styles become the commonplace (Anunobi & Ezeani, 2011:382)”.
- Users of digital information can now enjoy online information services like use OPAC, online chat with information providers etc.

3.7 Disadvantages Of Digital Information Services

Some of the disadvantages of providing and using digital information services are discussed below;

- Security aspects are the most pressing challenge of digital information service. Piracy of database, vital invasion and parallel satellite networking stress are some of the issues academic libraries are confronted as a way of routine.
- Insufficient bandwidth of the internet provided for rendering the services by information providers and poor access experienced by users who spend much time in accessing the provider services.
- In accessing some of the digital information services available on the user are required to authenticate their request by supplying their user name and password before access the services provided. The availability of the service does not guarantee its access.

- Some information providing institutions do not have sufficient trained staff to provide these services to users.
- Some users of digital information services are not aware of these services available to them thereby resulting in underutilization of such digital information services. Since availability does not guarantee utilization.

SELF-ASSESSMENT EXERCISE 1

This will take you 5 minutes to answer.

- Which of the medium does digitized information provided to users
- Internet
- Computer
- Network
- Data

- State the components of Digital Information Service (DIS)

3.4 Summary

In this unit, you have learnt about digital information services, types of digital information services their advantages and disadvantages. You can now evaluate yourself by attempting to the self-assessment questions. Digital Information services have changed the way and manner of serving information seekers. Digital information services have enabled users to access digital library services at the comfort of their home and offices without visiting the library or information centres. Users can engage the librarian in a discussion through video conferencing, instant text messaging and users can be attended by Digital Reference Robots.

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3.7 Possible answers to the Self-Assessment exercise(s) within the content

SAE 1

- A

SAE 2

- Interface
- Digitized information resources
- Information professional (librarian, information scientist/analysist)
- user

MODULE 3 EVALUATION OF INFORMATION SYSTEMS, SOURCES, RESOURCES AND SERVICES

This module introduces you to the concept of evaluation, its important and type, evaluation of information resources and services, evaluation of information system and evaluation of information services in library.

Unit 1 Concept, Importance and Types of Evaluation
Unit 2 Evaluation of Information System
Unit 3 Evaluation of Information Resources and Services

UNIT 1 CONCEPT, IMPORTANCE AND TYPES OF EVALUATION

Unit Structure

1.1 Introduction
1.2 Learning Outcomes
1.3 Concept of Evaluation
  1.3.1 Importance of Evaluation
  1.3.2 Types of Evaluation.
1.4 Summary
1.5 References and further reading
1.6 Possible answers to the self-assessment exercise(s) within the content

1.1 Introduction

When you have finished reading your books how do you ensure that you have mastered or understood what you have learnt? This can only be done when you ask yourself questions to actually identify if learning has occurred. This process you are undertaking is an evaluation process. This will bring us to the unit lesson which is the concept of evaluation, importance of evaluation and types of evaluation.

1.2 Learning Outcomes

By the end of this unit you should be able to;

- Explain what evaluation is.
- Explain the importance of evaluation.
- Identify the various types of evaluation

- Strategies for Implementing Formative and Summative Evaluations

1.3 Definition Of Evaluation

It is difficult to have one general acceptable definition of evaluation because of many interest group or actors involved in the process. The main groups namely policymakers, professionals and specialists, managers and administrators, citizens and those affected by public policies. All of these groups have different views on the definition of evaluation. Policymakers regard evaluation as a tool to measuring accountability and tools for policy decisions; managers and administrators see evaluation as tools for ensuring delivery of policies and programs, citizens see evaluation as an instrument for assessing accountability and an opportunity to shape their needs. Professionals regard evaluation as an opportunity to improve on the quality of their work and serves as a means of having control over their professional group.

Evaluations are planned measurement activities that are carried out to find the extent to which a system (for example a library) has achieved its objectives in a certain period of time. Evaluation should be regarded as is one of the major functions of a manager in an organization. In management, evaluation is the same as performance appraisal. Evaluations in libraries involve the use of research methods to measure the effectiveness of library resources, services and systems used.

Evaluation should be ongoing and should compare achievements with the objectives of the library and its parent institution. It is recommended that every library should undertake a regular evaluation to ensure quality services and effective storage and retrieval of information by users. One of the characteristics of evaluation research is that it "investigates particular programmes or policies with the specific intention of weighing up their strengths/weaknesses and considering how things might be improved" (Denscombe, 2009, p. 11). Neuman (2011) observed that research findings on the use of evaluation reports show that policymakers selectively use or ignore evaluation reports. Evaluation informs and guides individuals and organisations on how to perform better.

1.3.1 Importance of Evaluation

According to Research Council UK (2016), evaluations keep programs on a track. This means that evaluation ensures that the program is carried out in line with the objectives and is monitored throughout the

implementation process. evaluation provides feedback on the strength and weakness of a service program for internal improvement. Evaluations carried out during implementation phrase are essential because they help to identify problems with program during implementation before the program ends so that changes in programs or interventions can still have an impact (Research Council UK, n.d.).

1.3.2 Concepts of Library Evaluation

The evaluation of effectiveness is a complex issue particularly in social systems which the library is one. The terms ‘evaluation’ and ‘assessment’ are often used interchangeably, and they both involve the gathering of data or information which are used in decision making. However, evaluation is carried out on programs, products and projects, while assessment is based on people, finding out peoples their aptitudes, attitudes and achievements (Reeves, Apedoe, Woo and Georgia, 2005).

Evaluation can take place before, during and after an activity. It involves looking at the quality of the content or programs the delivery process and the impact of the activity or program on the audience(s) or the participants. It is aimed at finding out whether you have achieved what you had set out to, how well you did it, what impact your activity has had and to reflect critically on both the activities and processes will benefit you and your audiences (Research Council UK, 2016).

Furthermore, Trochim (2006) defines evaluation as the systematic acquisition and assessment of information to provide useful feedback about something. Evaluation in libraries is important as it provides feedback to relevant stakeholders on the services provided in the library. In carrying out evaluation in the library, the evaluation should aim at finding out what is the user’s needs, was the user need assessment carried out before the collection development, how effectively are the user utilizing the resources and services provided for them. Are the users aware of the services and resources available; what type of relationships exists between the users and the library staff; and are the resources provided adequate? This feedback is useful as it helps to support the development of resources and services in a library, to ensure that the library performs better, and to also achieve their aims (Research Council UK, 2016).

1.3.3 Types Of Evaluation

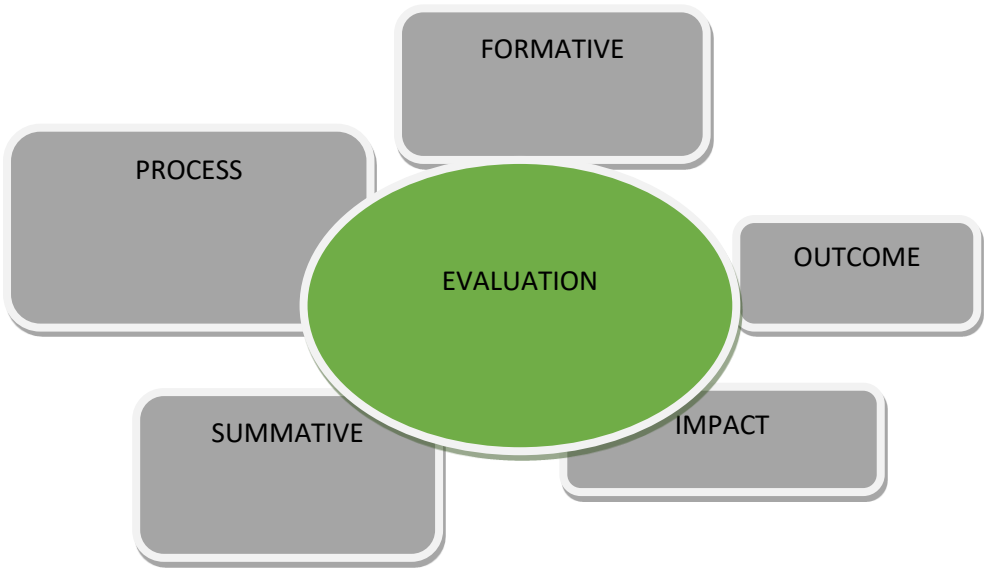

Figure 4. Different Types of Evaluation

There are two main types of Evaluation according to this content viz; Formative evaluation and summative evaluation

- ***Formative evaluation****:* Formative evaluation is carried out during the development of the activity in order to make early improvements or correction. It is used to test ideas, concepts, timings and prototypes of representatives of the audience in order to help in refining or improving the program. The formative evaluation is a method used in assessing the value of a program or training when the program or training is in the process of being developed. It is usually conducted at the beginning of developing a program or modification of an existing program.

- It finds out how well a program is being carried out and strategies for the improvement. Formative evaluation should be included in the implementation plan. Formative evaluation is very useful in answering uncertainty in the implementation of a program or activity. For example, with the implementation of digital reference services, if a librarian is unsure about how library users will receive or interact with the system, the librarian can test the service before it is launched. This type of evaluation is based on the implementation level of the program. It is aimed at determining whether the specific strategies and activities were implemented in the program as planned. It determines whether the program is accurately portrayed to outsides, specifies service hour and tackles inefficiencies in the program delivery.

- ***Summative evaluation****:* This type of evaluation is done at the end of the program or evaluation that evaluates the outcome of a program (Neuman, 2011). Summative evaluation is aimed at finding the outcomes of an activity or program and to measure whether or not the program has met its goals and whether or not it made an impact on the audience (Research Council UK, 2016). In outcome evaluation emphasis on whether the program had changed on attitudes, behaviour and knowledge on the participants. These changes can either be for short term or long-term result. An example is done your participants repot any changes after participating in the program.

The goal of summative evaluation is to measure the level of success that has been obtained at the end of program implementation. The evaluation can be done by comparing it against some stated standard or benchmark (Enhancing Education, 2013). This type of evaluations measures the impact of the program on the participants.

This Impact evaluation is concerned with long-term changes experienced by the participants in a program which may be positive or negative, unintended and intended behaviours. An example of changes in job performance of staff after undergoing training. These changes came as a result of attending the program. It also deals with the effects participants would have if they miss the program.

Nonetheless, each of these types of evaluation can, in turn, use different strategies, namely goal-free evaluation, goal-based evaluation and criteria-based evaluation depending on the motivation for evaluation.

1.3.4 Strategies for Implementing Formative and Summative Evaluations

The two types of evaluation formative and summative did not provide guideline on how the evaluation should be carried out, they only provide when an evaluation should be carried out. The strategies and criteria to employ in the evaluation methods are missing in view of the above gap created Cronholnm and Goldkuhl (2003) advocated the following strategies process to follow in carrying out summative and formation evaluation. These strategies are

- Goal-based Evaluation
- Goal-Free Evaluation
- Criteria – based Evaluation

- **Goal-*based Evaluation***: this method is based on evaluating the organization in line with the goals of the organization. It is aimed that finding out how the information systems have been used in achieving the organizational goals. Emphasis is on only the intended services and the outcome of the program goals and not on human and social aspects of the program. The main strategy is to measure pre-stated goals whether it has been achieved or not and to what extent and in what ways. The goal-based evaluation uses deductive method.

- ***Goal-Free Evaluation****:* As the name implies there is no stated goals to be used in this evaluation process. Goal – free evaluation uses inductive method and the goals are situational driven. Goal – free evaluation is extensive or robust because data collecting are broad because no program goals or discussion on the goals are held with the staff, no brochure or the proposed evaluation are read but only the programs outcome and measurable effects are reported. This method is appreciated because it avoids the risk of narrowing the program objectives so as not to miss vital unanticipated outcomes and remove the bias introduced to an evaluation process by knowledge.

- ***Criteria – based Evaluation***: this means that criteria are stated to be used as an evaluation yardstick. This criteria must be followed to the letter such criteria includes use of checklist, principles and heuristics. Using this method to evaluate information system, the information technology systems interface and its interaction with the users are evaluated.

These three strategies can be combined with the summative and formative evaluation respectively.

SELF-ASSESSMENT EXERCISE 1:

This will take you 5 minutes to answer.

- Evaluation provides feedback on the following
- Strength
- Opportunity
- Weakness
- threat

- Which of the following strategies of the evaluation uses inductive methods approach
- criterial base evaluation
- goal free evaluation
- goal base evaluation

- State two (2) types of evaluation

1.4 Summary

In this unit, you have learnt the meaning of evaluation and the evaluation of the library. You have also learnt the various types of evaluation and when to apply each type in the library and any organization for it to achieve the stated goals and aspiration of the organization. You can now access yourself to find out if learning has occurred which the evaluation.

Information Service evaluation research processes may vary in the nature of the process, that is, an evaluation may be formative or summative. This distinction results from a difference in the implementation of the evaluation in terms of the point in time in relation to the design and development cycle of the IS: formative during the process of design and development; summative at the end of this process.

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1.6 Possible Answers to The Self -Assessment Exercises Within the Content

SAE 1

A. Strength
C. weakness

SAE 2

Goal free evaluation

SAE 3

Summative, formative

UNIT 2 EVALUATION OF INFORMATION SYSTEMS

Unit Structure

2.1 Introduction

Having learnt about information system in module one, evaluation and it's important in library operations in module 2 unit one. The question now is, can this information systems used in the library be evaluated and what type of evaluation should be used in evaluating the information system. Your answer will introduce us to our lesson which is "Evaluation of Information Systems"

2.2 Learning Outcomes

By the end of this study, you should be able to;

- Explain what evaluation of information systems are,
- Discuss various types of evaluation use in evaluating information systems
- State why information systems should be evaluated.

2.3 Evaluation Of Information Systems (Is)

Evaluation of Information systems is the process of finding out or measuring the rate of performance and functionality of the hardware, software, telecommunication networks, data and human resources. The aim of the evaluation of information systems is to find out if the

information systems devices are performing their services or do they need upgrading and improvement on their quality. An evaluation of information systems formative evaluation is carried out at the beginning of the program so as to provide systems feedback to the designers and implementers of the systems while summative evaluations are carried out to identify and assess the success and outcome of a program after implementation of the program. It is important to carry out an evaluation on Information Systems (IS) due to the prevalence and heavy investments of IS in modern organizations and the failure rates of IS implementation and exploitation reported by Chen et al.,(2011) and Peng and Nunes, (2009) in their different research findings.

The belief that evaluation is a vital tool which will help in predicting and assessing potential costs, benefits and risks associated with the development, implementation and use of Information Systems, as well as assisting decision-makers to take proper actions. To increase Information System success, evaluation should be carried out throughout the entire system's lifecycle, from feasibility study to system development, implementation, post-implementation and even on system replacement (Seddon et al., 2002). Zheng (2015) defined information system evaluation as a process of systematically assessing the performance; value or success of the information systems in an organization.

2.3.1 Six Basic Methods Of Information Systems Evaluation

Information systems evaluation is interactive and complex because emphasis are laid on how and to what extent the information systems are serving the organization and what changes it has brought to the organization. The following are the six model strategies carried out in the evaluation of information systems namely;

- Goal-free formative evaluation
- Goal-free summative evaluation
- Goal-based formative evaluation
- Goal-based summative evaluation
- Criteria-based formative evaluation
- Criteria-based summative evaluation.

2.4.1 Goal-free formative evaluation

This type of evaluation methodology emerges from combining goal-free evaluation and formative evaluation. It means the evaluation is undertaken without clear goals during the development of information systems. Information System can be evaluated using goal-free formative evaluation methods. The aim is to detect, identify and explore the possible

unpredicted events that may have an undesirable impact on the use of Information Systems under development. Usually, external evaluators are asked to become involved in goal-free formative evaluation in order to avoid internal evaluators being biased because of their preconceived knowledge which may lead to prejudices about the IS under development.

This type of evaluation can be performed using joint application design workshops (users and technical developers working together), cognitive walkthroughs, prototyping (evaluating the design of the IS through asking users) to find out users are feeling about the system or even interpretive observation on the system design. The joint application design workshops involve the use of focus group discussion with a well-trained session leader/moderator who guides the group discussion. This approach aims at encouraging user participation; expedite system development, which will lead to better quality specifications. Goal-free formative evaluation is expensive because it requires a number of users to be involved in the evaluation at different phases of the development.

2.4.2 Goal-free summative evaluation

This type of evaluation methodology is a result of the combination of goal-free evaluation and summative evaluation. In this methodology, evaluation is done without clearly stated goals after the IS development process has finished. Methods used in this type of evaluation are interviews, and focus group which is similar to the ones used in goal-free formative evaluation, that is cognitive walkthroughs and observation.

Interviews used in goal free summative evaluation are usually semi-structured in nature, that is, the questions are drawn from lists of themes to be covered in an open conversation, rather using the much closed structured interview script. In a focus group, a semi-structured interview is used while the moderator keeps the direction of discussions under control by utilizing a predefined set of questions or script (McPherson and Nunes, 2008). Focus groups discussion in a goal-free summative evaluation gives a comprehensive form of discussion which permits Information System stakeholders to use their sensibilities, knowledge and experiences to discuss and negotiate the different understanding and aspects of the implemented IS (McPherson and Nunes, 2008).

2.4.3 Goal-based formative evaluation

This is the combination of Goal-based evaluation and formative evaluation. The aim of the goal-based evaluation is to find out whether the project has achieved its goals. Goal-based formative evaluation ensures that the evaluation is carried out to assess if specific and pre-established business goals are achieved during the development of the

Information Systems. This is done when carrying out the information systems design and checking the functionality of the information systems in line with stated business goals. Using this evaluation method information systems development techniques are used to the match the software functionality and business goals. Thus, goal-based formative evaluation is mainly used during the design and development of organizational IS and it provides a crucial contribution to ensure quality, usefulness and acceptance of the IS. In goal – based formative evaluation design workshops, observation and interviews are also often used. Here the evaluator observes user's actions in order to find out if goals and business actions defined in requirement specifications have been achieved.

2.4.4 Goal-based summative evaluation

This type of evaluation results from the combination of goal-based evaluation and summative evaluation. This means the main aim of the evaluation is to assess if the implemented Information System fulfils predetermined business goals. Apart from evaluating the attainment of business goals and systems requirements; the costs and benefits of implementing the Information System in making the decision are considered. According to Irani in Chen, Osman and Peng (2015) opined that the costs and benefits evaluated may be financial and non-financial measures or tangible and intangible factors.

- Financial measures: are based on cost-benefit assessment based on the capital investment measure analysis.
- Non-financial measures: are based on consideration of decision-makers on the non- financial costs like opinions from the users, the interaction between users and information systems and benefits of information system implementation along with the rapid development of information systems.
- Tangibles: the tangible performance evaluation should from an operation or tactical levels of information systems such as sales in a period, cycle producing time and so on.
- Intangibles: the intangible measures such as the reputation of the company, the technological factors should be considered in IS evaluation.

2.4.5 Criteria-based formative evaluation

This type of evaluation is the combination of criteria-based evaluation and a formative approach. Criteria-based formative evaluation approaches are concern with usability, accessibility and standard verification studies. The keywords here are precise guidelines or standards performed by expert evaluators who are much more efficient than users with less experience.

Experts are much better at assessing possibilities, judging problems and proposing solutions (Karoulis, 2006). Moreover, experts in usability, accessibility and specific standards are bound to improve acceptance and quality assurance of the development process. Therefore, employing experts in the formative stage of the development process is a welcomed development for efficient interventions to discovery of any shortcoming. Experts will be able to evaluate the systems that are being constructed. Methods used in criteria based formative evaluation are inspection, consistency inspection, standard inspection and guideline checklist inspection. All of these are usually performed against very detailed and precisely stated documented criteria using methods such as cognitive walkthroughs, heuristic evaluation or eye-tracking.

2.4.6 *Criteria-based summative evaluation*

This type of evaluation research is a combination of criteria-based principles with a summative approach. It is normally carried out after the development of the Information Systems. The criteria-based summative evaluation also focuses on usability, accessibility and standard verification studies conducted by experts. The summative nature, however, gives it a very different character because it is carried out at the end of the implementation level. This type of evaluation aims at certification obtainable from accrediting bodies, acceptance testing and quality assurance. It is an exercise also usually carried out by experts, but with a much less constructive purpose than in the formative stages of the IS design and development. Methods used are cognitive walkthroughs and heuristic evaluation.

SELF-ASSESSMENT EXERCISE 1

This will take you 5 minutes to answer.

- Explain the term evaluation of information systems?
- What are the three stages to carry out an evaluation of information systems?
- Highlight methods of information system evaluation

2.4 Summary

In summary goal-free formative and goal-free summative evaluations are not used always in Information System evaluation because of unexpected opportunities, impacts and negative effects it may have on the IS under evaluation. Goal-based and criteria-based formative evaluation provides feedback that helps in the design and development of the IS making it usable, efficient and compatible with the socio-technical environment and enforces standards and quality assurance based on needs for standard and guideline compliance by organizational IS.

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2.6 Possible Answers To The Self-Assessment Exercise(S) Within The Content Sae 1

Evaluation of Information systems is the process of finding out or measuring the rate of performance and functionality of the hardware, software, telecommunication networks, data and human resources. The aim of the evaluation of information systems is to find out if the information systems devices are performing their services or do they need upgrading and improvement on their quality.

SAE 2

Feasibility study to the system development stage
Implementation stage
Post-implementation stages

SAE 3

- Goal-free formative evaluation
- Goal-free summative evaluation
- Goal-based formative evaluation
- Goal-based summative evaluation
- Criteria-based formative evaluation
- Criteria-based summative evaluation.

UNIT 3: EVALUATION OF INFORMATION RESOURCES AND SERVICES

Unit Structure

3.1 Introduction

In your previous lesson, you have studied what information resources and services are. You know how the relevant information resources and services can help you to make decisions and carry out your day to day activities. The question here is all information resources and services available to you are they relevant for your use? If your answer is No, there is a great need to evaluate them in order to find out the desirable ones. This will introduce us to lesson of this the unit evaluation of information resources and services.

3.2 Learning Outcomes

By the end of the lesson

- Explain the Evaluation of Information Resources stands and Services
- Discuss the evaluation of Information Resources
- Explain the evaluation of Services in Libraries.
- Identify the problem associated with the evaluation of Information Resources and Services in Nigeria

3.3 Evaluation of Information Resources and Services

Evaluation of resources and services or any other service at a library is important because it helps in answering key questions such as: Is the resources and service accessible by (the students, lecturers, general public), who it is intended to serve? Is the service being implemented in a manner it was envisioned? What are the challenges encountered in the provision of these resources and services? Are the librarians satisfied with the performance of the resources and service (in terms of software used, services provided etc.), and if not, how can the service delivery be improved? How much does it cost to successfully implement this service?

Evaluation of library resources and services can help in the planning of improved services and acquisition of resources. The purposes of evaluating library services and resources are to determine if a library is carrying out its mission and objective of providing resources and service to its users in order to meet their information needs. Information systems have increased the development and use of online library resources and services if these services and resources are to evolve successfully as library and information resources and services; librarians need to engage in the ongoing evaluation of such resources and services. This is because their evaluation is vital for their development, existence and utilization by their users.

3.3.1 Evaluation of Information Resources

Characteristics to consider when evaluating information sources include the followings:

- ***Authority*:** in the evaluation of information resources always check for authority of the author before using or acquiring. The authority of the author can be checked through reading the biography of such author showing the author's educational background and if the author is a noble price winner. The authority of the author can be checked through citation databases like google scholar or indexes to track how often the source has been cited by others in the field and on the author's webpage or in other biographical sources. Also check the authority of the publisher to ensure that they are not the type that are out to make money and accepting sub-standard written document with poor editing work. So only reputable publishers especially university press, professional bodies and peer- reviewed journals that went through a critical review should accessed, acquired and use in research.

- ***Accuracy/Quality*:** it entrails that all the information must be verifiable and specific to the point at hand. There should be accuracy in the recording of progression of events, opinions, listing of names. The references used in the work should be acknowledged and should come from reliable sources**.** Check the content coverage of the information resources if the information source adequately covers the topic at hand.

- ***Timeliness:*** check the date of publication to find out if the information there in is obsolete. This is because one of the qualities of information is that it should be timely so as to address the problems at hand. The more the recent the better the quality of information as researches and information is generated every day. According to Barker and Hennesy, (2012) the date will tell you whether the author is still maintaining the page or has abandoned it as with the case of online resources.

- ***Quality***: check the accuracy of grammar and use of words, spelling, and punctuation. This can be evaluated through the authority of the editors and reviewers of such information sources. The quality of an online resource can check through the website address or the URL domain to provide insights. The hosting site of online resources can be used in checking the quality of the information such as the URL domain address like commercial (.com), educational (.edu), nonprofit (.org), government (.gov), military (.mil) or network (.net) (Barker & Hennesy, 2012). According to Driscoll and Brizee (2013) website may appear to be factual but actually be persuasive and/or deceptive.

- ***Bias*:** Also check whether the author is bias in handing some contents in the information source such resources should be avoided. This can be checked through reading the introduction and conclusion in the source to ascertain the author's line of arguments and conclusions.

3.3.2 Evaluation Of Information Services To In Libraries.

- ***Library input****:* The level of library input in terms of facilities, organized services, buildings and other resources is taken as a yardstick in the evaluation process. The effectiveness of a library is measured directly with the resources utilized; library standards and statistics are used to indicate the effectiveness and efficiency of the library and information system.

- ***Relationship between organizational goals and the needs of individuals:*** The relationship between the pursuit of organizational goals and the required tastes of individual should be evaluated. It is believed that the efficient and effective use of library personnel resources maximizes the library performance. Motivational forces, managerial style and other behavioural approaches are considered and evaluated to maximize the efficiency of staff.

- ***Library's interaction with Users****:* Evaluation is carried out on all encounters between the users and library staff, including what is provided and what is not done for the user to assess the strength and weakness of the library.

- ***Objectives of library service on the society****:* Impact on society and it's relation to the objectives of library service should be evaluated. Effective interaction between the library and its patron community indicates the measure of the effectiveness of the utilization of services and resources provided. Library evaluation should begin with the aims and objectives of the library and their relevance of the objectives of its parent organization. on the community it is serving include measurable statements such as: what type resources and services to be provided and the mode of dissemination of information services, is the library patrons actually using this resources and services. Also at peak hours does the library have enough space to accommodate the users? In evaluation, one should begin by defining what the system is intended to achieve. These are the desired outcomes. The next step is to determine the services (outputs) that are needed to produce the desired outcomes efficiently and economically. This now leads to the identification of inputs necessary to achieve the desired outputs. Criteria should be set for the evaluation of these services so as to predict the extent of attainment of the goals will guide the library in decision making.

3.3.3 Problems Associated With The Evaluation Of Information Resources And Services In Nigeria

Evaluation is crucial and beneficial to any organization providing information resources and services to users. Although this trend prevails in the developed countries it is worse in developing countries. The followings are some of the observed problems in relation to evaluating information resources and services:

- ***Lack of awareness****:* There is a lack of knowledge or awareness on how to evaluate information resources and services, the benchmark

or standard tools to be used in the evaluating progress. Usually, little or no funds are allocated for this process by the management.

- ***Lack of finance**:* Rosenberg and Roseroka in Mutula (2004) established that the library portion of the total budget of the parent institution was on average of 4 per cent compared with the international figure of 6 per cent. Even if the importance of evaluating information library resources and services are recognized, the cost of implementing the exercise is still an impediment. In developing countries like Nigeria, managers of libraries and information centres do not appreciate the value of evaluating information services due to lack of fund.

- ***Shortage of qualified staff**:* In the developing countries, there is lack of qualified staff, especially at the senior management level to carry out the evaluation exercise.

- ***Lack of evaluation tools**:* Even when issues of finance and trained personnel are overcome, lack of appropriate tools and methodology persists. The developing countries are unable to use the existing tools and methods because they were designed for a different environment.

SELF-ASSESSMENT EXERCISE 1

This will take you 5 minutes to answer.

- Characteristics of the information resources evaluation include the following except?
- Bias
- Quantity
- Authority
- Quality

- Select one incorrect option from the factors hindering the evaluation of information resources in Nigeria library.
- Lack of electricity
- Lack of awareness
- Lack of finance
- Lack of evaluation tools

3.4 Summary

In this unit, you have learnt about the importance of evaluation of information resources and services and approaches to evaluating library performances and the problems associated with the evaluation of information services in Nigeria. This evaluation cannot be an effect without setting a benchmark or standard and trained staff for easy assessment of the systems and services provided. You can now test your level of understanding in this unit through attempting the self-assessment exercise.

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3.6 Possible Answers To The Self-Assessment Exercise(S) Within The Content

SAE 1

1. B
2. A

MODULE 4 ICT APPLICATION TO INFORMATION RESOURCES AND SERVICES ACCESS AND MANAGEMENT

This module introduces you to the concept of ICT, application of ICT to information resources, benefits of ICT, application of ICT to information service, access and management.

Unit 1: ICT application to information resources
Unit 2: ICT application to information services, Access and management

UNIT 1 ICT APPLICATION TO INFORMATION RESOURCES

Unit Structure

1.1 Introduction

In module two you learnt about the process of converting print information resources into a digital format which are accessed over the web using information technology devices. Have you asked yourself how can this be possible? This was possible because of the presence of Information Communication Technology devices. This will lead us today's unit lesson which is application of Information Communication Technology to information resources.

1.2 Learning Outcomes

By the end of this unit you should be able to;

- Explain the Concept of Information Communication Technology (ICT)
- Discuss how ICT can be applied to Information Resources
- Outline the Benefits of Application of ICT to Information Resources
- Discuss some of the challenges associated with the Application of ICT to Information Resources

1.3 Concept Of Information Communication Technology (Ict)

Information communication technology is a term used in describing all the technologies used in the manipulating and communication of information between the producers and the users of such information. The aim of ICT is to use technologies like computers, networks, printer, scanners, Modems, CD-ROM, audio/video discs, flash memories in creating, process and storing and exchanging of information among users. According to Mishra, and Mishra, (2014) ICT comprises of two major technologies namely the computer and communication. Computer technology refers to the tool for storing and processing information into a digital format while Communication technology helps in transferring and dissemination of the digital information.

In summary, Information Communication Technology is the application of computers and telecommunication networks in gathering, processing, storage and dissemination of information to the desired users in the form of information products. In libraries ICTs are used in the acquisition, processing (that is classification and cataloguing), storing and disseminating of vocal, textual and numerical information through a microelectronics-based combination of computer and telecommunication. Furthermore, Dunmill and Arslangic in Mishra, and Mishra, (2014) described ICT as a range of equipment (hardware: personal computers, scanners and digital cameras) and computer programs (software: database programs & multimedia programs), and the telecommunications infrastructures (phones, faxes, modems, video conferencing equipment and web cameras) that permit individuals in accessing, retrieving, storing, organizing, manipulating, presenting, sending material and communicating locally, nationally and globally through digital media.

1.3.1 Application Of Ict To Information Resources

These materials being stored, accessed, retrieved and communicated locally and global are information resources. Information resources are both in their electronic formats and print formats (textbooks, journals, indexes, abstracts, newspapers and magazines, reports). The application of ICT in information resources brought about the production and use of electronic resources. The information resources in their printed formats can now be digitalized using ICT tools like the computers, scanners, telecommunication network (cables, switches, Routers, Internet) to convert them to computer-base information (E-resources) for easy access anytime and anywhere.

Information communication technology-based information resources are as follows

- ***Audiovisual materials:*** The Audiovisual Collection includes a wide range of audiovisual materials which convey information through the senses of hearing (audiobooks) and sight (Visual – motion pictures, documentaries) to support the research and study. Archrival resources like sculptures can be converted into audiovisual material through capturing their images and recording of commentary on such images. This information can be uploaded to the web for every desired user to access.

- ***Library website****:* It is the application of ICT in information resources that necessitated the development of Library website which helps to recognize the facilities and information sources available in the library on the web. Examples of information resources available on the library website are like Online Public Access Catalogue, online Library Tours; announcement of library events and subscribed database like Ebscohost, Hinari.

- ***Database***: A database is an organized collection of data or information for rapid search and retrieval using a computer device. ICT application to information resources has allowed the creation of a library database and other information centre databases for searching of information which is used in, study, research and decision making

- ***Electronic Journals***: Electronic journals are formatted PDF or HTML files of any journal, magazine, newsletter or type of electronic serial publication which is available and can be accessed over the internet using web browsers. The E-journals contain current information or up to date information on any subject area.

- ***Electronic Books***: E-books are files or books you can read using computer devices like a tablet, computer, smartphones. The elements E-books are that they are books published in digital forms or an electronic version of a book consisting of text, images or both readable by electronic devices. Electronic books (e-Books) give access (24-hours-a-day and 7-days-a-week) to authoritative information, and they enable users to quickly retrieve and access on specific research and study material easily and effectively.

- ***Web Technology*:** Web technology uses technology which allows different computers to communicate. Through this means information resources are being shared among users. The World Wide Web (WWW) is a client server-based, distributed hypertext, and multimedia information system on the Internet which allows users to interact with hosted information.

1.3.2 Benefits Of Applying Ict To Information Resources

There are many advantages emerging from the application of ICT to Information resources as asserted by EteBu (2010) these are opportunities of moving from the analogue to the digital paradigm as noted.

- The movement from traditional libraries to digital libraries. Whereas in the traditional library system an information seeker has to visit the library to sort for materials. This visitation restricts the reader to only one library at a particular time one user cannot be physically present in two libraries at a given time but in this digital era, a user can stay in his/her office and access materials from most libraries in the world.
- With the advent of ICTs, there has been a movement from print (on paper) to digital information which includes audios, videos, and information in different formats.
- In the digital era, library catalogue has moved beyond card catalogues to Web OPACs which gives more robust and comprehensive information.
- There has also been a shift from only the use of print journals to online or electronic journals.
- Information availability from libraries is no longer limited to use for a specific period as was obtained in the past. Users can access resources online from libraries round the clock online.
- Emphasis on information resources has moved beyond ownership to access. Libraries worldwide are making concerted efforts at digitizing and making public their resources in order to encourage patronage.

- ICT based information resources use animation, virtual and interactive charts in making the information easy to understand by their respective users.
- Wider access: It gives multiple accesses to particular information resources. Many users can access the same information at the same time from different locations.
- Reduces storage space because the Computer-based information resources do not require physical space for their storage instead they are stored on the web, databases, CDs etc.
- Reduces the burden of the library staff because they need not carry this information from one reading desk to shelves for re-shelving and they spend less time in meeting with the needs of their users since the user can communicate with them through text messages.
- It helps in saving cost for acquisition of multiple copies of particular information resources.
- Electronic information resources are easy to search with the access point or keyword the users of the information will retrieve the needed information.
- The use of Hypertext format links users to related articles and information on another website.

1.3.3 Challenges Associated With The Application Of Ict To Information Resources

Despite the numerous advantages of applying ICT to information resources, there some challenges associated with these types of processes and resources. They are as follows;

Insufficient funds: Operational costs are exceeding year by year and library and information centre are not adequately funded by their owners.

- Inadequately trained staff to carry the processes of applying ICT to information resources.
- Difficult to read from a computer screen, some users are affected by the rays of light coming out from these technological devices that they find it difficult to read from the screen of a computer for a ling time.
- Restriction to information access, some of the relevant information on the web page requires the use of password and user name for you to have access to them. When this occurs and if the user did not register to sign up it leads to frustrations on the side of the users. So here availability did not determine accessibility.
- The constant change in technology; as technology keeps on changing and there is always the need to migrate to current innovation where there is no fund it becomes a problem to the

information manager. Failure to migrate may lead to poor utilization of the available resources.

- Inadequate power supply; in developing countries like Nigeria where the supply of electricity is at its epileptic level, you cannot access the electronic information resources without energy to power the devices,
- Infringement on copyright law, some users' copy people work without acknowledging the source or the author of such information.

1.4 Summary

In this unit, you have learnt about Information Communication Technology (ICT) what it stands for and how it can be applied to information resources to give wider access to information to desired users at the comfort of their home, offices and in school.
Information Communication Technology (ICT) has changed the format, storage and access to information resources. This has allowed for increased patronage of information anytime and anywhere. It has also solved the problems associated with the information on a printed format like inadequate storage facilitates, reading space in the library and problem of remote access to information.

SELF-ASSESSMENT EXERCISE 1

This will take you 5 minutes to answer.

- One of the following is not a tool use in converting information resources to electronic resources
- Computer
- Monitor
- Telecommunication
- Scanner

- List any five challenges of ICT application on Information resources

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1.6 Possible answers to the Self-Assessment Exercise(s) within the content SAE 1

1. B, monitor

- Inadequately trained staff to carry the processes of applying ICT to information resources.
- Difficult to read from a computer screen, some users are affected by the rays of light coming out from these technological devices that they find it difficult to read from the screen of a computer for a ling time.
- Restriction to information access, some of the relevant information on the web page requires the use of password and user name for you to have access to them. When this occurs and if the user did not register to sign up it leads to frustrations on the side of the users. So here availability did not determine accessibility.
- The constant change in technology; as technology keeps on changing and there is always the need to migrate to current innovation where there is no fund it becomes a problem to the information manager. Failure to migrate may lead to poor utilization of the available resources.
- Inadequate power supply; in developing countries like Nigeria where the supply of electricity is at its epileptic level, you cannot access the electronic information resources without energy to power the devices,
- Infringement on copyright law, some users' copy people work with acknowledging the source or the author of such information.

UNIT 2: ICT APPLICATION TO INFORMATION SERVICES; ACCESS AND MANAGEMENT

Unit Structure

2.1 Introduction

In unit one, you have learnt what ICT means and you can identify areas where ICT can be applied in information resources. In this unit, you will learn how the same ICT can be applied to information services; access and information management.

2.2 Learning Outcomes

By the end of this study, you should be able to;

- Explain how ICT can be applied to information Services and Access
- Explain the application of ICT in Information Management
- Identify some advantages associated with the application of ICT to information Services Access and Management
- Outline some of the Challenges associated with Application of ICT in information services, access and management

2.3 Application of ICT to Information Services and Access

Application of ICT into information processes and storage have changed the way information services are provided and accessed. According to Vijayakumar and Vijayan (2011), Information communication technology is being used in libraries for information processing, storage, automation, communication which gives quick and easy access to information required by every user. It is worthy of note, that the emergence of ICT has impacted greatly on access to quality information services. In view of this Adebayo and Olayinka (2018) stressed that application of ICT in library operation has enabled the proper and adequate provision of library services to library users from all disciplines (Adebayo and Olayinka 2018). The followings are ICT based information services which are accessed using ICT devices.

- ***Electronic Document delivery services:*** The Electronic Document Delivery Service (EDDS) is a computer-based interlibrary lending system. Here electronic networks are used for documents delivery and information resources which may be copies of journal articles and book chapters from a library are sent to the desired users to fulfil the user's information needs. EDDS enables a library to use copies of research papers or another research document, from other libraries.

- ***Circulation Services*****:** In circulation section of the library such services like registration of users, renewing resources, reserving items and charging (lending) and discharging (returning)of books are carried out manually. The application of ICT through the use of computers and library software these services are now carried out electronically. Even charges and fines are also imposed on clients who have overdue books and reminder are sent to users e-mail address or their phone number. Users are also notified of the date due for the books they borrowed by sending a reminder before the expiration of the date due for the book return. These alert messages are sent to users through their phone numbers and email addresses. These tasks have greatly been made easier by the use of ICT. Ezeani (2010) noted that borrowers can carry out borrowing procedures by themselves with the in an automated library with the presence of Internet in the libraries. The automated system services are time-saving and give better access to services

- ***Online Instruction/User Education****:* Services like online library user programmes,
- online tutorials on searching online resources and virtual tours of library collections are services accessed by users with the

application of information communication technology on services provided in the library. Access to these services are available round the clock and accessed anywhere and anytime through the use of internet and ICT devices.

- ***Online Readers Advisory Services:*** ICT applications in service access have helped libraries to give web-based reader's advisory services to their users. These services are used in informing users about new acquisitions, providing book reviews, indexes and abstracts to information resources using the web.

- ***Video conferencing Services*** **(or video conference):** is a computer-based service
- which allows the conduction of conference between two or more people from a different location using computer networks in transmitting audio and video data or information. In videoconferencing, participants must have the video camera, speakers, and microphone installed on his or her computer for it to function. The voices produced are transmitted to each participant through the network while the images appear in the front of the video camera. Video conferencing system works much like video telephone calls. The library can use this to teach library orientation and user education for distance and off-campus students.

- ***Closed-Circuit Television (CCTV):***is used for video surveillance in libraries and
- other organizations. It keeps video images of activities going on wherever they are mounted. This technology plays an important role in library management. Through the help of CCTV librarian can supervise the whole activities going on the library both the users' actions and the staff activities.

- ***Interlibrary loan*****:** Interlibrary loan means when two or more libraries agree to
- share their resources among their members. One library may borrow material from another library in order to satisfy the information needs of its patron. In a nutshell, it means loaning of library materials by one library to another library.

- ***Current-Awareness Service (CAS):*** ICT application in services access has
- improved on the way libraries communicate to their users on their new acquisitions (New Arrivals). These new arrivals are

traditionally displayed on the shelves and display boards to draw the attention of the user but with ICT the new arrival can now be sent to users through e-mails, posted on the users portal and even displayed or posted in the library website for wider access. The library upcoming events are posted on the library website to create awareness on the program at hand. The purpose of a current-awareness service is to inform the users about new acquisitions in their libraries.

- ***Chat services***: Chat services are online service that is carried out between the
- information seeker and the information provider. It is a communication that is done with the use of ICT devices over the internet. Examples of the online chat are text-based messages, video calls and use of social media platforms in rendering and accessing information.

- ***Bulletin board services:*** uses computer software which allows users to connect and
- log in to a system using a terminal**.** BBS enables interactive communication between users on the subject of their interest ranging from hobbies to politics. Bulletin board service is an electronic place, cyberspace or clubhouse where callers share their experiences and inquire for an answer to their questions**.**

- ***Provision of web access to OPAC****:* The application of ICT to service access,
- libraries holdings (information Sources) are now compiled using library software for the provision of access to web-based catalogue called Online Public Access Catalogue (OPAC). The OPAC makes it faster and easier for users to know information available in the library and where they can be located. OPAC is the computer form of a library catalogue.

- ***Selective dissemination of information ("SDI")***: is a service program provided in
- the library, this service informs users of new resources on specified topics of their interest. Selective Dissemination of information is personalised service in the sense that the new resources acquired are for the specific user/users that have interest in the resources. An example is when a library acquires new resources on **Nutrition** will interest users who are offering Home Economics, Food Technology etc it is may not interest users offering "**Philosophy".** So the library users offering **Food technology** and **Home Economics** will be alerted not the users studying philosophy**.** The application of ICT in this service will help libraries to easily

identify each user's interest from the library database which shows each students area of study. The information will be passed to them through text messages which they can access without coming to the library to read billboards.

- ***Scanned Services****:* scanning service for material not available electronically are
- done using an image scanner which optically scans print text or handwritten document into an electronic resources.

- ***Reprographic Service:*** Reprographic technology is used for the reproduction of the
- documents into many copies using a photocopying machine. Using the photocopy machine, reproduction of documents has become very easy and accessible. Printed documents can now be converted into digital form using scanners and software. The digital information resources are uploaded into the web or saved in CDs or emails for future use. This service is provided to library users for the photocopy of some pages of books, journal articles or other materials they need.

- ***Bibliographic Service:*** Through the computer, bibliographic services have become
- convenient; librarians can now help users in a literature search on any topic of their choice using the computer-based information resources from a compiled list of references from research works. Examples of Bibliographic software are EndNote, RefWorks, and Zotero.

- ***Translation Service:*** The use of Google translator ICT based service has made it possible for the translation of foreign languages to English and vice-versa

2.3.2 Application Of Ict In Information Management

Application of Information Communication Technology in information had improved acquisition, capturing, storage; retrieval, analysis of information. Cambridge Dictionary defined information management as a process of collecting, organizing, storing and providing information within a company or organizations. Therefore an application of ICT in information management means the use of electronic technologies and techniques in managing information and knowledge, which includes information-handling tools use in producing, storing, and processing,

distributing and exchanging information and services to the desired information seeker.

Ridwan (2015) stated that the important aspects of information management are to identifying what should be kept, how it should be organized, where it should be held and who should have access to it. Also, Auster and Choo in Ridwan (2015) identified the basic goal of information management to include harnessing of information resources and information capabilities of the organization in order to enable the organization to learn and adapt to its changing environment.

There are four components of information management namely;

- People: There are people involved in the creation and use of data or information
- Policies and Processes: This centres on the rules guiding the information such as who is to access what, how to store and safeguard the information
- Technology: The device to be used in storing information like computers, catalogues, file cabinets and software etc.
- Data and Information: the data and information generated

The benefits of ICT in information management have been achieved through improved access to information resources and service, provisions of real-time information services like online chats with librarians, use of videoconferencing; data sharing and remote access to information. ICT application in information management has enabled libraries to store and organize information in different formats in order to deliver information through multiple channels online (phones and web interface) with the help of ICT. The use of ICT in information management has added value to information services and resources provided for both the management and users of the information services institution which would otherwise not have been possible under manual operations.

2.3.3 Advantages Of Ict To Information Services And Access

ICTs have brought tremendous advantages to libraries services. These advantages are discussed below:

- ***Speed***: The speeds with which information services are accessed are faster when compared with the past without ICT. Just a click on the library website with the mouse the library patrons is exposed to varieties of online services provided in the library. This application has helped users to search several websites with several search engines and collate needed information.

- ***Wider Access:*** ICT has enabled users to easily access services between and outside
- the online borders of their own library anytime anywhere.

- ***Availability:*** Library services are always available for users' access every time
- once you have internet connectivity and computer devices**.** Services belonging to several libraries can be easily shared among libraries.

2.3.4 Challenges Of Using Ict For Provision Of Information Services And Access

There are lots of benefits derived from the use of Information and Communication Technologies (ICTs) in providing services to improve on access to libraries resources but there are some challenges associated with the provision of these services with ICT. These Challenges include:

- ***Limited Financial Resources:*** The provision of online services and access depend
- on the acquisition and maintenance of the relevant equipment. The limited fund has to lead to the inability of librarians to acquire; the necessary ICTs devices that would enable them to connect to the internet to provide these services, subscribing to the various online databases and acquiring software.

- ***Low internet accessibility:*** affects the ability of users to access the computer-based
- services provided for them to solve their information needs. When the internet bandwidth is low it takes users a lot of time to access the services needed.

- ***Unreliable Vendors for Software Packages*****:** Some of the computer software
- needed for the provision of these ICT –based services are not reliable. Some of the produced library software when there is a breakdown of the technical skills needed for their upgrade or maintenance is lacking making to the library abandon the library software and access is denied. When this happens it leads to waste of time, energy and money.
- ***Some librarians lack the ICT skills***: you cannot give what you do not have and this
- makes it difficult for them to apply ICT to the information services they provide in these libraries. When ICT is not applied to information services, users cannot access the information service anytime they need it and anywhere.

- ***Lack of ICT Policies****:* There is a lack of systematic ICT policy on the type of
- services to be provided for users, how and who to provide them.

- ***Erratic Power Supply****:* Lack of constant power supply affects the provision and
- access to ICT based services in libraries. Provision of online library services depends on the availability of power supply and when there is power for the provision and inadequate power available to users' access is denied and utilization of such services will be hindered. In support of this Tukur and Adamu, in Adebayo, Ahmed, and Adeniran (2018) said that in developing countries, large areas are still without a reliable supply of electricity.

SELF-ASSESSMENT EXERCISE 1

This will take you 5 minutes to answer.

- ICT unit of a library could use information and communication technology _____ information

- ---------- affects the ability of users to access the computer-based services provided for them to solve their information needs

2.4 Summary

In this unit, you have learnt some of the information services which are provided for users with the help of the introduction of ICT into information services and access. Also, you can identify the advantages and challenges encountered in applying the use of ICT in providing those information services and their accessibility. You are now the position to attempt these questions to evaluate your level of understanding.

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2.9 Possible answers to the Self-Assessment Exercise(s) within the content

SAE 1

- Processing
- Low internet accessibility

MODULE 5 USER EDUCATION AND INFORMATION ACCESS, STORAGE AND UTILIZATION

This module introduces to the user education, information access, information storage, information utilization and factors affecting the development of information sources, resources and services in Nigeria.

Unit 1: user education
Unit 2: information access, storage and utilisation
Unit 3: factors affecting the development of information sources, resources and services in Nigeria**.**

UNIT 1: USER EDUCATION

Unit Structure

1.1 Introduction

In modules 1 to 4 you have learnt about information systems, classes of information, information services and resources provided for you in the library. The question now is, when you know the meaning of information resources and services but did not know whether they are available, how to use them or access them. Is it of any use to you? The answer is NO. There is an urgent need to teach you how to access and use these resources and services. This will bring us to the topic of this unit “User Education”

1.2 Learning Outcomes

By the end of this unit you should be able to;

- Explain the concept of user education.
- State the objectives of user education.
- Outline the various procedure in planning user education
- Identify the group of people involved in user education
- State the Competency Required for User Education Staff/ Instructor
- Explain the various methods of imparting user education
- Discuss the benefits of user education
- Explain the challenges encountered in the teaching user education.

1.3 Concept of User Education

Academic libraries should support the teaching and research needs of their institutions. It is the libraries responsibility to ensure that the information sources, resources and services provided are maximized used by its users, hence the necessity for user education programmes. Various terminologies have been used to discuss ways of teaching library patrons how to use the library resources. Some of these terms are user education, bibliographic instruction, user instruction; information literacy, library orientation etc. Let us look at the various definition of user education by some authors.

Bhatti, R. (2010) stressed that effective user education links naturally to active learning techniques and life-long learning. Active learning is a method of education where students are allowed them to participate in class activities not just as a passive listener and note-taker but take some direction and initiative in the course of the teaching.

Maduako (2013) defined user education as a planned process and techniques which are aimed at equipping library users with the basic skills to help them make adequate use of the resources available in their library.

Chalukya (2015) sees user education as an instruction which equips library users with the skills to become an independent and sophisticated user of libraries and their resources, services and facilities. Instruction here includes formal and informal instruction delivered by a librarian or other staff member one-on-one- or in the group. Also, Akimbola, Ogunmede & Emahara in Uwakwe, Onyeneke, and Njoku (2016) defined

User education as all types of activities designed to teach users about library facilities, services, organization, resources and search strategies which will equip them with the basic skills to enable them make optimal, effective, efficient and independent use of information resources and services available in the library.

The user education training should be developed to meet the demands of all students in search of information and are in need of reading information gathered at the libraries. Many libraries introduce user education for first-year students in the institutions of higher learning some of whom have never used a library before. Esse (2014) believes that even where these students are previously exposed to the use of the library, the size of the library in the institution, the resources and their organization are complex so they must be introduced again to user education because there is a greater responsibility for finding materials. Also, some users are ignorant of the vast resources and services available to them.

While some are reluctant and shy to approach library staff for inquiries User education teaches the skills needed for new information techniques to be used when searching for information in card catalogues, Online Public Access Catalogue, databases, CD ROMs, on Internet, e-books and other new media of information resources and services. User education is vital to the development of reading habits; independent reading improves the image of the library and helps to publicize the library services. Above all, user education and training are the best ways to implement some the Ranganathan's five laws of library science which states "Every book its reader" "Every reader its book, Save the time of the reader" "Library is a growing organism" and "books are for use".

1.3.1 Objectives Of User Education

Onifade and Busayo (2011) stressed that the aims of including user education in the curriculum of higher education are to expose students to the art of using the library and to inculcate in them the habits of independent learning. Hence the following are the objectives of user education:

- User education introduces the user to the various sections of the library so that they can approach the specific section for their specific queries and needs.
- It exposes user s to the technique of library usage
- To help users develop the skills required for advanced studies.
- Develop the skills needed for the presentation of bibliographic references.

- Introduces the readers to the various services available in the library
- Inculcate in them the several new methods of information transfer and online information retrieval systems such as the use of OPAC and Boolean search etc.
- User education teaches the users' library rules such as issuing and returns of books, overdue charges, proper care of the reading materials, interlibrary loan library rules such as "no noise and no reservation of seats for anybody".

1.3.2 User Education Planning Procedures

User education is regarded as reader instruction which is aimed at helping readers to make the best use of the library information resources and services. This should not be planned in a vacuum, it must follow organized procedures. The following steps should be considered during the planning of user education programmes namely;

- Understand the objective or mission of the institution to be served
- Commitment to users' education must be reflected in the mission statement of the library.
- Teaching methods and formats to be used in imparting user education
- User education programmes should be targeted at creating awareness of library resources and services available to all users.
- There should be a written policy on user education programmes.
- The mode of evaluation of user education should be stated.
- Determine the time frame for the revision of the User education curriculum in order to keep up to date with the changing information environment.

1.3.3 Groups Involved In Online User Education

Different groups are involved in developing and teaching of user education online they are:

- Database producers
- System operators'
- Institutions - libraries or information centres
- Library schools
- Intermediaries – consultants like Librarians or information Scientists
- End users – Students.

Each of these groups varies but all are aimed at imparting skills needed for retrieval, access to information resources and services. Online user education programme may be divided into two components: orientation and instruction. Orientation deals with enabling the user to be aware of computer-based resources, information retrieval and the services available to them. On the other hand, instruction is concerned with teaching the users how to carry out computerized information retrieval. The goals and objectives of online user education should be centred on two main groups namely the end-users and the intermediaries (Librarians or information Scientists).

1.3.4 Competency Required For User Education Staff/ Instructor

What is worth doing at all is worth doing well. An instructor of user education whether the librarian or any other faculty staff should acquire certain competency so as to impart the required knowledge and skills to the prospective information users. The followings are some of the required competencies he or she must possess;

- Knowledge of the Subject Matter: the content of the programme
- Understanding and being able to use appropriate teaching method for every skill.
- Ability to present instructions with computers and other technological devices
- Ability to manage a large class.
- should have good communication and interpersonal communication skills

1.3.5 Methods Of Imparting User Education

Several new methods are now used in information access, transfer and dissemination using information retrieval systems. The application of ICT has changed and introduced many methods through which user education can be delivered to the users of information resources and services in different levels of education. The followings are some of the methods use in imparting user education:

- ***Web-based User Education*:** This is done through designing or developing a web tutorial and training modules which involves interactive training or teaching to replace the traditional classroom setting. This web-based user education provides a high degree of interactivity and flexibility to the users. The use of Web guides and teaching tools in Web-based user education are easily updated, accessed everywhere, and printed on demand. Online library tour

can be uploaded into the library website for the library users to access and know how to use the library resources and services.

- ***The Lecture*:** Lecture method is the most commonly used method of instruction in user education. The lecture method is used in teaching a large group of students but it is more suitable for a mature group rather than the beginners. The course is usually taught by librarians or other teachers from the faculty or both. Lecture method appeals to both auditory as well as visual sensory inputs because it uses a blackboard or overhead projector and PowerPoint technique during a presentation. Lectures are conducted either in regular classrooms or at the Library. Its disadvantage is that the speed used in the delivery lecture cannot be controlled by the receiver and when there is no printed handout repetition becomes possible. However, it promotes personal interaction and some feedback between the instructor and the students.

- ***Seminars Method***: Here students/users are gathered in a small group to discuss the stated topic. Seminars, tutorials and demonstrations are methods which provide an opportunity for users/students to actively involved in the learning process through greater interaction between them and the teaching staff. In this method users may be given topic/s to present, they have to search for information by consulting various reference and other sources to enrich their seminar paper before the presentation and discussions. During the presentation, there are always questions and criticisms which permit students to receive feedback as to their progress. It will be more advantageous to conduct a seminar relating to library user education in libraries so that it will gives student the opportunity to demonstrate and use tools used for information storage and retrieval in the presentation of the seminar topics.

- ***Library Instruction / Orientation Methods*:** library orientations are organised by librarians for newly registered students of the library to equip them with activities going on the library. The aim of the orientation is to make the new student to be aware of information resources and services available to them and for them to know the library staff that they should approach for an assistant when the need arises.

- ***Bibliographic Instruction*:** This method teaches library users on how to locate information resources quickly and efficiently through using their bibliographic entries. Bibliographic instruction covers areas like systems used in the organization of materials in

the library, research methodology for every discipline, the access point for searching of information from catalogue, indexing and abstracting services and bibliographic databases. There should be practical on information retrieval systems like the use catalogue whether online (Online Public Access Catalogue) or offline (Card Catalogue), electronic databases and internet resources during user education training.

- ***Guide tours:*** library users are group into twenty to thirty depending on the size of the library. In this method of imparting user education, the library users are taking round the library section by section by a librarian or library staff. At each service point, the users are taught what services and resources available for their use. The processes of registration, borrowing procedures (Charging) and returning procedures (discharging) of the library resources are taught to the students. On each section, they will be exposed to the type of resources it houses and what they are used for. In the electronic section, they will be taught how to access the internet and other information databases.

1.3.5 Benefits of User Education

User education has been a link introducing information seekers on how to identify analysis and use the desired information in solving their information needs. The following are some of the benefits of participating in user education.

- Library user education course had enhanced the knowledge of library users who participated in the training to know the library and its functions.
- Students are exposed in the early stage of their study on how to use different tools in information retrieval thereby training them for independent reading and research findings.
- The user education program creates a positive change to the users' behaviour towards library use and the services provided in the library.
- Through user education, awareness of information services and resources available to users are created.
- It helps in promoting the inter-personal relationship between the library users and the library staff.
- User education introduces library to different search engines and various techniques of information search making access to required information timely and easy.

1.3.7 Challenges of User Education

Although there are many benefits accruing from the teaching of user education, the processes have challenges associated with it namely;

- There is a problem on who should teach the user education. Should it be taught by a professional librarian, library staff or any faculty staff?
- What and what should be in the curriculum content of user education.
- Should the course be taught alone or integrated with the use of English as can be observed from some higher institution of learning?
- What should be the evaluation method?
- Little time is allocated to user education and it is usually a one-semester course.
- When it is a web-based user education there is always the problem of low bandwidths for speed access and retrieval.
- Insufficient staff to handle the practical sections of the study because of the large number of students involved in the course.

1.4 Summary

The library should make user education training compulsory for all faculties both undergraduates and postgraduate students for effective research out. The teaching of user education will bring a positive attitude towards information retrieval and increase patronage of library services and information centres. Also, user education should be an interactive class where users are free to participate and ask questions for clarifications. The guided tour should be organised with practical exercises on the use of retrieval systems and bibliographic tools for effective retrieval of information resources and services by users of these information centres.

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1.6 Possible answers to the Self-Assessment Exercise(s) within the content

- Explain the concept of user education?
- State three objectives of user education?
- What are the various procedures in planning user education?
- Identify the group of people involved in user education?
- State four Competency Required for User Education Staff/ Instructor
- Explain three methods of imparting user education you know?
- Outline some of the benefits of user education?

UNIT 2: INFORMATION ACCESS, STORAGE AND UTILIZATION

Unit Structure

2.1 Introduction

In the previous unit, you have learnt what information that resources are organised, stored for library user to use in order to meet their information needs. Have ever asked yourself a question on how can I get these information resources and use them for my study and research? Your answer will introduce you to our lesson in this unit Information Access and Utilization.

2.2 Learning Outcomes

By the end of this unit of study you should be able to;

- Explain the Concept of Information Access and Utilization
- State the Components of Information Access
- Outline the Objectives of Information Storage and utilization
- Understand the requirements for Online Search
- Outline the methods of Information Access and Utilization

2.3 Concept Of Information Access

Access means the ability to or right to approach, enter, exit, communicate and make use of something (Free Online Dictionary). Most generally, information access can be understood as a means of "allowing people to find and share information" This does not apply to the use of information alone but allow users to develop and share their own expertise (Garrido 2015). Access to information involves you having all the needed devices not only computers and cables but having the relevant local content available in local languages for increased patronage. Garrido believes that even the local contents are available to access there is still need for the mastery of skills and attitude for finding and using of existing information and the creation of new information which will be shared among communities. This will motivate users to go online. Information access helps to increase an individual level of advancement and education development.

Access to information can be conceptualized in many ways and a number of different academic disciplines view access in alternate ways. Information access has a variety of impact on daily life. The information accessed are of books, Journals and Serials, newspapers, Government Publications An increased understanding of these different modes of information access will facilitate an effort to provide information to those who seek it

2.3.1 Components Of Information Access

It is of paramount importance for a user of information to have ability to or right to approach, enter, exit, communicate and make use of information but without all these elements in place, she or he must find it difficult to access information. The four elements of information are:

- Information carrier.
- Descriptor.
- Document address.
- Transmission of information

- ***Information carrier:*** It is any object or anything on which the information is stored for use. Examples are printed formats, Film, Magnetic Tape, CD, USB, DVD and web page etc.

- ***Descriptor:*** This represents terms or keywords that are used in storing information which is known as Descriptor because it describes the information sources and will form the keywords in

searching for the information from the information carrier. It is known as keywords that we use for searching for information from a storage device.

- ***Document address:*** Every document must have an address that identifies the location of that document showing where you can find particular information. Examples of document address are call number, International Standard Book Number (ISBN), International Standard Serial Number (ISSN), code number, shelf number or file number that helps us to retrieve information. These document address here users to access the list of the library holding but offline in the library card catalogue and online through the Library Online Public Access Catalogue

2.3.2 Concept Of Information Storage And Utilization

Information storage and retrieval is the systematic process(es) of collecting and cataloguing information for easy access and displayed on request by the user. Information could be stored in various formats print. Online resources are stored in website and/or web page. Information stored electronically gives more easy and fast access to users more than the printed format.

Information utilization is the practical and maximum use of library information materials identified and acquired by user for the purpose of solving problems (Popoola and Uzoezi 2016)

2.3.3 Objectives Of Information Storage And Utilization

Information resources are stored to promote effective utilization of the resources by users to satisfy their information needs.

- To provide information to the user in the least time with the least efforts.
- To identify sources of information relevant to the areas of the target user community
- To act as a facilitator between information and user.
- To provide non-ambiguous search results through proper indexing

The primary functions of libraries and information centres are to select, acquire, organize, process, store, and make available information resources to their desired users. These resources are meant for utilization by library users or information seekers. The utilization of information resources determined the level of how the resources are acquired, organized, and made available for users. Access to relevant information

is very necessary because accessibility has been identified as one of the prerequisites of information resources utilization.

2.3.4 Requirements For Online Search System

- Workstation or computer.
- Internet connection (dial-up or broadband).
- An Internet service provider such as Internet Solutions Nigeria (ISN), MTN and Globacom.
- Search software (search engine).
- Storage of information (in-house collection or databases).

2.3.5 Methods Of Information Access, Storage And Utilization

Information access and utilization are deliberate actions taken by an information seeker in search of information to identify and retrieve the needed stored information and utilize it in making decisions and solving problems. Information cannot be accessed and utilized without their adequate storage and provision of an access point. Internet is one of the vital tools used for information access to computer-based information.

Sometimes it becomes impossible for the users to understand the available information and where they are stored or located and how to access the right information. These factors lead to stress, delay in decision making, waste of time and wastage of money used in providing the information etc. Being Library professionals, it is our responsibility to provide the exact information to our users on time according the laws of Ranganathan "Every user it book and every book it user, save the time of the user". The following are the two basic methods of accessing information namely;

- Manual Method of Information Access and Utilization
- Automated Method of Information Access and Utilization

- ***Manual Method of Information Access and Utilization:*** In this method of information access, an information seeker uses physical human effort in identifying and retrieval of information before utilizing it. The information seeker visits the information centre or the library by him to find answers to his information needs. The information seeker visits the circulation desk offer or the information officers to ask for where to locate the needed information. The officer or library staff in charge directs the seeker of information on the information resources available based on their arrangement on the self that can provide answers to his queries.

On the contrarily where the information seeker has received user education on the use of the catalogue, he walks straight to the catalogue cabinet to search through the cards either through subject or author entries to check for needed information sources. If he identifies any of the resources relevant to his information need, the call number of the resource is copied and matched with resources on the shelve using the shelve guide. On retrieving the information source from the shelve the library user first check through the table of content to identify the concepts or terms or keywords sought for, then turns to the exact page to utilize the information in solving his information needs. The second method of access to information is done through the use of information technology that is the automated method.

- ***Automated Method of Information Access and Utilization*:** The introduction of information systems in library operations gave rise to library automation. This gave information seekers the opportunity to access information online irrespective of time and location. The automated method of information access and utilization of information can only be carried out in computer-based information centres or libraries. In computer-based libraries (automated) information is accessed faster and timely with the use of internet connectivity. Only what you need to do is to determine the "access point" which may be the subject, author's name, International Standard Book Number (ISBN) or the classification number type in the computer and press "enter" the system will automatically search the library database using Information Retrieval System (IRS) to generate answers to your query or questions and displays on the screen for you to utilize. Let's have a look at Information Retrieval System (IRS)

2.3.6 Information Retrieval System (Irs)

Information Retrieval System (IRS) is a library system where information is stored, processed, organized and retrieved on demand by its users. Different types of information retrieval systems have been developed since the 1950s to meet in different kinds of information needs of different users. Information retrieval system offers different search approaches that deal with three basic aspects. These aspects are as follows.

- Information storage and organization.
- Information representation.
- Information access.

Retrieval techniques are designed to help users to locate the information they need effectively and efficiently. These techniques help users to find

out the required information easily. Information retrieval techniques include the following;

2.3.7 Boolean search

There are three types of' retrieval techniques. Three techniques used in the search are

- Full-text or Word Search
- Subject Term Search
- Combing Search Terms

- ***Full-text or Word Search:*** It is always good for the beginning stages of your information search on a topic especially when the area you are searching is new. That is the terminology or concept is not yet established in subject term or the topic is not specific. An example is when a search term is carried out on a database that has different languages. When you use full-text or word search it gives you a lot of irrelevant results because it looks for the terms or concepts anywhere in the record. So the broader the database or your topic, the harder it is to find relevant results using word searches.

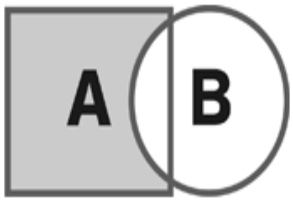
- ***Subject Term Search****:* The use of subject term search will help you to get more accurate results for your search more than when you use full-text or word searching techniques because the result of your search will be limited to the subject term or concept being searched.

- ***Combing Search Terms:*** This is the use of Boolean logic "AND, OR, NOT" called Boolean operators in search or retrieval of information. By using these techniques you can narrow down your search to get the required information.

  AND: the **AND** operator is used to retrieve or search for results that contain all of the searching terms or concepts. It retrieves all those items where all the constituent terms occur.

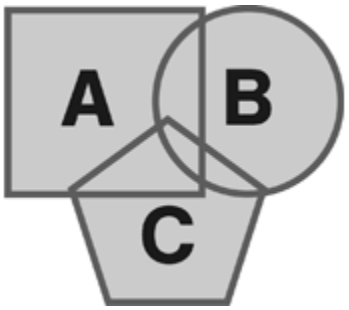
Examples: Library resources **AND** Library services (A stands for Library Resource while B stands for Library Services) both will be retrieved from the system and accessed by the user.

b) **NOT:** It is the separation of complex concepts into individual simpler ones. It allows users to specify those terms that they do not want to appear in the retrieval records. It excludes unwanted results. Search output decreases the unwanted results when NOT term is used.



Example: Library Services **NOT** Resources

c) **OR:** The inclusion of more concepts to expand their connotation. It is used for broadening a search. It allows users to combine two or more searching terms that system will retrieve all those terms that contain either one or all of the constituent terms at a particular time.



Digital library **OR** Electronic Library **OR** Virtual Library

- **2. Nesting Searching Techniques:** Nesting is the use of parentheses ( ) in making a group search of words that can be explained in multiple ways. For an example search for "Library Materials (Information Resources, Information sources and Information materials)" will retrieve records which contain Library materials. Also, you can use nesting when you are interested in searching for two different aspects of a topic like if you are searching for (advantages and disadvantages of using ICT in a library) the two aspects can be searched and retrieved the same time

    - **Wildcard Searching Techniques:** The wildcard is an advanced search technique
- which narrows search results in library databases. The three commonly used wildcard are ***question marks (?), the asterisk (*)*** and the ***exclamation mark*** (!). ***Question marks (?)*** are used to present a single character anywhere in a word while searching for alternate spelling. It is used in replacing letters within a word that

has variable spelling. Examples when searching for a word like *"**Colo**? **r**"* will retrieve result with the word **"*Colour*"**. The difference in the above word is American and Britain spelling respectively.

- **An asterisk *** allows users to search for all terms with a root-word. The use of asterisk * It is commonly used at the end of a root word it is called truncation. For example, when you want to search for variable endings of a root word **"communicat *** would instruct the database to look for all possible endings to the root. The retrieved result will include *"***communicate, communicated, communication, communicator, communicational"**

- **2.9.4 Field search:** The field search is used when a search is done with respect to subject treatment. The databases store information base on-field treatment such as the type of publication, language, Publisher and country. In such a search, only the preferred field will be searched leaving the other fields.

2.4 Summary

In this unit, you have learnt the meaning of information access and utilization, components of access information; requirement for online search and methods for information access and utilization. You can now test your learning outputs by answering the questions below.

Your right to access information can only be achieved only when you know the information available to you and how you can retrieve the available information. Accessibility leads to utilization of information resources. You need to acquire the necessary skills and tools that will enable you to access and utilize the information for your study and research.

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2.6 Possible Answers to the Self-Assessment Exercise(S) Within the Content

- What do you understand as information access and utilization?
- State the Components of Information Access?
- What are the requirements for Online Search?
- Discuss any method of Information Access and utilization you know?

UNIT 3: FACTORS AFFECTING THE DEVELOPMENT OF INFORMATION SOURCES, RESOURCES, SERVICES IN NIGERIA

Unit Structure

3.1 Introduction

Having learnt what information resources, sources and services and the role each play in satisfying of information needs of library users. Then you should ask yourself is there factors that will prevent or affect the development of these resources and services. This will introduce us to the topic of today "Factors Affecting the Development of Information Sources, Resources, Services in Nigeria"

3.2 Learning Outcomes

By the end of this unit you should be able

- Explain the processes of information resources and services development
- Discuss factors affecting the development of information sources, resources, services in Nigeria

3.3 Development Of Information Sources, Resources, Services

These information resources are acquired, catalogued, stored by information centres and libraries. Access to these resources, sources and

services are provided for the patrons for easy retrieval for solving their information needs. Information resources are those materials, strategies, manipulations, apparatuses or consultations that help the researcher to enhance research and development. Information resources, therefore, include all forms of information carriers that can be used to promote and encourage effective research and developmental projects (Chima & Nwokocha, 2013:43). An individual can be informed about a thing by a person or group of people or an organization such a person is known as an information source. This implies that one can get information from observations, documents, human sources such as speeches, and organizations. Hertzum, Andersen, Andersen and Hansen (2002) concluded in their study of "trust in information sources that information source could be oral or written, human or virtual, in-house or external, lay or authoritative, easily accessible or hard to get."

Information services are all the activities involved in gathering the information resources from their different sources and making it accessible to their desired users using many channels of communication or information dissemination medium for easy access, retrieval and utilization. Pearson in Abuiyada (2018:115) defined development as "an improvement qualitative, quantitative or both - in the use of available resources". Development deals with the process of growth or improvement in the availability of information resources. Development of information sources, resources and services involve the acquisition, processing, storing and making information available to users. This information may be written or orally transmitted to users. Development of information sources, resources and services are called collection development which is the highest activities carried out in any libraries and information centres.

In summary, the development of information resources, sources and services is the practice of selecting, ordering, receiving of information, bibliographic checking; record-keeping of information materials from reliable sources which will help librarians and information specialist to provide functional services to users. The main function of any information centre or library is the acquisition and development of information resources and services based on its community needs. Collection development as defined by Ozioko and Ekere (2011) is a process whereby a library provides information resources needed by the patron regardless of the format or location of the information and provides to access the information provided. Collection development has six stages to follow so as to ensure a balanced collection. These include;

- Community analysis (CA): the person to be served (age, needs, educational background etc)

- Selection Policies: formulation and implementation of selection policies line with information
- Acquisition: deciding on the new information resources and services to be provided and who is responsible for the activities.
- Weeding: When to remove obsolescent information resources and services to promote patronage.
- Evaluation: to measure the strength and weakness of the staff and assessing the patrons' behaviour to find out what changes are occurring negatively or positively.

In the development of balanced information sources, resources and services for effective use and easy access the librarian and information specialist should follow the above steps to ensure that their information needs of users are met at any given time.

3.3.1 Factors Affecting The Development Of Information Sources, Resources, Services In Nigeria.

Nigeria as one of the developing countries in the world has many factors that are affecting the development of information sources, resources and services provided to her numerous information seekers**.** The followings are some the factors affecting the development of information sources, resources and services in Nigeria:

- ***Financial Constraints***: the fund allocated to libraries and information centres in Nigeria for the development of information sources, resources and services are always static from year to year and the purchasing power of naira has continued to dwindle due to high rate of inflation. This invariably is affecting the qualitative and quantitative growth of information resources, sources and services available to information users in Nigeria.

- ***Constant and radically changes in hardware and Software***: According to Bhatt and Singh in Behera and Singh (2011:140) obsolescence of equipment required to access digital information directly affects the longevity of digital information. This implies that when there is a change in the hardware and software systems used in the development of information resources and services the existing ones become obsolete and will affect the development of information resources and services rendered with such obsolete hardware and software systems. To upgrade them to the current standard requires a lot of money which is scarcely available.

- ***Poor Collection development policies***: Some information centres and libraries do not have collection development policies guiding

the development of information resources, sources and services as such do have a balanced collection. They offer services and information resources without first analysing the need of the patron community and anybody carries out acquisition processes even the politicians and traders as a contractor without the consent of the professional librarian or information specialist.

- ***Poor access to the computer in rural areas***: Nigeria is a developing country where few elites can access and manipulate computers. According to Eje, Ikhimeaku and Ayanlola (2018), most people in the rural areas in Nigeria are poor and as a result, are not able to acquire computers to launch into the World Wide Web to acquire information. The implication of this is that the access to information resources, sources and services that are computer-based cannot be developed in such areas.

- ***Epileptic power supply***: Electricity power generation in Nigeria is not stable. Although the National Electricity Power Authority (NEPA) changed their name to Power Holding Company of Nigeria (PHCN) yet the situation is still the same low current or absent of light most of the time. In such situation development or building up of information resources and services which are internet-based in libraries in Nigeria will be affected.

- ***Poor telecommunication services***: Low internet access due to low bandwidth affects the development of computer – based information resources and services. Users of information spend more time downloading information while information providers spend much time in the uploading of information resources and services to the websites and web pages for their users to access. Also, there is high cost of tariff charged on the users of these telecommunication devices (internet data and credit charges for mobile phones). All these affect the development of information resources, services and access.

- ***Lack of publishing***: poor economic situation and availability of on line resources and services have seriously affected the publishing industry especially scholarly publishing. Many publishing industries in Nigeria have stopped their operations due to unstable power supply, high exchange rate and taxes imposed on the importation of equipment and raw materials. Print resources especially scholarly ones are hard and expensive to come by. This invariable is affecting the development of print information resources in Nigeria.

3.4 Summary

You have learnt in this unit some of the factors that affect the development information resources and services development in Nigeria. Evaluate your level of understanding by answering the questions below.

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3.6 Possible Answers To The Self-Assessment Exercise(S) Within The Content

- Explain the processes of information resources and services development
- Discuss five factors that affect the development of information sources, resources, services in Nigeria.