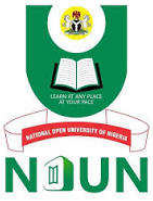
COURSE

GUIDE

LIS324
SPECIALIZED INFORMATION SYSTEM AND SERVICES

Course Team Omotunde Oluwatobi. I, Ph.D. (Developer/Writer) – FUOYE
Assoc. Prof. I. J. Ezema (Editor) - ESUT



NATIONAL OPEN UNIVERSITY OF NIGERIA

National Open University of Nigeria
Headquarters
University Village
Plot 91, Cadastral Zone
Nnamdi Azikiwe Expressway
Jabi, Abuja

Lagos Office
14/16 Ahmadu Bello Way
Victoria Island, Lagos

e-mail: centralinfo@nou.edu.ng
URL: www.nou.edu.ng

First Printed

ISBN:

CONTENTS **PAGE**

INTRODUCTION

Welcome to **LIS 324: Specialized Information System and Services.** This is a two-credit (2-CR) unit course which is an elective course for undergraduate students in the department of Library and Information Science. The study explores in details the concept of information, systems, information systems and specialized information system. It further examined the nature, types and characteristics of specialized information systems. Discussions were also made on users of specialized information systems and services with special focus on digital divide and the role of library in managing specialized information system. Digitalization of libraries automation and library networking were extensively introduced in this study. In general, efforts were made to adequately expose students to important issues and themes that will guaranty effective understanding and mastery of the subject matter.

The course guide briefly provides the students with what to expect from reading the accompanying study material. It provides information on how to make the best use of the materials so that you can achieve good success. Carefully read it and pay attention to the instructions and suggestions.

WHAT YOU WILL LEARN IN THIS COURSE

This course, LIS 324, titled Specialized Information System and Services, has been specifically designed to help you understand the concept of specialized information systems and services.

You will learn about the concept of information, systems, information systems and specialized information systems. The students will also be exposed to the nature, types and characteristics of specialized information systems, including users of specialized information systems and services. More importantly, the students will also learn about digitalization in libraries, library automation and networking.

COURSE OBJECTIVES

By the end of this course, you should be able to discuss any topic in the area of financial management in library services. Specifically, you will be able to:

i. Effectively define these concepts; information, information systems, information systems and specialized information systems.
ii. Distinguish their various functions, types, attributes and levels
iii. Identify and discuss the various components of specialized information system.

iv. Discuss adequately the various functions of each component.
v. Identify and discuss the various components of specialized information system.
vi. Discuss the various functions of each component of specialized information system.
vii. Enumerate the links, roles, similarities and differences of Information Technology and specialized information system.
viii. explain the concepts of hardware and software
ix. Identify the different types and roles of specialized information systems
x. Explain how to address the issues of divides among users of specialized information systems.
xi. Describe the roles and needs of librarians in managing specialized information systems
xii. Differentiate digital libraries from the conventional libraries.
xiii. Explain the impact of specialized information system on the library services.
xiv. Define automation and networking as a concept
xv. Discuss the prospect of library automation and networking development.

WORKING THROUGH THIS COURSE

To successfully complete this course, students are required to participate in both the theoretical and practical parts of the course. Students are also to read the study units, listen to the audios and videos, do all assessments, examine the links and read, participate in discussion forums; read the recommended books and other materials provided, prepare your portfolios, and participate in the online facilitation.

Each study unit has introduction, intended learning outcomes, the main content, summary conclusion, and references/further readings. The introduction opens the door to each unit and gives a glimpse of the expectations in the study unit. Read and note the 2.0 Learning Outcomes which outline what you should be able to do at the completion of each study unit. This will help in evaluation at the end of each unit to ensure you have achieved the designed objectives (outcomes). To achieve the intended learning outcomes, the content of each section is presented in modules and units with videos and links to other sources to enhance your study. Click on the links as may be directed but where you are reading the text offline, you may have to copy and paste the link address into a browser. You can download the audios and videos to view offline. You can also print or download the texts and save in your computer or external drive. The unit summaries provide a recapitulation of the essential points in the unit. It's an indispensable brief that garnishes your

journey through the unit. The conclusion brings you to the climax of the study and what you should be taking away from the unit.

There are two main forms of assessments – the formative and the summative. The formative assessments will help you monitor your learning. This is presented as in-text questions, discussion forums and Self-Assessment Exercises. The summative assessments would be used by the university to evaluate students' academic performance. This will be given as Computer-Based Test (CBT) which serves as continuous assessment and final examinations. A minimum of three computer-based tests will be given with only one final examination at the end of the semester. Students are required to take all the computer base tests and the final examination.

COURSE MARKING SCHEME

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

Assessment	**Marks**
Assignment 1- 4 (four submitted but the best three of all the assignments selected)	Three assignments, marked out of 10% each, totalling 30% (Undergraduate) 40% (Postgraduate)
Final Examination	70% (Undergraduate) 60% (Postgraduate)
Total	**100% of Course work**

COURSE OVERVIEW

The table below presents the course in terms of the time required to complete each of the study-units in addition to the assignments.

Unit	**Title of Study-Unit**	**Weeks/Activity**	**Assignment**
	Course Guide	1	
Module 1 Concept of Specialized Information Systems and Services			
1	Definition of Key Terms, Information, Systems, Services, Information System and Specialized Information System	2	Assignment
2	Components of Specialized Information Systems	3	Assignment
3	IT & Specialized Information System	4	TMA 1 to be submitted

Module 2	**The Nature, Types and Characteristics of Specialized Information System**		
1	The Nature and Types of Specialized Information Systems	5	Assignment
2	The Characteristics of Specialized Information Systems	6	TMA 2 to be submitted
Module 3	**Users of Specialized Information System and Services**		
1	Digital Divide	7	Assignment
2	Overcoming Digital Divide Among User of Specialized Information Systems	8	Assignment
3	Different Users of Specialized Information System and Services	9	Assignment
4	The Role of Digital Libraries in The Management of Specialized Information System	10	TMA 3 to be submitted
Module 4	**Digitalization in Libraries**		
1	Concept of Digital Libraries	11	Assignment
2	Principles for Building a Digital Collection	12	Assignment
3	ICT Application in the Library	13	Assignment
4	Impact of Specialized Information System on Library Services	14	Assignment
5	Library Management Information System a form of Specialized Information System	15	TMA 4 to be submitted
Module 5	**Library Automation and Networking**		
1	Library Automation	16	Assignment
2	Tasks of Library Automation	17	Assignment
3	Benefits and Barriers of Library Automation	18	Assignment
4	Networking	19	Assignment
5	Library Network	20	TMA 5 to be submitted
	Revision	21	
	Examination	22	
	Total	**22**	

PRESENTATION SCHEDULE

The presentation schedule gives you the important dates for the completion of computer-based tests, participation in forum discussions and at facilitation. Remember to submit all your assignments at the appropriate time. You should guide against delays and plagiarisms in your

work. Plagiarism is a criminal offence in academics and liable to heavy penalty.

ASSESSMENT

There are two main forms of assessment in this course that will be scored. First is the set of Tutor-Marked Assignment (TMAs). 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, students 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.

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. Students 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 Assignments (TMAs) 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.

2. Your first assignment in this course is to read this course guide thoroughly.

3. Organize a study schedule: Refer to the course overview for more details. 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.

4. 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 it is too late to help.

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

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

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

8. Visit your study centre whenever you need up to date information

9. 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.

10. 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.

11. 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.

12. 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).

FACILITATION

You will receive online facilitation. The facilitation is learner centred. The mode of facilitation shall be asynchronous and synchronous. For the asynchronous facilitation, your facilitator will:

- Present the theme for the week;
- Direct and summarise forum discussions;
- Coordinate activities in the platform;
- Score and grade activities when needed;
- Upload scores into the university recommended platform;
- Support and help you to learn. In this regard personal mails may be sent;
- Send videos, audio lectures and podcasts to you.

For the synchronous:

- There will be eight hours of online real time contacts in the course. This will be through video conferencing in the Learning Management System. The eight hours shall be of one-hour contact for eight times.
- At the end of each one-hour video conferencing, the video will be uploaded for viewing at your pace.

- The facilitator will concentrate on main themes that are very essential in the course.
- The facilitator is to present the online real time video facilitation timetable at the beginning of the course.
- The facilitator will take you through the course guide in the first lecture at the start date of facilitation

Do not hesitate to contact your facilitator. Contact your facilitator if you:

- do not understand any part of the study units or the assignments.
- have difficulty with the self-assessment exercises.
- have any question or problem with an assignment or with your tutor's comments on an assignment.

Also, use the contact provided for technical support.

Read all the comments and notes of your facilitator especially on your assignments; participate in the forums and discussions. This gives you the opportunity to socialise with others in the programme. You can discuss any problem encountered during your study. To gain the maximum benefit from course facilitation, prepare a list of questions before the discussion session. You will learn a lot from participating actively in the discussions.

Finally, respond to the questionnaire. This will help the university to know your areas of challenges and how to improve on them for the review of the course materials and lectures.

SUMMARY

Specialized information systems and services is intended to make you understand the nature and characteristics of specialized information systems. The usage and application of ICT will be made understandable to you at the end of the course. Digitalization of libraries will be discussed. At the end of the course, you are expected to be able to effectively provide and manage specialized information systems and services both in digitalized and none digitalized environments. We wish you success as you adhere strictly to the instructions and advice given to you for this course.

MAIN COURSE

CONTENTS **PAGE**

MODULE 1 CONCEPT OF SPECIALIZED INFORMATION SYSTEMS AND SERVICES

Unit 1 Definition of Key Terms, Information, Systems, Information System and Specialized Information System
Unit 2 Components of Specialized Information Systems
Unit 3 IT & Specialized Information System
Unit 4 Specialized Information System Software & Hardware

UNIT 1 DEFINITION OF CONCEPTS

CONTENTS

1.0 INTRODUCTION

The unit will introduce you to the definition of information, its attributes, types and levels of information. Furthermore, the concepts of systems and information systems will be explicitly reviewed. Finally, an all comprising clarity on specialized information systems will be defined in this unit.

2.0 LEARNING OUTCOMES

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

- effectively define these different concepts: information, information systems, services, information systems and specialized information systems
- distinguish its various functions, types, attributes and level of the different concepts.

3.0 MAIN CONTENT

3.1 Definition of Information

Information as a concept is organized, structured and classified data, which has some impactful and meaningful values for the receiver. In other words, decisions and actions of the users are based on valued Information. For the decision to be made and meaningful, it must have the following quality and characteristics namely; timely, accuracy and completeness. In relating information to information technology, the result of processing data is information aided by computer. This results in facts, which enables the processed data to be used in context and have meaning. Information is data that has meaning.

3.1.1 Attributes/Properties of Information

- It must facilitate effective decisions making
- It must be suitable for taking effective control action
- It must be compatible with the responsibilities of specific managers i.e. to the proper person who is responsible for the decision in hand.
- It must relate to current situation
- It must contain an appropriate level of detail for the recipient.
- It must be based on exceptions or variances to accord to the principle of management by exception when appropriate lengthy reports take time to read and digest, resulting in overlooking vital facts.
- It must be produced at an optimum cost i.e must be cost effective.
- It must be easily understandable by the recipient else it will not be usable.
- It must not contain unnecessary redundancy i.e. be relevant for reliable decisions by managers.
- It must be provided at a suitable frequency i.e. not too frequently.
- It must be accurate enough for the purpose in hand.

- It must be compatible with response time needs of the systems i.e. it should be available when the planning or control decisions are to be taken or ought to be taken.

3.1.2 Categories/Levels of Information

The main categories of information are in three kinds. They are connected to the levels of information. Wherein the higher levels of information is associated with strategic information and lower level with operational information.

Strategic Information: is mostly interested with top management because of its relationship to long-term planning policies. Strategic information in business structure and organization includes market availability and penetration figures, product development, manpower changes, projected raw material costs and new technologies. Strategic information runs through overall profitability, capital equipment needs and future market prospects, profit comparisons with previous periods, trend of cash flows, current share prices. It is communicated not too often.

Tactical Information: this is short-term planning, i.e. within months rather than years with deep interest at department level. Middle management makes use of this category to guarantee resources of the business are utilized to achieve the strategic 2.0 Learning Outcomes of the organisation, or is usually prepared regularly, weekly or monthly. Such information includes sales analysis and forecasts, cash flow projections, production resources requirements and the annual financial statements, manpower levels both current and projected, operating expenses, amount of capital expenditure incurred on various projects and the level of productivity being attained.

Operational Information: relates to shorter-term, possibly hourly running of a department. It is specific to people compare to other categories of information because of its direct interest to a limited number of people than is tactical information. It includes current stock-in-hand, outstanding and overdue purchase orders, work- in-progress levels etc. Current activities of data can be established from operational information. It is often connected with the need for emergency action is a unique feature. In a payroll office, for example, operational information relating to labour cost will include hours worked each week by employee, his rate of pay per hour, details of deductions and details of the time each man spent on individual jobs during the week. Such information is required weekly but more urgent information, such as raw materials available is required on daily basis.

3.1.3 Types of Information

Quantitative Information deals with the magnitude of variables, their variability and absolute value expressed in terms of the quantity of various entities. Examples include:

- variations in the level of income and expenditure, stocks, product costs
- variations from the credit limit allowed to customers
- variations in the amount of capital expenditure on projects
- level of labour turnover
- actual quantity produced or sold

Qualitative Information relates to the attributes of an entity in respect of quality factors. It is useful for managerial control and entails comparisons with quality standards and actual achievements as a basis for management by exception. Examples are:

i. Effectiveness of current methods of producing information.
ii. Quality of information for effective decision-making.
iii. Variations of quality of the ingredients used in the manufacture of foodstuffs which after taste and texture.

There are three points of view of information namely:

3.1.4 The Objective Point of View of Information

- Information is output from a computer program
- The system analyst decides what output will be useful. This output remains useful and meaningful regardless who the recipient is
- The processing which produces the information includes summarizing in order to reduce the volume of data
- Data may be associated with other data, which may be obtained from different sources, to produce the information.

3.1.5 The Subjective Point of View of Information

- Data become information only once they have been appropriated by the human recipient. Hence, the output from any computer program is still data.
- Some authors consider data to be information only if they are used by the recipient in making a decision.
- Data become information only if they include something previously unknown to the recipient.

3.1.6 The Inter-Subjective Point of View of Information

- The recipient has participated in the systems analysis and hence has influenced the process and has said what output was likely to be meaningful to him and others using the system.
- More advanced, database-oriented, systems allow the user to formulate queries and interact directly with the data in the database. Hence, there is more dynamic process where the user's judgment is combined with the power of the technology.

3.2 Definition of a System

Synergistic is another word to describe system. Synergy is used to demonstrate the concept B.5 (11111) i.e. the sum of a whole that is greater than the sum of individual parts. in addition, the combination of interconnected elements, or sub - systems, organized to ensure the competent functioning of the system as a whole, necessitating a high degree of co-ordination between sub- systems, each of which is designed to achieve a specified purpose.

System Resources: Business systems require finance resources to enable them operate in the same way that a factory requires resources. Finance is an enabling resource for obtaining the other resources essential to the effective operation of systems. These resources are personnel, office space, machines and equipment and business forms and documents.

Business System: is described as a grouping of related sub-system consisting of a series of operations arranged in a logical sequence to achieve a particular purpose as efficiently as possible. System relationship describes relationship of the system with other system that is close to it and how it reacts to or is influences, in its environment by other systems.

3.2.1 Types of Systems Relationship

1. **Closed System:** These are systems which do not enhance relation with their environment either for the exchanged of information or business transactions. Closed systems are isolated from their environment and independent of it so that no environmental influences affect the behaviour of the system. Such systems are self-contained and business systems do not conform to these categories as they interact with their environment to a great degree as no business exit in a vacuum.

2. **Open System:** These are those which interact with their environment either for the collection of data on which to base strategy or for conducting business transactions with suppliers, customers, the general public, trade organization, government, etc. Employees are obviously influenced by what they do in their job, but as members of society at large, they are also a part of the environment of the business, and therefore their work inevitably affects the environment. Open systems are adaptive and require speedy reaction to competitive and other situations in the most effective way.

3. **Control Systems:** These are usually structurally detached from the systems which they control, i.e. the quality control system controls the quality of production. Control systems are administrative systems for monitoring the results and modifying the state of the physical systems to which they relate.

4. **Input-Output Systems**: reveal and display a situation where the output from one system is the input to another even though they may be administered as separate systems. In order to achieve administrative efficiency and convenience there has been the structure which permitted large systems to take in orders.

5. **Coupling and De-coupling or Integration and Disintegration of System:** The complexity to understand and operate a system is base on its over-integration. Hence, if one part of the system ceases to function correctly this may cause the system as a whole to deteriorate and perhaps ceases to function completely.

3.2.2 Classification of Systems

Systems may be classified according to a hierarchy of level or properties:

1. **Cybernetic or Adaptive or Self-organizing System**: It is one of a kind which adapts and reacts to stimuli. In other words, adapts to its environment by adjusting its behaviors on a self-organizing basis. The system alerts it's input as a result of measuring its performance (outputs) by monitoring its own behaviour. Human, plants and organizations are examples of adaptive system. Reaction is the only means for survivor in a competitive world, thus the importance for reaction, if they do not react, then they die. The adaptive system is the most suitable type of system. In the human body, a number of adaptive systems control temperature, blood pressure and motor

reactions. In electrical systems such as a voltage regulator, the principle of feedback is used. Computerized stock control systems are often adaptive as changes in demand are sensed and responses are speedily implemented to change the state of the system to avoid overstocking or stock shortages. Computerized credit control system is also adaptive since credit facility will be prevented from exceeding the credit limit in order to minimize exposure to a particular client.

2. **Planning System:** It deals with the distribution of resources to specific tasks and the setting of performance standards. It establishes the guiding principles for future action without which a business is likely to drift in the wrong directions.

3. **Probabilistic System**: allows its output to be predicted within certain limits i.e. their precise outputs cannot be known in advance. Business and economic systems are of a probabilistic nature, since they are subjected to many internal and external forces.

Information is probabilistic (e.g. forecasts) a set of possible outcomes and their associated probabilities is given. Production activities are subject to random variations in respect of manpower. Availability and level of productivity achieved, machine breakdowns and materials supply etc. Production planning and control system are implemented to detect and control such variations in order to minimize their effect on the achievement of desired states. Similarly, the quality of production varies randomly due to inconsistency in the quality of raw materials, human error and faculty machines operation. Quality control systems are designed to correct such situation.

3.2.3 Definition of Information Systems

There are various views and school of thoughts to Information system. Hence, information system can be defined from different perspectives accordingly. Information system has been defined in terms of two perspectives: one relating to its function; the other relating to its structure. From a functional perspective; an information system is a technologically implemented medium for the purpose of recording, storing, and disseminating linguistic expressions as well as for the supporting of inference making. From a structural perspective; an information system consists of a collection of people, processes, data, models, technology and partly formalized language, forming a cohesive structure which serves some organizational purpose or function. The functional definition has its

merits in focusing on what actual users -from a conceptual point of view- do with the information system while using it. They communicate with experts to solve a particular problem. The structural definition makes clear that IS are socio-technical systems, i.e., systems consisting of humans, behavior rules, and conceptual and technical artifacts.

An information system can be defined precisely as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization. In addition to supporting decision making, coordination, and control, information systems may also help managers and workers analyze problems, visualize complex subjects, and create new products. Further, "information system can be defined technically as a set of interrelated components that collect, process, store, and distribute information to support decision making and control in an organization." (laudon & laudon, 2014) Another definition of information system is of the view that IS are combinations of hardware, software, and telecommunications networks that people useful data, typically in organizational settings. (Valacich & Schneider, 2010). As you can see these definitions focus on two different ways of describing information system: the components that make up an information system and the role those components play in an organization.
For an information system to produce the information that organizations need to make decisions, there are three activities involve namely, control operations, analyze problems, and create new products or services. These activities are input, processing, and output. Input captures or collects raw data from within the organization or from its external environment. Processing converts this raw input into a more meaningful form. Output transfers the processed information to the people who will use it or to the activities for which it will be used. Information systems also necessitate feedback, which is output that is returned to appropriate members of the organization to help them evaluate or correct the input stage.

3.2.4 Functions of an Information System

Data Processing: A data processing information system is organized to collect and process raw data into valuable information in an efficient and effective manner whether manual or computerized system. The electronic data processing (EDP) system has the advantage of being capable of producing information (such as financial statements and budgets) much more accurately speedily and cheaply. Thus, management of efficiency and effectiveness can be improved considerably by a mechanized data processing system.

Decision-making: An information system can monitor by itself disturbances in a system, determine a cause of action and take action to get the system in control i.e. information constitutes an efficient tool to management. For instance, a computer programmed to determine automatically the Economic Order Quantity (EOQ), the re-order levels, and to prepare purchase orders for items below re-order levels for non-programmable decisions, an information system provides support by supplying information for the search, the analysis, the evaluation and the choice and implementation processes of decision-making.

Planning: Planning involves the establishment of organizational goals, the identification of problems and resource constraints and the establishment of strategies to help achieve set 2.0 Learning Outcomes. Information is required to identify as many alternatives as possible.

Control: involves three elements:

i. Establishment of a standard output i.e. the desired performance level of the system.
ii. Design and implementation of a sensor which gathers data that relates to the output, evaluates and measures the performance of the output, and communicates the resulting information to management.
iii. Employment of a manager or mechanism, which takes corrective action should the information so indicate.

An information system contains information about an organization and its surrounding environment. Three basic activities input, processing, and output - produce the information organizations need. Feedback is output returned to appropriate people or activities in the organization to evaluate and refine the input. Environmental actors, such as customers, suppliers, competitors, stockholders, and regulatory agencies, interact with the organization and its information systems.

This corrective action results in the release of decisions, which act as inputs, back into the process of the system. All these management activities require information. Information flows horizontally and vertically, and it is with the vertical flow (between superiors and subordinates) that management information system is most concerned. Reports generated by an information system will range between:

- Information for low-level management about the small area of the business under their control.
- Reports of a broader nature for top-level management concerned with overall control.

3.2.5 The Information Systems Department

The information systems department consists of specialists, such as programmers, systems analysts, project leaders, and information systems managers.

Programmers are highly trained technical specialists who write the software instructions for computers.

Systems analysts constitute the principal liaisons between the information systems groups and the rest of the organization. It is the systems analyst's job to translate business problems and requirements into information requirements and systems.

Information systems managers are leaders of teams of programmers and analysts, project managers, physical facility managers, telecommunications managers, or database specialists. They are also managers of computer operations and data entry staff. Also, external specialists, such as hardware vendors and manufacturers, software firms, and consultants, frequently participate in the day- to-day operations and long-term planning of information systems.

The chief security officer (CSO) is in charge of information systems security for the firm and is responsible for enforcing the firm's information security. Sometimes this position is called the chief information security officer (CISO) where information systems security is separated from physical security. The CSO is responsible for educating and training users and information systems specialists about security, keeping management aware of security threats and breakdowns, and maintaining the tools and policies chosen to implement security.

Information systems security and the need to safeguard personal data have become so important that corporations collecting vast quantities of personal data have established positions for a **chief privacy officer (CPO).** The CPO is responsible for ensuring that the company complies with existing data privacy laws.

The chief knowledge officer (CKO) is responsible for the firm's knowledge management program. The CKO helps design programs and systems to find new sources of knowledge or to make better use of existing knowledge in organizational and management processes.

End users are representatives of departments outside of the information systems group for whom applications are developed. These users are playing an increasingly large role in the design and development of information systems.

3.3 Definition of Specialized Information Systems

A specialized information system consists of an assemblage of software, hardware, procedures, data and computer networks used by specific or group of people within an organization. It functions encompasses collecting, storing, managing and distributing data to support precise activities. The complexity around organizations and their activities have enabled specialized information systems have emerged due to the nature of organizations. For example, an information system that works well to in the technical section in the library may not be the best to keep track of the inventory of a bookshop, although it may share some similarities base on its activities. A single organization may use a number of different information systems. Consider the bookshop example. A single bookshop will have some type of inventory system, which keeps track of what is in stock, what is sold every day and what is being delivered. This inventory system is linked to a transaction system of actual sales at individual registers. Think of all the decisions being made just within the library chain. Hundreds of decisions are made every day. Starting from acquisition, cataloguing, and circulation services, among other almost all these decisions require information, and library must be having reliant on information systems to support their decision making.

4.0 CONCLUSION

You have come to understand that information deals with decision making. There are three points of view to information. We were able to identify twelve attributes of information. Also, tactical, operational and strategic information are major levels of information. The point of view of information could be subjective, objective and inter subjective. Information system deals with interrelated components that collect, process, store, and distribute information to support decision making and control in an organization. In other words, they are supporting mechanisms for decision making. There are functions and departments that administer information systems. While specialized information system deals with specific technological devices or tools used to collect, store, manage and distribute data for decision making. This can also be called classified information system. It is important to effectively differentiate these three

key concepts (information, information system, and specialized information system).

5.0 SUMMARY

You have learnt in this unit, the definition of information, its, attributes, level, type and identified three points of views. Also, the definition of information system and specialized information systems was effectively explained. To refresh your memory on what you have learned in this unit, you will recall that information was in a nutshell described as the processed data on which decisions and actions are based. There are levels, attributes and types of information. Information can be viewed from a subjective, objective and inter subjective points. Further, discussion was made on information system. It was described as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization. Finally, specialized information system was specifically differentiated from information system. Its differences are on the specific group of people in organizations to make use of certain devices, or technological tools to support its decision making.

6.0 TUTOR-MARKED ASSIGNMENT

1. Adequately differentiate the following concepts, information, information system and specialized information system.
2. Explain the three levels of information.
3. Identify five attributes of information.
4. Describe the three points of views of information.
5. Differentiate the concepts of system from information system.
6. Identify the functions of an information system.
7. List and explain four information system departments.

7.0 REFERENCES/FURTHER READING

Laudon, K.C. & Laudon, J.P. (2014). *Management Information Systems: Managing the Digital Firm*, (13 Edition).

Valacich, J. & Schneider, C. (2010) *Information Systems today: Managing the Digital World*, (4th Edition}. Prentice-Hall.

Long, P., Lawrey, S., & Ellis, V. (2019). Cambridge International AS & A Level Information Technology. Topic Support Guide. Cambridge International Examinations. Accessed Online

www.education.cambridge.org.

Zandbergen P. What are Specialized Information Systems?- Decision Support Systems for Business. Retrieved from https://study.com/academy/lesson/what-are-speciaized-information-systems.html

UNIT 2 COMPONENTS OF SPECIALIZED INFORMATION SYSTEM

CONTENTS

1.0 INTRODUCTION

In this unit, we will discuss the components of specialized information system and the role of information systems.

2.0 LEARNING OUTCOMES

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

- identify and discuss the various components of specialized information system
- discuss the various functions of each component.

3.0 MAIN CONTENT

3.1 The Components of Specialized Information Systems

A specialized information system is a combination of hardware and software technology network that is built to collect, create and distribute useful data, in a typically organization. The objective of a specialized information system is to provide appropriate information to the user, to gather data, process the data and communicate information to the user of the system. In most cases a specialized information system involves people.

People and organization define the task and pattern a specialized information system will perform or function. Components of the specialized information system are as follows:

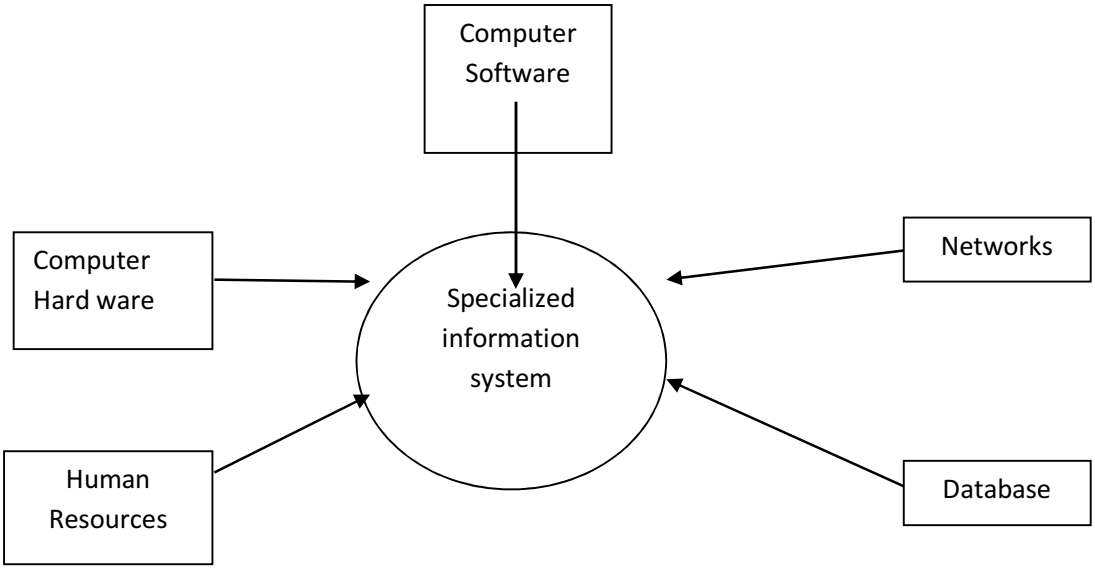


Figure 1: Diagram of components of Specialized Information System

3.1.1 Computer Software

Computer software also known as software resources are programs/application programs employed to control and coordinate the hardware components. All sets of information processing instructions are included. It is applied for analyzing and processing of the data. This basic concept of software includes not only programs, which direct and control computers but also the sets of information processing. Software is further classified into 3 types:

- System software, such as an operating system
- Application software, which are programs that direct processing for a particular use of computers by end users
- Procedures, which area operating instructions for the people, who will use an information system. Examples are instructions for filling out a questionnaire form or using a particular software package.

3.1.2 Computer Hardware

These are physical equipment used for input, output and processing. The hardware structure depends upon the type and size of the organization. It consists of an input and an output device, operating system, processor, and media devices. This also includes computer peripheral devices. In other words, it consists of but machines and computer systems

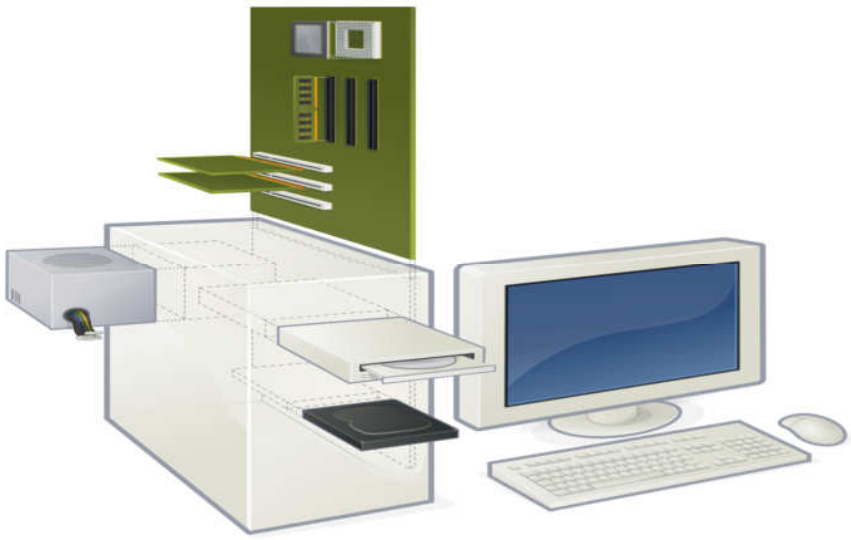


Figure 2: Diagram of Computer Hardware

3.1.3 Human Resources

It is associated with the manpower required to run and manage the system. People are the end user of specialized information system, the end-user apply information produced for their own purpose. The main purpose of specialized information system is to benefit the end user who may be librarians, library patrons or academician. People are responsible to develop and operate information systems. Hence, human resources can be divided into end users and SIS Specialists. The end users are people who use an information system while, SIS Specialist are the developers and operators of information system.

3.1.4 Databases

Data are the raw facts that are unorganized and later processed to generate information. It includes data and software. Software is used for organizing and serving data to the user, managing physical storage of media and virtual resources. Hardware can't function without software. Likewise,

software needs data for processing. Data are managed using database management system. Database must meet the following criteria:

- Comprehensiveness: means that all the data about the subject are actually present in the database.
- Non-redundancy: means that each individual piece of data exists only once in the database.
- Appropriate structure: means that the data are stored in such a way as to minimize the cost of expected processing and storage.

Conclusively, the database of SIS is typically organized into; processed and organized databases and knowledge in a variety of forms such as facts, rules, and case examples about successful practices.

Figure 3: Diagram of Database

3.1.5 Network

Network resources refer to the telecommunication networks like the internet, intranets and extranet which are essential to the successful operation of all types of organizations and their computer based information systems. These resources facilitate the flow of information in the organization. Telecommunications networks consist of computers,

communication processors and other devices interconnected by communications media and controlled by communications software. Networks consists of both the physicals devises such as networks cards, routers, hubs and cables and software such as operating systems, web servers, data servers and application servers. The concept of network resources emphasizes that communications networks are fundamental resources component of all specialized information systems. Finally, it can be said that network resources consist of communications media and network support.

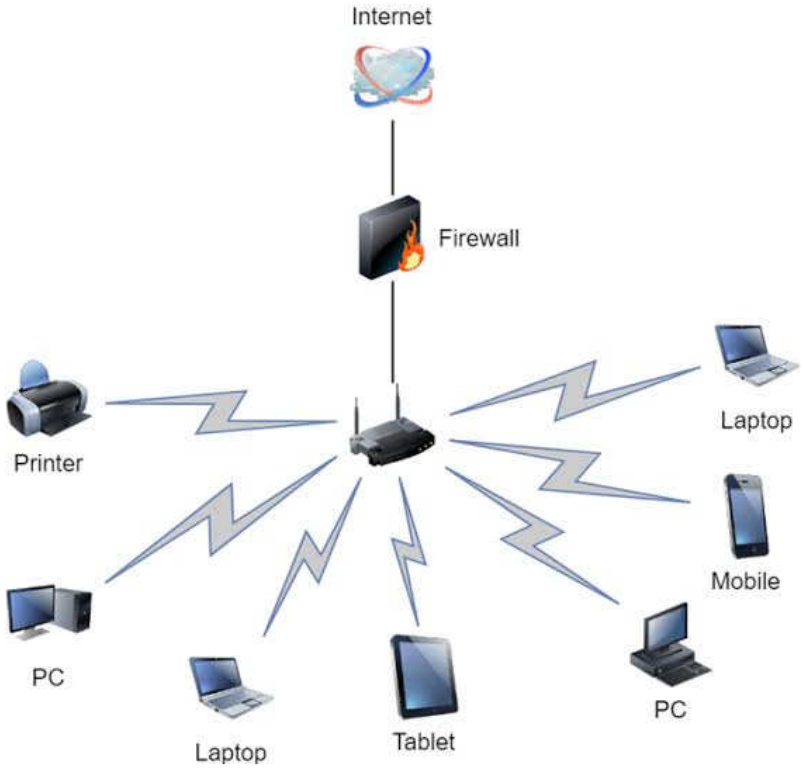


Figure 4: Diagram of a Network System

4.0 CONCLUSION

You have learnt about the components of specialized information system. This component has been well defined and discussed. The different feature of each component was identified. People, organization and technology define the task and pattern of the specialized information system.

5.0 SUMMARY

In this unit, we have discussed specialized information system components, its functions, features and distinguish roles in an organization. To refresh

your memory on what you have learned in this unit, you will recall that there are five key components of specialized information system namely; computer software, computer hardware, human resources, database and networks, each has its function and are integral part of specialized information system structure.

The computer software consists of system software, application software and procedures. Computer hardware consists of both machine and computer systems. It will be important to note that manpower required running and managing the specialized information system are potential human resources. Furthermore, database must meet some criteria which are comprehensiveness, non-redundancy and appropriate structure. An effective network is needed for a specialized information system. It must consist of communication media and network support.

6.0 TUTOR-MARKED ASSIGNMENT

1. List and discuss the component of specialized information system.
2. Identify the three classification of computer software.
3. Explain the criteria of a functional database.

7.0 REFERENCES/FURTHER READING

Components of Information Systems and Practices. Accessed online https://www.google.com/amp/s/www.geeksforgeeks.org/components-of-information-system/amp/

Management Information Systems (MIS) accessed online https://opentextbook.site/informationsystems2019/chapter/chapter-1-what-is-an-inforrmation-systems-introducation

Laudon, K.C., & Laudon, J.P. (2012). *Management Information Systems: Managing the Digital Firm*. (12th ed.). Boston; London: Pearson.

UNIT 3 INFORMATION TECHNOLOGY AND SPECIALIZED INFORMATION SYSTEM

CONTENTS

1.0 INTRODUCTION

In this unit, we will discuss about the interrelationship between information technology and specialized information system and further examine the components of specialization information systems.

2.0 LEARNING OUTCOMES

At the end of your study in this unit, students should be able to identify the links, roles, similarities and differences of Information Technology and specialized information system. Also, students must be able to identify and explain the components of specialized information system which are hardware, software, operation system and databases. Furthermore, the types of databases will be effectively examined.

3.0 MAIN CONTENT

3.1 Information Technology and Specialized Information System

Information technology is broadly defined as the collection of computer systems used by an organization. Information technology, in its narrow definition, refers to the technological side of an information system. It includes the hardware, software, databases, networks, and other electronic devices. It can be viewed as a subsystem of an information system. Sometimes, though, the term information technology is also used interchangeably with information system.

The term IT in its broadest sense is used to describe an organization's collection of specialized information systems, their users, and the management that oversees them. A major role of IT is being a facilitator of organizational activities and processes. That role will become more important as time passes. Therefore, it is necessary that every manager and professional staff member learn about IT not only in his or her specialized field, but also in the entire organization and in inter-organizational settings as well. Obviously, you will be more effective in your chosen career if you understand how successful information systems are built, used, and managed. You also will be more effective if you know how to recognize and avoid unsuccessful systems and failures. Also, in many ways, having a comfort level with information technology will enable you, off the job and in your private life, to take advantage of new IT products and systems as they are developed. (Wouldn't you rather be the one explaining to friends how some new product works, than the one asking about it?) Finally, you should learn about IT because being knowledgeable about information technology can also increase employment opportunities. Even though computerization eliminates some jobs, it also creates many more.

The demand for traditional information technology staff—such as programmers, systems analysts, and designers—is substantial. In addition, many excellent opportunities are appearing in emerging areas such as the Internet and e-commerce, m-commerce, network security, object-oriented programming, telecommunications, multimedia design, and document management.

Information system and information technology are similar in many ways but at the same time they are different. Following are some aspects about specialized information system as well as information technology.

- **Origin:** information systems have been in existence since pre-mechanical era in form of books, drawings etc. however, the origin of information technology is mostly associated with invention of computers.
- **Development:** information systems have undergone great deal of evolution, i.e from manual record keeping to the current cloud storage system. Similarly, information technology is seeing constant changes with evermore faster processor and constantly shrinking size of storage devices.

- **Business application:** businesses have been using information systems for example in form of manual books of accounts to modern TALLY. The mode of communication has also gone under big change, for example from a letter to email. Information technology has helped drive efficiency across organization.

Information technology has shown exponential growth in the last decade, leading to more sophisticated information systems. Today's information technology has tremendously improved quality of life. Modern libraries also called digital libraries has benefited the most with better information system using the latest information technology.

Specialized Information systems have been known to mankind in one form or the other as a resource for decision making. However, with the advent of information technology, information systems have become sophisticated and their usage proliferated across all walks of life. Information technology has helped managed large amount of data into useful and valuable information.

3.1.1 Hardware

They are physical structures that house a computer's processor, memory, storage, communication ports and peripheral devices. Each of these components also called devices have a different purpose, which may be either accepting inputs, storing or sending outputs. For instance, a mouse and a microphone are input devices used to record user activities and transform them into data that is transmitted to the system unit. A hard disk is a storage unit where data is stored and accessed by other devices. Usually, the core components that represent the bare minimum that allows a computer to function are; processor (centre processing unit), motherboard, memory, storage device and power supply unit.

3.1.2 Software

All parts of a computer that are not strictly physical, such as data, programs, applications, protocols, etc, are generally defined as software, however, software has no physical or material form, it is no less critical to receive information, encode, store and process it. Computer software includes all executable and non-executable data, such as documents, digital media, libraries, and online information. A computer works with software programs that are sent to its underlying hardware architecture for reading, interpretation and execution.

3.1.3 Operating System

An operating system (OS), in its most general sense, is software that allows librarians or user of the library to run other applications in a computer device. The operating system manages a computer's software hardware resources, including; input devices such as keyboard and mouse, output devices such as monitors, printers and scanners, network devices such as modems, routers and network connections and lastly, storage devices such as internal and external drives. Operating system also provides services to facilities the efficient execution and management of, and memory allocations for, any additional installed software application programs. Examples of Oss include; android, iOS, Mac OS X, Microsoft windows and Linux.

3.1.4 Database

Libraries must have accurate and reliable data for effective decision making. Generally, the library maintains records on the various facets maintaining relationship among them. Such related data are called a database. A database system is an integrated collection of related files, along with details of the interpretation of the data contained therein. Basically, database system is nothing more than computers based record keeping system i.e a system whose overall purpose is to record and maintain information and data. (Bhojaraju & koganurmath, 2003). Database can be classified into four kinds namely, bibliographic databases, knowledge database, graphic- oriented database and decision making databases.

3.1.4.1 Bibliographic Databases: these are data which is free of format (unformatted data). They are composed of textual data which, by its very nature, displays little or no format. Such databases are often used in library and information system. Here data could be composed of abstracts of books

and such documents with key words and key phrases. Through the abstract, one can determine the document is of interest or not. Bibliographic database contains descriptive information about documents, titles, authors, journal name, volume and number, date, keywords, abstract etc.

3.1.4.2 Knowledge Databases: are used in Artificial intelligence applications. The data contained in these is discrete and formatted. In these there are typically many kinds of data, with only a very few occurrences of each kind. Such as databases having the size of the data is an as large as the definition of the data (Bhojaraju & koganurmath, 2003).

3.1.4.3 Graphic- Oriented Databases: could possibly use in Computer-Aided Design (CAD). The data in such database is characterized as being active. This means that data is a procedure capable of being executed.

3.1.4.4 Decision making Databases: are used in corporate management and allied administrative tasks. Using data contained in these databases, one could handle problem like resource planning in the library, human workforce needs among others. These databases are characterized by the fact and their data contents are formatted, far longer than description and passive. (Bhojaraju & Koganurmath, 2003).

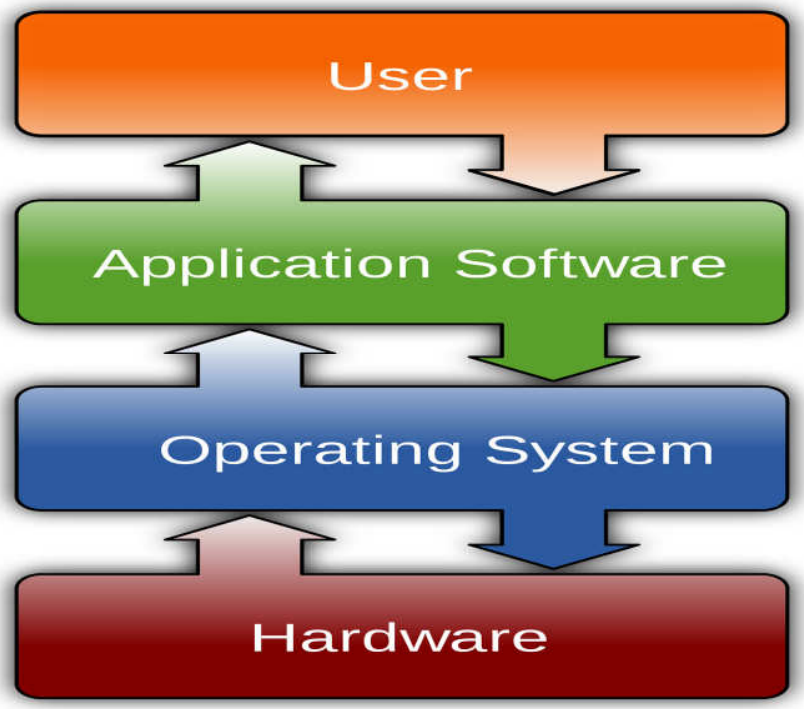


Figure 1: Diagram of an Information System

4.0 CONCLUSION

Information Technology is enabled by computers system. It is viewed as a subsystem of an information system. Sometimes, the term information technology is also used interchangeably with information system. A major role of Information Technology is being a facilitator of organizational activities and processes. Furthermore, information technology is made up of components namely, hardware, software, operating system and databases. The term IT in its broadest sense used to describe an organization's collection of information systems that are specialized for specific purpose, their users, and the management that oversees them. With the advent of information technology, information systems have become sophisticated and their usage proliferated across all works of life.

5.0 SUMMARY

You have learnt in this unit, the inter-relational attributes of information technology and specialized information systems. Recall that the technological side of a specialized information system includes the hardware, software, databases, networks, and other electronic devices. These units also identify some aspects about differs specialized information system as well as information technology.

6.0 TUTOR-MARKED ASSIGNMENT

1. Define Information technology in its narrow definition as related to information system.
2. Identify and explain the components of Information technology and specialization information system.
3. Define the term database and identify the types of databases.
4. Difference Information Systems from Specialized Information Systems.

7.0 REFERENCES/FURTHER READING

Bhojaraju, G., & Koganurmath, M.M. (2003). "Database Management: Concepts and Design". A Conference Proceedings of 24th IASLIC-SIG, December 2003.

Cornford, T. & Shaikh, M. (2013). *Introduction to Information Systems ISI060*. University of London.

Curtis, G. & Cobham D. (2008). *Business Information Systems: Analysis, Design and Practice*. (6th ed.). London: Prentice Hall.

Laudon, K.C. & Laudon, J.P. (2012). *Management Information Systems: Managing the Digital Firm.* (12th ed.). Boston; London: Pearson.

UNIT 4 SPECIALIZED INFORMATION SYSTEM SOFTWARE AND HARDWARE

CONTENTS

1.0 INTRODUCTION

In this unit, two critical components of specialized information system, computer software and hardware will form the basis for discussion in this unit. A more detailed discussion on them will be established.

2.0 LEARNING OUTCOMES

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

- explain the concepts of hardware and software
- enumerate classification of software
- list the functions and types of operating system.

3.0 MAIN CONTENT

3.1 What is Software?

Software is the generic term for all sorts of program that runs on the hardware system. The hardware system on its own is just a bunch of electrical gadgets which at best could deliver a fatal electric shock when powered. It is the software that drives the hardware. The software is

designed to exploit and provide the potential capabilities of the hardware to the intending user. Although software consists of series of instructions, rather than pieces of equipment, it does of course have to be recorded on some physical medium. In principle, the programs could simply be written or printed on pieces of paper. Sometimes this is done; when we can for instance buy books on programs, which we can type into the computer for ourselves. However, for large programs or for programs, which are used frequently, it is more convenient to use a recording medium, which can be read directly by the computer. The most familiar media of this kind are magnetic discs and tapes. Pieces of software, which are used particularly often, may be stored permanently in the computer itself by means of read-only memory.

Software can therefore be embodied in a variety of physical forms, although the software itself consists of a series of instructions rather than physical objects. The tasks that may be performed by software are even more varied.

3.2 Classification of Software

The programs used on a computer can be divided into two main kinds:

i. Systems software/program
ii. Application software/program

Essentially, systems software helps us to run the computer itself, while applications programs tell the computer how to carry out the particular tasks that we want performed e.g. calculate statistics, keep accounts or whatever.

3.2.1 Systems Software

This is the collection of programs that directs the basic functions of the computer in such a way that they are for the most part transparent to the user. They refer to the sets of programs that facilitate the optimal use of the hardware systems and provide suitable environment for the writing, testing, editing, debugging and running of user programs. Usually, all computer systems come with a collection of these suites of programs which are provided by the hardware manufacturer. They permit the programmer to concentrate on writing efficient program to solve problems, without being concerned with such things as the internal memory, selection of memory addresses, control of input and output devices, or error detection.

The major types of systems software are:

- Operating systems (OS)
- Utilities and service programs'
- General purpose subroutines
- Communication monitors
- Data base management systems
- Translators

Operating System (OS): The operating system is the program that controls and monitors execution of all other programs. Without an operating system, constant human intervention is required to enter a program, initiate its execution, and manually record its successful termination. It is an organized collection of programs that acts as an interface between machine hardware and users.

Functions of an Operating System (OS)

- Executes and monitors input and output operation;
- Monitors the status of hardware devices; It assigns priority to the users i.e. jobs award, executions are scheduled according to either a predetermined or a dynamic assignment plans.
- It handles control of multi-programming allowing the process of several jobs at the same time.
- Receive, interpret and executive commands from the human operator i.e. operator communications via the console printer or Visual Display Unit (VDU).
- Control of data transmission between terminals and the computer and computer to computer.
- Controls the database management system.
- Control of assemblers, interpreters, compilers, utility software and sub-routines so that these are immediately available when required.
- Debugging and editing new programs in conjunction with the computer, and passing error messages to the users.
- Dynamic allocation of main and backing storage including virtual storage. Virtual storage operates on the principle of holding programs on disk and transferring segments (pages) of the programs into the main store for execution.
- Allows many terminal users of the computer to use it as though it were at the disposal of each of them exclusively.
- Control of program library.
- Spooling the control of input/output peripheral in order to achieve their best utilization. For example, if the printer is unavailable the

operating system spools the output onto say a margin in disk for subsequent printing.

- Implement the use of passwords.
- Format new discs. Maintain disc directories.
- Execute disc reading and writing operations.
- Diagnose disc errors.
- Execute disc commands relating to the deletion, copying, renaming, dumping of files, etc.
- Report on the status of disc usage and bytes available.

3.3 General Purpose Application Areas

Word processing programs are used for the preparation and editing of text. For instance, these notes were prepared using Microsoft Word. For relatively long documents of this kind, the main advantage of using a word processor rather than an ordinary typewriter is that it is possible to correct or change part of the text without the need to retype the material which is unaltered. It would, for example, be quite easy to add new sentences or paragraphs to these notes, or to remove some of those that are here at the moment. If the notes had been typed on an ordinary typewriter, such changes might mean that the whole thing had to be retyped. However, word processors can also be useful in dealing with shorter documents. For example, many organizations need to send out large numbers of letters which are essentially the same but which differ in their details. A word processing program can substantially reduce the amount of work involved in this task. In addition, other programs, handling such things as mailing lists or the checking of spelling, can sometimes be used in conjunction with word processing programs.

There are in fact two different ways of providing a word processing facility. One way is by the use of a word processing program (such as MS-Word, WordPerfect, WordStar) on a general-purpose computer. This is relatively cheap and has the additional advantage that the computer can be used to do other things when it is not being used for word processing. The other way is by means of a dedicated word processor – a machine that can be used only for word processing.

A word processing system will consist of five unions:

- A keyboard
- A Visual display unit
- A computer processor
- A computer disc storage
- A printer

Advantages of Word Processing

1) **Cost Savings**: The ability to store text and then retrieve and readily amend it means that much operator time should be saved when dealing with such items as standard letters, contracts, etc.

2) **Increased Operator Efficiency:** The fact that word processing systems readily allow for error correction and that most of them are user friendly should result in a greater output per individual operator.

3) **Improved Operator Morale**: The nature of word processors is such that the operator is likely to find the job more satisfying, less tedious and also possibly quieter and neater.

4) **Improved Quality of Output:** The report layout facilities which are feature of most word processing packages should result in better quality output which will both improve the image of the company and also result in more job satisfaction for the operator.

5) **Database programs:** The simplest way of describing what a database program is to say that it is used to organize and process a database, and that a database consists of structured information. It may be more helpful to give a simple example. Suppose that we are carrying out a large-scale survey of, say, the farmers in a particular area. We might collect data on the areas they devote to different crops, the number of workers they employ, the number of information resources acquired periodically, the OPAC used to access the available information resources in the library. There is also what is called the subject and general database. Examples of Subject database used in the library as; ERIC, legal collections, AGRICOLA, computer sources among others. Also, general databases include; JSTOR, Ebsco Discovery Service, Academic search complete and so on. It covers multiple disciplines or a wide range of subjects. It is a helpful start to research as they give information about articles from many disciplines. A database is essentially the computer's equivalent of this set of records cards. The database program helps us to organize and update it and can analyze the data to give us such information as, say, the total number of workers employed by the farmers in our survey. The simplest database programs can handle only one kind of record at a time. More sophisticated programs can handle different but related kinds of records.

6) **Spreadsheet Programs**: These can handle calculations of the kind that might be set out in a two-dimensional table. Examples might include sets of accounts, in which the columns of the table might correspond to particular periods of time and the rows to particular kinds of income and expenditure, or certain kinds of statistical calculations such as regression analysis. A spreadsheet program allows us to set up a table of this kind, specify how rows and columns are related one another, and enter data into the table. Data can be changed, and the resulting changes to other values in the table are calculated automatically. Spreadsheet programs have a wide variety of possible applications. They are particularly useful in planning, where their capacity to recalculate a set of related figures allows us to explore the implications of alternative sets of assumptions relatively easily. Spreadsheets are so large (possibly upward of 250 columns wide by in excess of 1,000,000 rows deep) that it is impossible to view the whole spreadsheet at one time. It is possible to scroll across or up and down the sheet in order to view a different range of cells. It may also be possible to go direct to a particular area of the sheet by setting up a ‗window'. Some integrated software packages currently on the market will also allow for the data contained in the spreadsheet to be displayed in a variety of graphical forms (pie chart, bar chart, line chart etc), and to be linked with database, word processing and communication facilities. Spreadsheets have grown in popularity as a result of their use in micro-computers although software packages are also available for mini-computers and mainframes. To work efficiently spreadsheets will require a fairly large internal memory with the systems software being held on disk or ROM chips or possibly a mixture of the two.

7) **Business Graphics**: There are a variety of different kinds of graphics programs available, but business graphics programs are intended for the production of diagrams such as pie charts, histograms and so on. Such diagrams can present data in a way which has a much clearer immediate impact than can be achieved by giving the same information in the form of a series of numbers. At one time the only way in which such diagrams could be produced with microcomputer was to make the diagram out of a series of characters such as letters, but in the last 15 years or so a number of programs have appeared which can produce much better quality graphics. The quality of the results that graphics programs can produce is very dependent on the details of the hardware used. The computer itself, the monitor and the printer all play an important role in determining the visual quality of the output. In considering the

purchase of a business graphics package it is also important to take account of how easily data can be transferred between the graphics programs and any other programs which you are likely to use to handle the same data.

8) **Library Signage and Information Graphic**: this are media used to educate the library user, they derive their importance and usefulness from the needs that users experience as they search for information. Signage and information graphics include and are not limited to signs that identify individual areas and rooms, as well as signs that identify the objects and applications found in these rooms. (Onwuchekwa, 2020). There are a variety of functions to what information the signage's can communicate to the library users. For instances, an informational signage need not only tell users about things that they are seeking information on but can also tell them things they may have never known about. Library digital signage is also the perfect tool to answer frequently asked questions, how-to inquires and even display upcoming events and highlight new library services. Library signage is also there to help users to use the library, which could be anything from assisting a user in navigating the library collection, to explaining how to use a self-check loans machine. According to Serfass (2012), library signage serves two broad purposes: "information library users and trying to influence their behavior". It is important to help users to feel comfortable and confident in using the library to achieve this. Librarians should be encouraged to undertake responsibilities around designed signage, brochures, and information handouts, web pages promotional and instructional documents every day as part of their jobs. (Onwuchekwa, 2020).

Figure 2: Diagram of Library Signage

3.4 Computer Hardware

Computer hardware refers to the physical devices such as servers, desktop computers, laptops, portable devices, networking devices, storage devices and printers, etc. Let's now look at each of these elements separately.

- **Servers:** A server is a computer with high computing power and storage space that is used to host shared resources. The server can be used as a database server that stores all of the business transaction. An email server could be used for all emails of the company. A file share could be used for storing the individual files of the organization employees, etc.

- **Desktop computers:** These are workstation clients that usually connect to the server to post, process, and retrieve information e.g., a point-of-sale system installed on a desktop computer to connect to the POS database on the server to post and retrieve data.

- **Laptops and portable devices:** Laptops have the same computing power as desktop computers but have the advantage of been portable. With the advent of the internet and virtual private networks, employees can travel with their laptops to remote locations and still be able to access the server at the head office. Tablets are much easier to carry compared to laptops, and many organizations have business applications that run from tablets. They are also capable of connecting to the server via the internet.

- **Networking devices**: Networking devices are used to interconnect computing resources so that they can communicate with each other. Common networking devices include networking hubs and switches, Wi-Fi routers, etc. Hubs and switches are used to provide network connectivity via a physical cable, and they are usually used to connect desktop computers. Wi-Fi routers are used to provide wireless networking capabilities. Wi-Fi routers are usually used to connect laptops and mobile devices to the corporate network.

- **Printers**: Printers are used to print hardcopies of reports. They vary depending on the use. Some printers have networking capabilities and can be installed on a network and used by more than one person. This reduces the costs of buying individual printers for each computer. Dot-matrix printers are usually very common with the point of sale and bank tellers for printing receipts, deposit slips, etc.

- **Storage devices:** Storage devices are used to store data. The data could be in the form of documents, audio, video, software installation packages, database backups, etc. The most common storage devices are external discs. Storage devices with networking capabilities also exist that can be used to share files on a network. The IT department usually creates file storage directories according to departments and type of data to be stored.

Computer hardware refers to the physical units or machine, which makes up the computer configuration. The software refers to the programs, which are processed by the hardware. The hardware can be divided into Unit:

- The Central processing Unit (CPU)
- The Peripheral unit or Electrical gadgets

The Central Processing Unit: This is the heart of the computer system; it consists of three hardware sections:

- The main memory of storage section
- The control Unit (CU)
- The Arithmetic and logical unit (ALU)

The main store is also called main memory or immediate access store or internal store or random store. The main store holds the program being executed and the data to be worked upon. Result of processing are also stored here prior to transfer to an output device or auxiliary storage device.

The Control unit is a hardware device, controls and coordinates the other elements of the system as directed by the program in store. It decodes and interprets the instruction and directs their implementation.

The Arithmetic Logic Unit consist of two units; the arithmetic unit which performs arithmetic operation such as addition, subtraction, multiplication, division and the Logic Unit which performs logical operations such as comparison between numbers, shifting values from one area to another.
The peripheral unit: This can be subdivided into 3 units:

- Input Devices
- Output Devices
- Auxiliary Devices

The Input device allows data to be read into the CPU from the outside world by the user. Examples are keyboard devices, mouse, joystick, scanner etc. Output devices: permits results of processing to be transferred from the CPU to the outside world examples are printers, visual Display Unit (VDU), graph plotters etc. The auxiliary storage is also known as backing storage, external store or secondary store. Since the main store is very fast it would be ideal to store programs permanently in it. But because of its high cost, there is need to have slower and less expensive types of storage called auxiliary storage to back up the memory. Data and programs not currently required for processing are held on auxiliary storage devices until they are needed.

4.0 CONCLUSION

You have learnt about the basic and detailed knowledge of computer software and hardware as a key component of specialized information systems. The types and functions of systems were established. Spread sheet, word processing, data bases program, library signage and information graphic were identified as the general application areas. The physical devices such as servers, desktop computers, and laptops, portable devices, networking devices, storage devices and printers were identified as common computer hardware.

5.0 SUMMARY

In this unit, we established that software can be embodied in a variety of physical forms, although the software itself consists of a series of instructions rather than physical objects. However, the tasks that may be performed by software are even more varied. Further, system software,

refer to the sets of programs that facilitate the optimal use of the hardware systems and provide suitable environment for the writing, testing, editing, debugging and running of user programs. Operation system was identified as a key type of system software. It is an organized collection of programs that acts as an interface between machine hardware and users. At a minimum, an implementation of information technology requires computer hardware which is the physical devices such as servers, workstations, printers, etc. The software most used included database servers, email servers, spreadsheet applications, word processors, etc. Local area networks and sometimes wide area networks are used to share resources among users.

6.0 TUTOR-MARKED ASSIGNMENT

1. Discuss the functions of the operating system.
2. Identify the types of system software.
3. Write a detailed note on computer hardware and discuss its role in information system production.
4. Explain the usefulness of Library Signage and Information Graphic to information users.

7.0 REFERENCES/FURTHER READING

Types of Information Systems- Components and Classification of Information Systems. https://www.managementstudyguide.com/types-of-information-systems.htm

Cornford, T. & Shaikh, M. (2013). *Introduction to Information Systems ISI060*. University of London.

Curtis, G. & Cobham D. (2008). *Business Information Systems: Analysis, Design and Practice*. (6th ed.). London: Prentice Hall.

Laudon, K.C, & Laudon, J.P. (2012). Management Information Systems: Managing the Digital Firm. (12th ed.). Boston; London: Pearson.

Onwuchekwa, E.O. (2020). *Library Signage and Information Graphics: A Communication Tool for Library Users. In Tella, A. (Eds.), Handbook of Research on Digital Devices for Inclusivity and Engagement in Libraries* (pp. 231- 237). IGI Global. http://doi:10.4018/978-1-5225-9034-7.ch011.

Pearson Curtis, G. & Cobham D. (2008). Business Information Systems: *Analysis, Design and Practice*. (6th ed.). London: Prentice Hall.

Serfass, M. (2012). The signs they are a-changing': is it time to give your library's signage a makeover? *AALL Spectrum*, 16(9), 5-6.

MODULE 2 DIMENSIONS, TYPES AND CHARACTERISTICS OF SPECIALIZED INFORMATION SYSTEM

UNIT 1 DIMENSIONS OF SPECIALIZED INFORMATION SYSTEM

CONTENTS

1.0 INTRODUCTION

This unit introduces you to the dimensions of specialized information system. It encompasses the broad management and organizational dimension of systems. Organization, management and technology as key dimensions of specialized information system was emphasized in this unit. Finally, the components of each dimension were established in this unit.

2.0 Learning Outcomes

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

- identify the dimensions of specialized information system
- differentiate the characteristics of the dimensions of specialized information systems
- describe the components of each dimension of specialized information systems.

3.0 MAIN CONTENT

3.1 Dimensions of Specialized Information System

To understand specialized information systems, we must understand the broader organization, management and information technology dimensions of systems and their power to provide solutions to challenges and problems in an organization. We refer to this broader understanding of information systems, which encompasses an understanding of the management and organizational dimensions of systems as well as the technical dimensions of systems, as specialized information systems literacy. In other hand, computer literacy focuses primarily on knowledge of information technology. Management information systems try to achieve this broader information system literacy. This type of system deals with behavioral issues as well as technical issues surrounding the development, use and impact of information systems used by managers and employees in an organization. There are three dimensions of specialized information system namely: organizations, technology and management.

Organizations
Key elements of an organization are its people, structure, business processes, politics and culture. Organizations have a structure that is composed of different levels and specialties. Authority and responsibility in an organization are organized as a hierarchy, where higher levels respect to managerial, professional and technical employees. Each organization has a unique culture that has been accepted by most of its members. Parts of an organization's culture can always be found in its specialized information system. Different levels and specialties in an organization create different interests and point of view. Conclusively, information systems are part of organization. Information system will have the standard operating procedure and culture of an organization embedded within them. This involves; functional specialties, business process, culture and political interest groups.

Management
Management's job is to make sense about the situation faced by organization, make decisions, and formulate action plans to solve problems. However, because of an inconstant environment, it is expected that mangers set an organizational strategy to respond to these challenges, by allocating human and financial resources in order to achieve success. This can achieve by exercising responsible leadership. And there is where information system appears. They reflect the hopes, dreams and realities of real-world mangers. Although they also must create new services and occasionally, re-creating the organization.

Mangers perceive business challenges in the environment. Information systems supply tools and information needed by the managers to allocate, coordinate and monitor their work, make decision, create new products and services and make long range strategic decision.

Technology

- Computer hardware: physical equipment used for input, processing and output activities in information systems
- Computer software with detailed preprogrammed instructions that control and coordinate computer hardware components in an information system.
- Data management technology which consists of the software governing by organization of data and physical storage media.
- Networking and telecommunication technology: consisting of both physical devices and software, links the various pieces of hardware and transfers data from one physical location to another e.g networks, internet, intranet, and extranets, worldwide web).

All these technologies, along with the people required to run and manage them, represent sources that can be shared throughout the organization and constitute an organization information technology infrastructure. This IT infrastructure provides platform that system is built on.

4.0 CONCLUSION

Students have learnt about the dimensions of specialized information systems. Organization, management and technology are key three dimensions of specialized information system. Specialized information systems have the standard operating procedure and culture of an organization embedded within them. Furthermore, specialized information systems supply tools and information needed by the managers to allocate, coordinate and monitor their work, make decision, create new products and services and make long range strategic decision. Finally, technology is enabled by computer hardware, computer software, data management and networking and telecommunication technology.

5.0 SUMMARY

In this unit, we discussed the dimensions of specialized information systems. We were able to identify three dimensions namely, organizations, technology and management. The uniqueness of each dimension is as following, specialized information system will have the standard operating procedure and culture of an organization embedded within them. This involves; functional specialties, business process,

culture and political interest groups. Also, Information systems supply tools and information needed by the managers to allocate, coordinate and monitor their work, make decision, create new products and services and make long range strategic decision. Finally, the technology infrastructure provides platform that specialized information system is built on.

6.0 TUTOR-MARKED ASSIGNMENT

1. Identify the dimensions of specialized information systems.
2. Explain the uniqueness of each dimension of specialized information systems with regards to a workplace.

7.0 REFERENCES/FURTHER READING

Davis, G.B. (1974). *Management Information Systems: Conceptual Foundation, Structure and Development*. McGraw-Hill.

Cornford, T. & Shaikh, M. (2013). *Introduction to Information Systems ISI060*. University of London.

Curtis, G. & Cobham D. (2008). *Business Information Systems: Analysis, Design and Practice*. (6th ed.). London: Prentice Hall.

Laudon, J. & Laudon, K. 2007. *Management Information Systems: Managing the Digital Firm* (10th Edition), Prentice Hall.

UNIT 2 TYPES OF SPECIALIZED INFORMATION SYSTEM

CONTENTS

1.0 INTRODUCTION

No single system provides all the information an organization needs. Organizations have many information systems serving different organizational levels and functions. Thus, the typical systems found in organisations are designed to assist workers or managers at each level and in the functions of sales and marketing, manufacturing, accounting, finance, and human resources. In this unit, we describe the specific types of specialized information system that serves each organizational level. We will also look at manual information systems vs. computerized information systems and the Consciousness that information is needed to make decisions by everyone is an organization.

2.0 Learning Outcomes

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

- identify the different types of specialized information systems
- differentiate the roles of each specialized information systems

- list the characteristics of each type of specialized information system
- explain the different distinction between manual information system and computer information system.

3.0 MAIN CONTENT

3.1 Types of Specialized Information Systems

The type of information system that a user uses depends on their level in an organization. This study will discuss three major levels of users in an organization and the type of information system that they use.

3.1.1 Transaction Processing Systems (TPS)

Transaction processing systems serve the operational level of the organization. A transaction processing system is a computerized system that performs and records the daily routine transactions necessary to the conduct of the business. Examples in the library are barcodes on information resources, patrons record keeping, information on book borrowed and returned numbers of patrons that used the library daily, weekly, monthly and yearly. This type of information system is used to record the day-to-day transactions of a business. An example of a Transaction Processing System is a Point of Sale (POS) system. Or an electronic card that gives access to a particular library resources the decision, in that sense, has been programmed. All that must be determined is whether the patrons meet the criteria. Two features of TPS are noteworthy. First, TPS span the boundary between the organisation and its environment. They connect users to the firm's warehouse, resources and management. Secondly, TPS are major producers of information for the other types of systems. Because TPS track relations with the environment, they are the only place where managers can obtain both up-to-the-minute assessments of organisational performance and longterm records of performance. TPS can be viewed as organisational message processing systems (Huber, 1982), informing managers about the status of internal operations and about the firm's relations with the external environment, and supporting other information systems that facilitate management decision making (Culnan, 1989). TPS failure for a few hours can spell the demise of a firm and perhaps other firms linked to it. All organizations have five kinds of TPS, even if the systems are manual. These five kinds of TPS are sales/marketing, manufacturing/production, finance/accounting, human resources, and other types of TPS that are unique to a particular industry. The master file in each of the systems is composed of discrete pieces of information (such as a name, address, or customer number) called data elements. Data are keyed into the system, updating the data

elements. The elements on the master file are combined in different ways to make up reports of interest to management. These TPS can generate other report combinations of existing data elements.

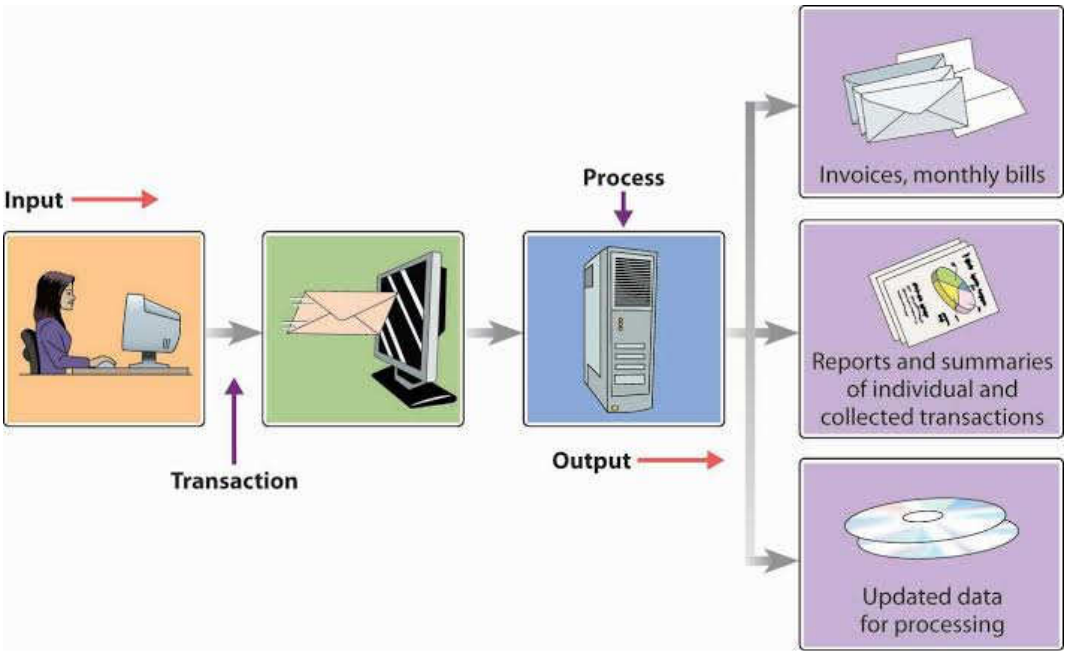


Figure 1: Diagram of Transaction Processing System

3.1.2 Management Information Systems (MIS)

Management information system (MIS) help managers monitor the organization's current performance and predict future performance, so that they can intervene when things are not going well. The system helps management control the organisation. MIS are generally dependent on underlying transaction processing systems (TPS) for their data. MIS summarizes and reports the basic operations of the company, often using data supplied by TPS. The basic transaction data are compressed by summarization and are usually presented in long reports. The reports are usually produced on a regular schedule; they answer structured, routine questions. Also, an example of a circulation system in the library, is the records the movement of information resources such as books and, if the circulation system is linked to the online catalogue, library users can see the status of the item (for example, date due or missing). A typical MIS will transform transaction level data from inventory, production, \ accounting or any other unit into a sample report that might be produced by an MIS system for managers to use. MIS address structured questions that are known well in advance, are generally not flexible, and have little analytical capability. Newer MIS are more flexible and may include software that lets managers structure their own reports and combine data from separate files and TPS. For instance, suppose the librarian in charge of circulation wanted to know if

a particular information resource which could be journals or books is on loan or on the shelve the information system adopted in such library can be used to determine it. An MIS could tell the librarian who or if the library patrons is in possession of a particular library's resources. Management Information Systems are used to guide tactic managers to make semi- structured decisions. The output from the transaction processing system is used as input to the MIS system.

3.1.2.1 Objectives of MIS

The goals of an MIS are to implement the organizational structure and dynamics of the enterprise for the purpose of managing the organization in a better way and capturing the potential of the information system for competitive advantage.

Following are the basic objectives of an MIS –

1. **Capturing Data** − Capturing contextual data, or operational information that will contribute in decision making from various internal and external sources of organization.

2. **Processing Data** − The captured data is processed into information needed for planning, organizing, coordinating, directing and controlling functionalities at strategic, tactical and operational level. Processing data means –

    1. making calculations with the data
    2. sorting data
    3. classifying data and
    4. summarizing data

3. **Information Storage** − Information or processed data need to be stored for future use.

4. **Information Retrieval** − the system should be able to retrieve this information from the storage as and when required by various users.
5.
6. **Information Propagation** − Information or the finished product of the MIS should be circulated to its users periodically using the organizational network.

3.1.2.2 Characteristics of MIS

Following are the characteristics of an MIS −

1. It should be based on a long-term planning.

2. It should provide a holistic view of the dynamics and the structure of the organization.
3. It should work as a complete and comprehensive system covering all interconnecting sub-systems within the organization.
4. It should be planned in a top-down way, as the decision makers or the management should actively take part and provide clear direction at the development stage of the MIS.
5. It should be based on need of strategic, operational and tactical information of managers of an organization.
6. It should also take care of exceptional situations by reporting such situations.
7. It should be able to make forecasts and estimates, and generate advanced information, thus providing a competitive advantage. Decision makers can take actions on the basis of such predictions.
8. It should create linkage between all sub-systems within the organization, so that the decision makers can take the right decision based on an integrated view.
9. It should allow easy flow of information through various sub-systems, thus avoiding redundancy and duplicity of data. It should simplify the operations with as much practicability as possible.
10. Although the MIS is an integrated, complete system, it should be made in such a flexible way that it could be easily split into smaller sub-systems as and when required.
11. A central database is the backbone of a well-built MIS.

3.1.2.3 Characteristics of Computerized MIS

Following are the characteristics of a well-designed computerized MIS –

12. It should be able to process data accurately and with high speed, using various techniques like operations research, simulation, heuristics, etc.
13. It should be able to collect, organize, manipulate, and update large amount of raw data of both related and unrelated nature, coming from various internal and external sources at different periods of time.
14. It should provide real time information on on-going events without any delay.
15. It should support various output formats and follow latest rules and regulations in practice.
16. It should provide organized and relevant information for all levels of management: strategic, operational, and tactical.
17. It should aim at extreme flexibility in data storage and retrieval.

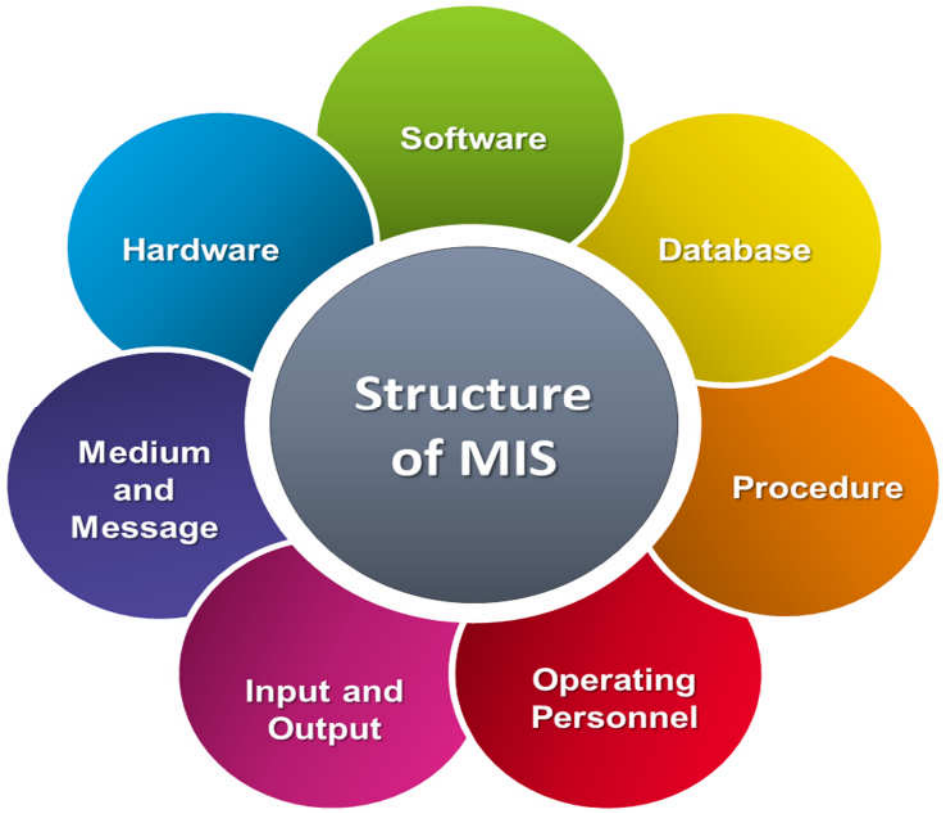


Figure 2: Diagram of Management Information System

3.1.3 Decision Support Systems (DSS)

Any system that supports a decision is a decision support system. Nonetheless, systems support decisions in a vastly different way, and there is a class of systems that supports decisions in a unique way. DSS are quick-hit, interactive, model-oriented, and action-oriented, whereas MIS systems tend to be ponderous, batch-oriented, and data-oriented (Sprague and Carlson 1982; Keen 1985). DSS have to be responsive enough to run several times a day in order to correspond to changing conditions. DSS have a different set of users from MIS. DSS are used by managers and also by the vast army of knowledge workers, analysts, and professionals whose primary job is handling information and making decisions. Clearly by design, DSS have more analytical power than other systems; they are built explicitly with a variety of models to analyze data. The database is important as well, but the emphasis is on analysis. Second, DSS are designed so that users can work with them directly; these systems explicitly include user- friendly software. This follows both from their purpose (to inform personal decision making by key actors) and from the method of design. Third, these systems are interactive; the user can change assumptions and include new data. Decision support systems are used by top level managers to make semi structured decisions. The output from the Management Information

System is used as input to the decision support system. DSS systems also get data input from external sources such as current market forces, competition, etc.

3.1.3.1 Characteristics of a DSS

- Support for decision-makers in semi-structured and unstructured problems.
- Support for managers at various managerial levels, ranging from top executive to line managers.
- Support for individuals and groups. Less structured problems often require the involvement of several individuals from different departments and organization level.
- Support for interdependent or sequential decisions.
- Support for intelligence, design, choice, and implementation.
- Support for variety of decision processes and styles.
- DSSs are adaptive over time.

3.1.3.2 Benefits of DSS

- Improves efficiency and speed of decision-making activities.
- Increases the control, competitiveness and capability of futuristic decision-making of the organization.
- Facilitates interpersonal communication.
- Encourages learning or training.
- Since it is mostly used in non-programmed decisions, it reveals new approaches and sets up new evidences for an unusual decision.
- Helps automate managerial processes.

3.1.3.3 Components of a DSS

Following are the components of the Decision Support System –

- **Database Management System (DBMS)** − to solve a problem the necessary data may come from internal or external database. In an organization, internal data are generated by a system such as TPS and MIS. External data come from a variety of sources such as newspapers, online data services, databases (financial, marketing, human resources).

- **Model Management System** − It stores and accesses models that managers use to make decisions. Such models are used for designing manufacturing facility, analyzing the financial health of an organization, forecasting demand of a product or service, etc.

- **Support Tools** − Support tools like online help; pulls down menus, user interfaces, graphical analysis, error correction mechanism, facilitates the user interactions with the system.

3.1.3.4 Classification of DSS

There are several ways to classify DSS. Hoi Apple and Whinstone classifies DSS as follows –

- **Text Oriented DSS** − It contains textually represented information that could have a bearing on decision. It allows documents to be electronically created, revised and viewed as needed.

- **Database Oriented DSS** − Database plays a major role here; it contains organized and highly structured data.

- **Spread sheet Oriented DSS** − It contains information in spread sheets that allows create, view, modify procedural knowledge and also instructs the system to execute self-contained instructions. The most popular tool is Excel and Lotus 1-2-3.

- **Solver Oriented DSS** − It is based on a solver, which is an algorithm or procedure written for performing certain calculations and particular program type.

- **Rules Oriented DSS** − It follows certain procedures adopted as rules.

- **Rules Oriented DSS** − Procedures are adopted in rules oriented DSS. Export system is the example.

- **Compound DSS** − It is built by using two or more of the five structures explained above.

3.1.3.5 Types of DSS

Following are some typical DSS

- **Status Inquiry System** − It helps in taking operational, management level, or middle level management decisions, for example daily schedules of jobs to machines or machines to operators.

- **Data Analysis System** − It needs comparative analysis and makes use of formula or an algorithm, for example cash flow analysis, inventory analysis etc.

- **Information Analysis System** − in this system data is analyzed and the information report is generated. For example, sales analysis, accounts receivable systems, market analysis etc.

- **Accounting System** − It keeps track of accounting and finance related information, for example, final account, accounts receivables, accounts payables, etc. that keep track of the major aspects of the business.

- **Model Based System** − Simulation models or optimization models used for decision-making are used infrequently and creates general guidelines for operation or management.

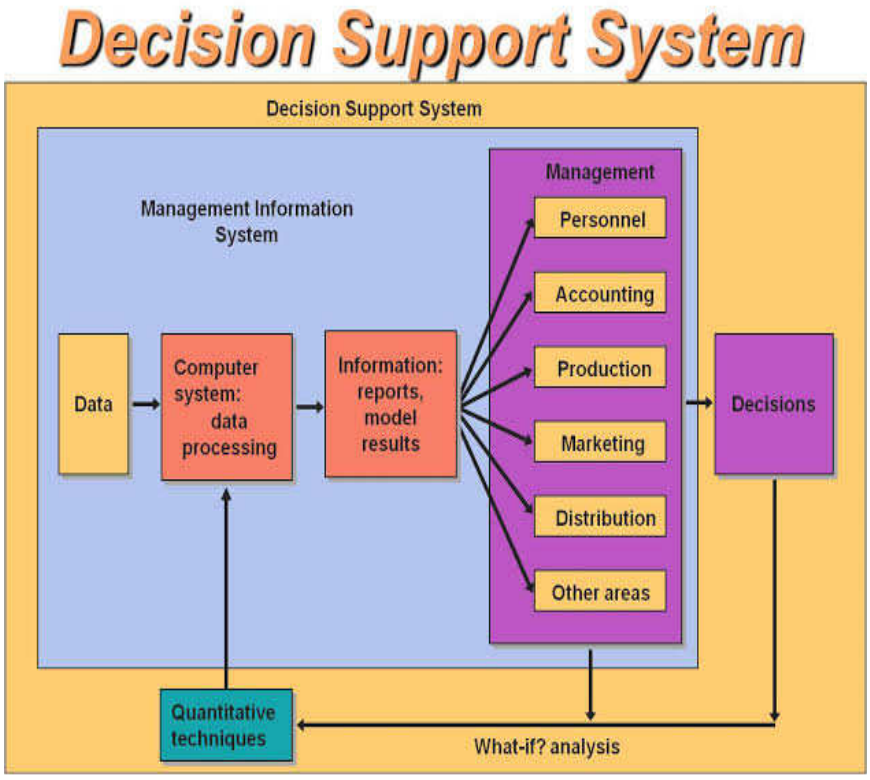


Figure 3: Diagram of a Decision Support System

3.2 Manual Information Systems Vs. Computerized Information Systems (MIS)

Data is the bloodstream of any business entity. Everyone in an organization needs information to make decisions. An information system is an organized way of recording, storing data, and retrieving

information. In this section, we will look at manual information systems vs. computerized information systems.

3.2.1 Manual Information System

A manual information system does not use any computerized devices. The recording, storing and retrieving of data is done manually by the people, who are responsible for the information system. The following are the major components of a manual information system

- **People:** They are the recipients of information system
- **Business Procedures:** These are measures put in place that define the rules for processing data, storing it, analyzing it and producing information
- **Data:** These are the recorded day to day transactions
- **Filing system:** This is an organized way of storing information
- **Reports**: The reports are generated after manually analyzing the data from the filing system and compiling it.

3.2.2 Advantages and Disadvantages of a Manual Information System

Advantages:

The following are the advantages of manual information systems

- **Cost effective:** it is cheaper compared to a computerized system because there is no need to purchase expensive equipment such as servers, workstations, printers, etc.
- **Flexible:** evolving business requirements can easily be implemented into the business procedures and implemented immediately Disadvantages: The following are some of the disadvantages of a manual information system

Disadvantages

- **Time consuming:** All data entries need to be verified before filing, this is a time-consuming task when done by humans. Retrieving data from the filing system also takes a considerable amount of time
- **Prone to error:** The accuracy of the data when verified and validated by human beings is more prone to errors compared to verification and validation done by computerized systems.
- **Lack of security:** The security of manual systems is implemented by restricting access to the file room. Experience shows unauthorized people can easily gain access to the filing room

- **Duplication of data:** Most departments in an organization need to have access to the same data. In a manual system, it is common to duplicate this data to make it easy to accessible to all authorized users. The challenge comes in when the same data needs to be updated
- **Data inconsistency:** Due to the duplication of data, it is very common to update data in one file and not update the other files. This leads to data inconsistency
- **Lack of backups:** If the file gets lost or mishandled; the chances of recovering the data are almost zero.

3.2.3 Computerized Information System

Computerized systems were developed to address the challenges of manual information systems. The major difference between a manual and computerized information system is a computerized system uses a combination of software and hardware to record, store, analyze and retrieve information.

3.2.4 Advantages and Disadvantages of a Computerized Information System

The following are some of the advantages and disadvantages of a computerized information system.

Advantages: The following are the advantages of computerized information systems

- **Fast data processing and information retrieval:** this is one of the major advantages of computerized information system. It processes data and retrieves information at a faster rate. This leads to improved client/customer service.

- **Improved data accuracy:** it is easy to implement data validation and verification checks in a computerized system compared to a manual system.

- **Improved security:** in addition to restricting access to the database server, the computerized information system can implement other security controls such as user's authentication, biometric authentication systems, access rights control, etc.

- **Reduced data duplication:** database systems are designed in such a way that minimized duplication of data. This means updating data in one department automatically makes it available to the other departments.

- **Improved backup systems:** with modern day technology, backups can be stored in the cloud which makes it easy to recover the data if something happened to the hardware and software used to store the data.

- **Easy access to information:** most business executives need to travel and still be able to make a decision based on the information. The web and Mobile technologies make accessing data from anywhere possible.

Disadvantages:

- **It is expensive to set up and configure:** the organisation has to buy hardware and the required software to run the information system. In addition to that, business procedures will need to be revised, and the staff will need to be trained on how to use the computerized information system.

- **Heavy reliance on technology:** if something happens to the hardware or software that makes it stop functioning, then the information cannot be accessed until the required hardware or software has been replaced.

- **Risk of fraud:** if proper controls and checks are not in place, an intruder can post unauthorized transactions such as an invoice for goods that were never delivered, etc.

4.0 CONCLUSION

No single system provides all the information an organization needs. Organizations have many information systems serving different organizational levels and functions. Thus, the typical systems found in organisations are designed to assist workers or managers at each level and in the functions of sales and marketing, manufacturing, accounting, finance, and human resources. In this unit, we describe the specific categories of systems serving each organizational level.

5.0 SUMMARY

- MIS is the acronym for Management Information System. It is a collection of people, procedures, data, and information technology that aids managers to make informed decisions.
- Computerized information systems are more efficient compared to manual information systems. Manual information systems are cheaper compared to computerized information systems.

- Transaction processing systems (TPS) are by operational staff to record day to day business transactions, and they are used to make structured decisions
- Management Information Systems (MIS) are used by middle-level managers to make semi-structured decisions
- Decision Support Systems are used by top level managers, and they help top level managers to make unstructured decisions.

6.0 TUTOR-MARKED ASSIGNMENT

1. Compare and contrast the three main types of information system in Organizations Why are specialized information systems so essential for running and managing a business today?
2. List and describe six reasons why information systems are so important for business today.

7.0 REFERENCES/FURTHER READING

Laudon, K. C. & Laudon J.P. (2012). Management *Information Systems: Managing the Digital Firm*. (12th ed.). Boston; London:

Cornford, T., & Shaikh, M. (2013). *Introduction to Information Systems ISI060*. University of London.

Curtis, G. & Cobham D. (2008). *Business Information Systems: Analysis, Design and Practice*. (6th ed.). London: Prentice Hall.

MODULE 3 DIGITAL DIVIDE

UNIT 1 DIGITAL DIVIDE

CONTENTS

1.0 INTRODUCTION

This unit introduces the concept of digital divide and various dimensions to it. It further discusses the nature of digital divide in the context of Nigeria libraries. The role of specialized information systems cannot be underestimated in bridging the digital divide in libraries. Access to specialized information systems remains a key factor in bridging the gaps of digital divide in the library. Finally, this unit reflects on some benefits that the library derives from been able to bridge the gap among users in the library in terms of access, skills, use and efficacy of specialized information system in the library.

2.0 LEARNING OUTCOMES

By the end of this unit, students will be able to:

- define the concept of digital divide
- discuss digital divide in the context of libraries in Nigeria
- explain why Nigerian Libraries must adapt to the use of specialized information system and services
- identify measure needed to bridge the divide in libraries
- finally, what are the benefits of bridging the divide in libraries?

3.0 MAIN CONTENT

3.1 Digital Divide

The term digital divide probably has caused more confusion than clarification. According to Gunkel (2003) it is a deeply ambiguous term in the sharp dichotomy it refers to. Van Dijk (2005) has warned against a number of pitfalls of this metaphor. First, the metaphor suggests a simple divide between two clearly divided groups with a yawning gap between them. In fact the divide is more like a spectrum on one side of the people who use computers and the Internet for daily task and the people not using them at all at the other side. Secondly, it suggests that the gap is very difficult to bridge. A third misunderstanding might be the impression that the divide is about absolute inequalities that is between those included and those excluded. In reality most inequalities of the access to digital technology observed are more of a relative kind. A final wrong connotation might be the suggestion that the divide is a static condition while in fact the gaps observed are continually shifting.

The common current opinion among policy makers and the public at large is that the divide is closing between those who do and do not have access to computers, the Internet and other digital media. In some countries, Internet connection rates in households have reached the figure of 90 percent. Computers, mobile telephony, digital televisions and other digital media are becoming cheaper by the day, while their capacity to perform complex tasks increases. These media are introduced on a massive scale and into all aspects of everyday life. Several applications appear so easy to use that basic literacy supposedly is the sole prerequisite for using them. However, simultaneously defining the digital divide in terms of physical access to a technology is considered superficial by digital divide researchers; physical access alone is no longer considered to be the most important factor explaining information superiority observed. The emphasis is shifting to new dimensions that are inequalities of skills and usage.

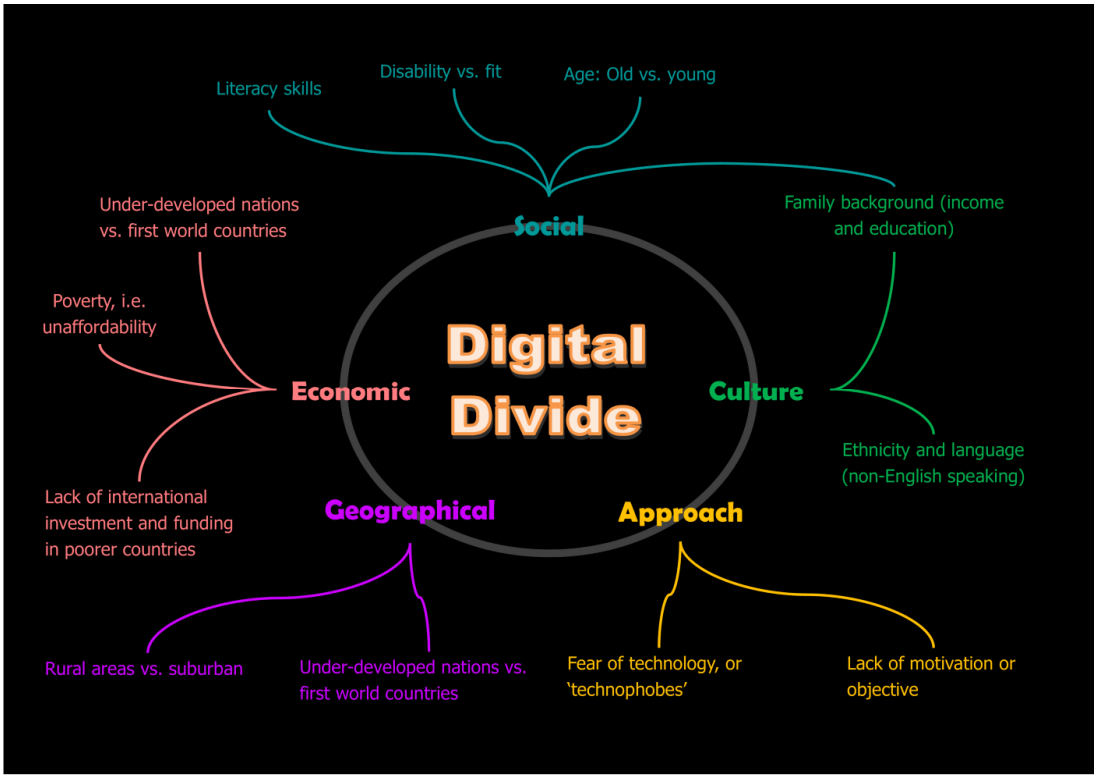


Figure 1: A Diagram of Contribution Factors of Digital Divide

3.2 Digital Divide in Libraries in Nigeria

Nigerian libraries with access and those without access to information technology is actually narrowing, as the "Information Age" continues to expand the horizon through which information services are provided in libraries. This is one of the many challenges confronting Nigerian libraries and librarians as Information Technology sweeps the world. Many Nigerian libraries are now converting the contents of their print resources into electronic databases thus increasing their dependence on technology. Unlike in the past, today, technology has provided opportunity for librarians in Nigeria to know how they can combine computer and communication technologies in the performance of library tasks. This confirms Williams and Sawyer (2003), assertion that, in the era of information technology, "we will have everything connected to everything", which are internet-based remote control devices to regulate our libraries. Technology has brought about a completely different way of providing library services resulting to the development of new services (Gbaje, 2007). The Internet is now the dominant mode of information exchange in libraries in the digital age, then, it is no longer a luxury but, a necessity which Nigerian libraries must accept and adopt to close the digital gap.

The concept of digital divide refers to the widening imbalances of access to ICTs in Nigerian libraries and, is perceived in the light of the following

postulations: There is a gap that exists between traditional and modern methods of processing, storing, analyzing, retrieving, providing and using information in Nigerian libraries. There is inequitable access to ICTs and other Internet-related technologies associated with the provision and use of information services in Nigerian libraries. There are imbalances of access to ICT among Nigerian libraries. And, these imbalances have implications for equitable access to quality information service delivering in Nigerian libraries. Digital divide is a phenomenon that limits the numerous uses, benefits and advantages that ICT brings to Nigerian libraries that are ICT compliant, this shows clearly the distinction between libraries without walls and those with walls, and the degree of effectiveness and efficiency, when ICT is used in the provision of information services and performance of library tasks. That, digital library (e-library) is a library that stored information electronically and made accessible to users through electronic systems and networks, but having no single physical location. It is therefore analogous to a library as a store house of information, but has an existence in virtual reality. Or is a bookless space, facilitating the provision of information resources predominantly by electronic means, including the web, e-mail, fax, and electronic transfer scanned documents across the Internet. In this kind of space, there is wireless access to the library network and the internet provides all the software needed. As services and resources are largely "invisible", students and staff acceptance of such a paradigm shift requires a holistic model of service, which minimizes isolation, encourages interaction and strives to enhance the online environment (Tuomi and Namaala, 2007). Information technology is the acquisition, processing, storage and dissemination of information by means of computers, office machines and telecommunication," (Ehikhamenor, 1993). In other words, computers provide the processing, storage and retrieval capabilities, while telecommunication provides the capabilities for the transfer and or communication of data from one work workstation to another. That, the introduction of modern technologies, particularly information technologies, has had far-reading effects upon organizations such as libraries (Bryson, 1990).

3.3 Nigerian Libraries Must Adapt to The Use of Specialized Information System and Services

Globalization and technological innovations are processes that have created a new global change. A change powered by technology, fueled by information and driven by knowledge. The emergence of this change has serious implication for the nature and purpose of educational institutions (Tinio,2002). ICT is a force that has changed many aspects of the way we live and do things. If one compares such fields as medicine, tourism, travel, business, law, banking, engineering and architecture, the impact of ICT across the past two or three decades has been enormous.

The way these fields operate today is vastly different from the ways they operated in the past (Oliver, 2002). The rapid breakthrough in new information and communication technologies will further change the way knowledge is developed, acquired and delivered (Mlitwa, 2007) Advances in ICT and globalization have enabled resource sharing and exchange of information for various purposes worldwide. This development has placed libraries in most advantageous position that will enable them to serve the information needs of the global village. This brings into focus the concept of digitization as a means of globalization. However, it has become necessary for Nigerian libraries to make their intellectual collections available for global access via the internet in order to fit into the new direction. Nigerian libraries need to digitize their scholarly and literacy materials for online access. According toIkpahindi (2007), libraries are duty bound to acquire, preserve and disseminate information from whatever source. Hence, there is need for such sources of information to be kept, preserved and made available in a more convenient and accessible format. Over the years Nigerian libraries have been burdened with the problems of space, accessibility and preservation. The changing trend in the digital age has made it imperative for Nigerian libraries now to develop ways on how to manage access to materials available in electronic format and effectively share them, since the digital age has provided a platform on which they have to share their resources in the 21st century. ICTs have offered Nigerian libraries more efficient ways of acquiring, organizing, storing and disseminating or transmitting, information. New information technologies which are integral components in the shaping of information systems have the potential of changing the status quo of libraries (Mosuro, 2000). In recent times, the traditional methods of providing information services are changing, and also, the performance of library tasks is undergoing a major change process Libraries are thus being transformed from book centered to information centered institutions, and emphasis is shifting form book collection and storage to access and provision of electronic information services (Atinmo, 2000). In the great ancient libraries of Egypt and Mesopotamia which date back to about 3000 B.C., information resources of that period underwent a series of developments in their storage methods. From that time to this present decade in library history, technology has impacted greatly on the operations of libraries in the provision of information services. This is evident in the continued transition of these information storage devices from papyrus and clay tablets to the present-day books along with other forms of electronic storage media, such as magnetic disks, magnetic tapes, microforms, CD-ROM, and so on (Ochogwu,1984) The information technologies found in Nigerian libraries today is a combination of computers, storage media and telecommunications. In other words, computers provide the processing, storage and retrieval capabilities of information in the library, while telecommunication provides the capabilities for the transfer and or

communication of data (information) from one workstation to another in the library. (Ajibero, 2002). Today, circumstances have change in Nigerian libraries as information delivery processes have been enhanced through the use of improved ICT system. Mwamba (2002) also reports that, libraries have now been found to shift their focus of operation from library-centered to information-centered, from the library as an institution to the library as an information provider, and to the librarian as skilled information specialist functioning in all-related information environment, from using new technology for the automation of library functions to using technology for the enhancement of information access and delivery not physically contained within the four walls of the library, and from library networking for information provision to area networking for all types of information resources providers. Olanlokun (2003), opined that, at forty, Nigerian libraries have come of age, and the relevance of libraries are becoming increasingly clear at the dawn of the information age to perceptive elites. Undoubtedly, the changing trend inherent in the digital age is impacting positively on all facets of library and information services, and the Nigerian community is now aware of the role which the library can play in the information superhighway.

3.4 Measures Needed to Bridge the Divide in Nigerian Libraries

The world over, one of the common barriers to the use of ICTs in the digital age is associated with information literacy. Information literacy is an art that extends from knowing how to use computers and access information to critical reflection on the nature of information itself, its technical infrastructure and its social, culture, and philosophical context and impact (Shapiro and Hughes, 1996). To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information (The American Library Association's Presidential Committee on Information Literacy, 1989). The digital age is characterized with enormous challenges as new innovations in ICTs are emerging. The skills to find, locate and use information from print sources, computer and other storage media are to be acquired. To acquire these skills, Nigerian librarians need education which is ICT-based. This type of education will assist them to Articulate reasons why their libraries must digitized their library materials and work strictly on a preferred digitizing policy that will define the purpose and process of digitizing their library materials, identify what materials to digitize, determine priorities for digitization, access human resources to be involved in the digitization exercise, identify users to benefit from the digitization effort, choose the hardware and software consideration, determine the beginning and ending date of the digitization process, device access to digitization content, set standards and funding policy (Akintunde, 2007) Acquire

broad-based education that will assist them to confidently demonstrate their information literacy competence through which they can communicate their ideas in data to the word of scholarship. Stimulate their interest positively and sustain their awareness of their expected roles as information professionals in the digital era. Generate in them a great deal of thought to the onerous tasks of developing library collections that will be technologically driven. See the need to use the vast materials that abound as information resources in the cyberspace and the libraries. In this era of ICT, Nigerian librarians who are not information literate as Henriatta (2005), rightly pointed out, are potential national risks because they ceased to be information literate professionals in the digital age. A development that makes the widening digital gap parallel to the digital divide.

Additional strategies apart from education required to be advanced by all stakeholders, including governments include; Putting in place continuous training programmes in ICTs for the benefit of all; Enabling access by all people to information through use of ICTs;- Developing human capacity to exploit the benefits of ICTs.- Building of public awareness on the capabilities of ICTs.- Enhancing universal access through deployment of affordable ICTs.- Improvement of connectivity in libraries- Providing technical assistance and support to ICTs and making available appropriate electric power sources. (Mutula and Mutula, 2007)- Every space, such as schools, libraries, and community centres should be used as primary location for accessing and teaching computer skills, for both adults and children. And, local content for all media and the creation of awareness about ICTs should be developed to enhance understanding of the use and potential of digital technologies (Mutula, 2008).

3.5 Benefits of Bridging the Divide in Nigerian Libraries

The benefits derived from bridging the digital divide is expected to have positive result on Nigerian libraries. Some of the benefits are as below:

- Traditionally, one of the basic functions of the library according to Odini (1991) is to match the information needs of users with information contents of documents. Proper performance of this function requires the services of library staff, library facilities and equipment. Therefore, ICTs in Nigerian libraries offers quick and easier ways of performing increased workload of library tasks with greater efficiency.

- Enhances adequate ICT for easy accessibility of information needed by patrons in Nigerian libraries.

- Enables major policy roles and strategies to be defined in relation to ICT in Nigeria libraries.

- Concretizes the prospects and hope for information users as Nigerian libraries are now involved in resource sharing enabled by ICT.

- Enables Nigerian libraries (especially universities) to fully adopt the use of ICT in information handling and library activities/services such as indexing cataloguing, reference and information retrieval services, circulation, serial control/management and the provision of other technical services.

- Enables Nigerian libraries to establish positive correlation in the networked world. Will clearly show that in the networked world, the capabilities to access information and adapt it for local problem solving are the real developmental dividends as against information possession (Henriatta, 2005).

- it will clearly show that Nigerian libraries have now been found to shift their focus of operation from library centred to information-centred; form the library as an institution to the library as an information provider, and to the librarian as a skilled information specialist functioning in all-related information environment, form using new technology for the automation of library functions to using technology for the enhancement of information access and delivery not physically contained within the four walls of the library and from library networking for information provision to area networking for all types of information resources providers. (Mwamba, 2002).

4.0 CONCLUSION

The common opinion among the public at large is that the divide is closing between those who do and do not have access to information technology enabling devices. Specialized Information systems is now the dominant mode of information exchange in libraries in the digital age, then, it is no longer a luxury but, a necessity which Nigerian libraries must accept and adopt to close the digital gap. Specialized information systems provide the processing, storage and retrieval capabilities of information resources in the library. The introduction of modern technologies, particularly information technologies, has had far-reading effects upon organizations such as libraries. Hence, the library must put in some measures to reduce the gaps among users. The skills to find, locate and use information from print sources, computer and other storage media are to be acquired. Finally, the library can benefit in no small measure for bridging the gap

in the use and acceptance of specialized information systems especially in handling and library activities/services such as indexing cataloguing, reference and information retrieval services, circulation, serial control/management and the provision of other technical services.

5.0 SUMMARY

In this unit, we have discussed the concept of digital divide and its relevance to libraries. Further, how the adaption of specialized information system can used to close the gap of digital divide was extensively discussed in this unit. We were able to identify the benefits of bridging the gap of digital divide among library users.

6.0 TUTOR-MARKED ASSIGNMENT

1. Define the concept of Digital Divide.
2. Explain extensively the state of Digital Divide in Libraries in Nigeria.
3. Identify some measures needed to bridge the divide in libraries.
4. What role does specialized information system play in the concept of digital divide?
5. List two benefits of bridging the divide among users in the library.

7.0 REFERENCES/FURTHER READING

Ajibero, M.I. (2002). Strategies and Tools for Information Services Delivery in the New Millennium" in Compendium of (papers presentation) at the 2000 NLA Annual National Conferences

Atinmo, M.I. (2000). *Role of Library Information Storage and Retrieval Systems in The Information Age in Library Automation for The Information Age* edited by Ajibola, B and Tiamiyu, M. Ibadan, Centre for Leveraging Information Technologies on Libraries and The Library user. p 15.

Gunkel, D.J. (2003). Second Thoughts: Toward a Critique of the Digital Divide. *New Media & Society*. 5(4).

Nkanu, W.O., & Okon, H.I. (2010). Digital Divide: Bridging the Gap through ICT in Nigerian Libraries. *Library Philosophy and Practice*.

Van Dijk, A.G.M. (2005). *The Deepening Divide: Inequality in the Information Society*. Sage Publication, Inc.

William, B.K., & Sawyer, S.C. (2003). *Using Information Technology: A Practical Introduction to Computer and Communication*. New York, McGraw-Hill Companies p. 352.

Shapiro, J. and Hughes, S. (1996). *Information Literacy*. http://em.wikipedia.org.

Tinio, V.L. (2002) *ICT in Education*. http://www.eprimers.orgabdhttp://www.apdipnet

UNIT 2 OVERCOMING DIGITAL DIVIDES AMONG USERS OF SPECIALIZED INFORMATION SYSTEM

CONTENTS

1.0 INTRODUCTION

In the previous study on digital divide students were expose to the fact that digital divide influences the user's ability to function maximally with specialized information system. The critical question that should be asked is how the issues of divide among users of specialized information system can be addressed. This unit will introduce students on measures to be applied to overcome divide among users of specialized information systems.

2.0 LEARNING OUTCOMES

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

- explain how to address the issues of divides among users of specialized information systems
- establish how policy making is a key factor to digital divide among users of specialized information systems.

3.0 MAIN CONTENT

3.1 Overcoming Digital Divides Among Users of Specialized Information System

Policy making is considered instrumental for closing the digital gap. In general, policy initiatives can include subsidies targeting specific digitally disadvantaged segments as for instance rural populations (Talukdar and Gauri, 2011). For instance, governments can apply strong intervention policies to provide equitable ICT access also in rural areas. Furthermore,

digital divides may be addressed at scale by crafting policies to equip underprivileged groups with better communication skills (reading, writing and software use) enabling meaningful engagement with digital platforms. Government policy makers can collaborate with schools to support students from low-income households through the provision of home computers aiming to reduce the effect of socio-economic inequalities among students. Policies raising the priority of IT, protecting property rights, and enhancing freedom of the press and openness, can help to stimulate educational advances, labour force participation and income growth, all of which contribute to advancing technology use. Policy measures should allow room for local adaptations, as contextual and local elements seem to play a role for technology users and could influence policy success. Effective evaluation mechanisms make it easier to develop new policies addressing digital divides helping policy makers to refine initiatives targeting certain segments of society, such as elderly people, and socio-economically disadvantaged groups (Hsieh et al, 2011). Contemporary workplaces can help by taking greater responsibility for IT education of their employees even when they are close to retirement. Developing digital skills of seniors while they are still employed is important for preventing digital exclusion after retirement (Rockmann et al. 2018). Overall, employment has a pivotal role in explaining citizen usage of e-government initiatives. As an employee, an individual may have access to the internet at the place of employment. Furthermore, employment demands may increase the confidence of an individual in performing new tasks. Thinking beyond workplaces, policies that leverage existing communities, social structures, and local actors can also help in reducing digital inequalities. Such policies can stimulate public/private partnerships with grassroots organizations that already have “hooks” in local communities. Moreover, long term government policies could set a goal of encouraging growth in social capital within communities.

Proper training and education can mitigate digital inequalities. For instance, platform operators can provide coaching services for underprivileged populations. Furthermore, information campaigns also have a significant role to play, digital divides may be narrowed. If vendors engage in trust-building campaigns integrating digital education into curricula can also contribute to reducing digital inequalities and education campaigns can stimulate the adoption and usage of ICTs bridging rural-urban digital gaps. Rural communities typically lag in digital skills, and digital literacy training programs can improve digital engagement in rural communities. Digital literacy programs targeting senior citizens can help them develop the necessary skills and abilities to use digital mobile devices so that they could be part of the digital society. Educational efforts for the elderly must be practically oriented in order to show directly what is to be gained by becoming more digital compliant individuals. In

addition, social networks, friends and family are important for supporting the training of disadvantaged people in technologies; family emotional and cognitive support can increase users' digital capabilities, reduce computer anxiety and increase trust and motivation for learning (Xiong&Zuo, 2019).

The design and development of ICT and specialized information systems should take into account individual differences for creating proper stimuli to different user groups. This specialized information system can be improved by making them more engaging, interactive, and personal to address a particular work space norms and values. This makes the role of appropriate design for overcoming the digital divide a center of attention. There is a potential to shift older individuals towards a more active engagement with digital media by ensuring ease of use in the design of digital services. Furthermore, the needs of groups with disabilities ought to be taken into account when designing information systems for the general public. It is important to integrate assistive functionalities in specialized information system to emphasize authentic inclusiveness.

4.0 CONCLUSION

In overcoming the divide and gaps in digital acceptance, use and awareness policy making is considered instrumental. It is essential to target specific digitally disadvantage groups in promotion an all-round effective policy direction. A contextual and local element plays a role for technology users and it influence policy success. Proper training and education can mitigate digital inequalities. The design and development of ICT and specialized information systems should take into account individual differences for creating proper stimuli to different user groups. This specialized information system can be improved by making them more engaging, interactive, and personal to address a particular work space norms and values.

5.0 SUMMARY

In this unit, you have learnt about policy making as a critical factor in overcoming digital divide among users of specialized information systems. This unit re-echo governments as policy makers. Hence, they are to collaborate with key stakeholders on how to effectively implore users' ability to use different information systems. Finally, it should be noted that digital literacy programs targeting at users can help them develop the necessary skills and abilities to use information systems so that they could be part of the digital society.

6.0 TUTOR-MARKED ASSIGNMENT

1. Briefly explain the process of overcoming digital divide among users of specialized information systems.
2. What is the role of training and education in bridging the divide among users?

7.0 REFERENCES/FURTHER READING

Hsieh, J.P.A., Rai, A. & Keil, M. (2011). Addressing Digital Inequality for The Socioeconomically Disadvantaged Through Government Initiatives: Forms of Capital That Affect ICT Utilization. *Information Systems Research, 22*(2), 233-253.

Mansell, R. (2002). From Digital Divides to Digital Entitlements in Knowledge Societies. *Current Sociology*, 50(3), 407-426.

Talukdar, D., & Gauri, D.K. (2011). Home Internet Access and Usage in the USA: Trends in the Socio-Economic Digital Divide. *Communication of the Association for Information Systems 28*(1): 85-98.

Van Deursen, A. J. A. M. & Van Dijk, J. A. G. M. (2014). The Digital Divide Shifts to Differences in Usage. *New Media & Society*, 16(3), 507-526.

UNIT 3 DIFFERENT USERS OF SPECIALIZED INFORMATION SYSTEM AND SERVICE

CONTENTS

1.0 INTRODUCTION

In the previous unit, you learnt the measures that can be used to overcome the issues of digital divide among users of information systems. It is therefore important to identify the various groups of users of specialized systems so as to understand each group uniqueness and features. The peculiarity of each group of users will help understand the kind of service that they need and use.

2.0 LEARNING OUTCOMES

This unit is intended to enable students identify the different groups that use the specialized information system and services. At the end of this unit, you would be expected to recognize the nature and pattern of service needed by each group of users. Further, you will be able to understand what information system services preferred by each users group.

3.0 MAIN CONTENT

3.1 Elder Population

Although digital technologies have been around for several decades, some of the elderly members of society have difficulties familiarizing with and adopting digital tools and services. Nevertheless, although a decade ago age-related underutilization of IT was significant (Niehaves and Plattfaut, 2010), over the years, information and communication technologies (ICTs) have been gradually better integrated in the lives of elderly adults. A recent study on the digital divide related to mobile phone use among old adults in UK found that more than 70% have adopted smart phones

(Choudrie et al. 2018). Specifically, research finding indicate that older adults frequently use internet related smart phone features such as emailing and browsing although only very few use smart phones to access public services. One potential reason for the limited use of specialized web-based services among the elderly despite the wide adoption of smart phones, is that their former workplaces may have been characterized by low IT intensity causing a lower exploratory IT behavior when seniors are retiring used the unified theory of acceptance and use of technology (UTAUT) and the model of adoption of technology in households to explain internet acceptance and usage by the elderly. Performance expectancy was found to be the main use driver among senior citizens. These models were able to predict how the elderly could be encouraged to learn to use digital technologies.

When asked, the elderly themselves identified several key impeding factors for their digital involvement: fear and anxiety of using digital technology and services, negative attitude, a sense of feeling too old for learning, lack of knowledge, difficulties understanding digital terminology. Family support is the key for developing mobile internet skill literacy and mobile internet information literacy among older adults. Seniors become better positioned to take advantage of digital resources when they have cognitive and emotional support. Cognitive support from family facilitates learning and digital skills development and also, the development of skills for judging, analyzing and selecting information. Emotional support based on patience, praise, encouragement and comfort can help the elderly avoid computer anxiety and stress. Emotional support is important because unwillingness to adopt advanced digital services by the elderly was found to stem from mistrust, high-risk perceptions, and privacy concerns. Overall, older people are a heterogeneous group, and it is important not to overlook their differences in digital skills and digital practice.

3.1.1 Marginalized Population Group

Language barriers, for instance, in the case of displaced people, immigrants and refugees, and practical resource limitations as in the case of distressed urban areas and remote rural areas can cause social exclusion and hinder the process of digital technologies “assimilation throughout society. Refugees and immigrants realize that technology is helpful for finding new jobs or facilitating social engagement. Digital technologies are of particular valve to refugees for multiple reasons: to participate in an information society; to communicate effectively; to understand a new society; to be socially connected; to express their cultural identities (Diaz Andrade and Doolin, 2016). A study on mobile communications by labour migrants (Aricat, 2015) showed that mobile phones may also facilitate the development of ghettos and the lack of integration in the new

countries by easing communications between the migrants and their countries. The study identified a visible divide in the framing of the prospects and potentialities of mobile phones related to acculturation.
Enhancing the relationship between citizens and government through digital services requires reaching out to individuals and communities on the unfortunate side of the divide. Digital technology access and use in the context of e-government information system which is type of specialized information service is one of the most used services among this group of people. Digital exclusion can result from three intertwined layers: availability (elements of infrastructure and connectivity), adoption and digital engagement (Park et al. 2015). As digital technologies are becoming indispensable for participating in the economy and engaging in society, sustained digital divides amplify marginalization.

3.1.2 General Population

A study by Pick and colleagues (2018) showed the positive influence of managerial/science/arts occupations, innovation, and social capital on the use of digital technologies (Pick et al. 2018). Nevertheless, unreasonably high expectations are found to have a negative impact on ICT acceptance (Ebermann et al 2016). Low levels of education and levels of income below the poverty line still tend to lead to higher proportion of people with no internet access (Davis et al 2020). Even when individuals do have equal access to digital technologies, difference in skills can lead to digital inequalities. Taking a differentiated view on skills is needed to understand technology use and no-use. Physical skills matter, users with disabilities can be digitally disadvantaged and despite the benefits promised by specialized assistive technologies their adoption rate short of expectations. Some groups may be challenged because they are too far embedded in older system, which makes it difficult for them to adopt newer ICTs. Furthermore, digital inequality manifests on the efficacy of using crowd funding platforms, due to a lack of critical mass in the number of potential transaction partners (donors). The results show the importance of looking beyond access or connectivity to investigate efficacy and how it associates with different population segments.

At the country level, a number of studies examined socio-economic influences on access and use of particular forms of technologies, for instance, personal computers and broadband internet. Also, complementarities in the diffusion of PCs leading to narrower digital divides while Education levels and telecommunications infrastructure leading to the widening of the digital divide.

4.0 CONCLUSION

Users are important in the functioning of any specialized information system and services provided. The ability to identify each group's uniqueness will help in reducing the divide among users of information system. In this unit, it was discovered that older adults frequently use internet related smart phone features such as emailing and browsing as the services they enjoy. One potential reason for the limited use of specialized web-based services among the elderly despite the wide adoption of smart phones is that their former workplaces may have been characterized by low IT intensity causing a lower exploratory IT behavior. Furthermore, information system services have been identified to help marginalized groups to integral effectively to their new environment.

5.0 SUMMARY

In this unit you have learnt about the different groups of users that are relevant to overall usage of specialized information systems and service. This unit helps to explore the peculiar services that are used by each group of users.

6.0 TUTOR-MARKED ASSIGNMENT

1. Identify the various groups of users of specialized systems and their uniqueness and features.
2. Briefly explain what services marginalized population group engage specialized information system to do.

7.0 REFERENCES/FURTHER READING

Díaz Andrade, A., & Doolin, B. (2016). Information and Communication Technology and The Social Inclusion of Refugees. *MIS Quarterly, 40*(2), 405-416.

Gell, N. M., Rosenberg, D. E., Demiris, G., LaCroix, A. Z., & Patel, K. V. (2013). Patterns of Technology Use Among Older Adults with and Without Disabilities. *The Gerontologist*, 55(3), 412-421.

Lam, J. C. Y., & Lee, M. K. O. (2006). Digital Inclusiveness: Longitudinal Study of Internet Adoption by Older Adults. *Journal of Management Information Systems, 22(4), 177-206.*

Niehaves, B., & Plattfaut, R. (2014). Internet Adoption by The Elderly: Employing is Technology Acceptance Theories for Understanding the Age-Related Digital Divide. *European Journal of Information Systems, 23*(6), 708-726.

Mansell, R. (2002). From Digital Divides to Digital Entitlements in Knowledge Societies. *Current Sociology*, 50(3), 407-426.

UNIT 4 THE ROLE OF DIGITAL LIBRARIANS IN THE MANAGEMENT OF SPECIALIZED INFORMATION SYSTEM

CONTENTS

1.0 INTRODUCTION

This unit will introduce students to the roles of digital librarians in managing specialized information system. You will understand why librarians are needed in managing digital information system. The competencies and skills required by librarians will further be discussed in this unit.

2.0 LEARNING OUTCOMES

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

- identify the roles of librarians in managing specialized information systems
- the need for digital librarians in the management of digital information system
- the competencies/skills required by librarians in the management of digital information system.

3.0 MAIN CONTENT

3.1 The Role of Digital Librarians in The Management of Specialized Information System

In an era of digital information, electronic technology, WWW's growing popularity and the tremendous growth of CD-ROM products, digital libraries offer a huge range of multimedia information, everything from movies, speeches, images and photos to sounds, text and beyond. The amounts of online, CD-ROMs and other digital sources of information are exploding and infrastructure for accessing material improves almost daily. In building the next generation of digital libraries, multimedia and artificial intelligence will play several important roles. The multimedia nature of digital libraries requires digital librarians for the locating of relevant information efficiently and cost-efficiently and cost-effectively and disseminating it in a wide variety of a format of digital information system (DIS). The advent of digital libraries presents aplethora of challenges and opportunities to the digital librarian. Digital librarians add value and can make digital libraries truly useful and user friendly. A digital librarian, a type of specialist information professional who manages and organizes the digital library, combines the functionality for information, elicitation, planning, data mining, knowledge mining, digital reference services, electronic information services, representation of information, extraction and distribution of information, coordination, searching notably CD-ROMs, online, internet-based WWW, multimedia access and retrieval. The ultimate goal of a DL is to facilitate access to information just in time to the critical wants of end user and additionally to facilitate electronic publishing. The digital librarian plays a distinctive and dynamic role in easy accessing of computer held digital information including abstracts, indexes, full text databases, sound and video recording in the digital formats. For finding the right information at the right time, the research, education and training, learning and development work and disseminating to the user in required format are the basic requirements of DL.

3.1.1 Need for A Digital Librarian in The Management of DIS

Necessity is the mother of invention. The emerging global digital libraries or world-wide digital information centers generate the need for creating a new job-title ‘digital librarian" to manage their digital knowledge resources. The huge digital libraries are emerging as knowledge warehouses. Digital librarians are required to:

- Manage the digital libraries
- Organize digital knowledge and information
- Disseminate digital information from the computer held digital information
- Provide digital reference services and electronic information services
- Provide knowledge mining from the emerging knowledge warehouses
- Handle the tasks of massive digitization, digital storage process and digital preservation
- Provide universal access and retrieval of digital knowledge and ultimately access to all
- Catalogue and classify digital documents and digital knowledge.

3.1.2 The Role of a Digital Librarian in The Management of DIS

Digital information system management refers to the overall competencies (knowledge, know-how, skills and attitudes) necessary to create, store, analyze, organize, retrieve and disseminate digital information (text, images, sounds) in digital libraries or any type of information. To describe the roles of the digital librarian, the following concepts are introduced to understand further.

3.1.2.1 Guardian of Information Super Highway (ISH)

The information super highway is a vision or a metaphor. It envisions a fusion of the two-way wired and wireless capabilities of telephones and networked computers with a cable TV’s capacity to transmit hundreds of programs. Services would be delivered by telecommunications networks, cable TV networks, and the Internet and mobile communications (Williametal, 1995). Infrastructure that provides bandwidth -on-demand and information on demand services are called information super highway. There will be two types of information services such as public (free) services and commercial services. The use of existing telephone, fax, and analogue TV broadcast services will be supported in the initial information super highway. In addition, new services such as video

phone, multimedia electronic messaging, digital TV/HD TV broadcast and movie and video on-demand service will be provided (Lu, 1996).

3.1.2.2 Guardian of the Global Digital Library/ the Universal Digital Library

The digital library is really a transitory phase towards the universal digital library, a vast distributed information and active repository accessible from anywhere with increasing improved indexing, extraction and summarization techniques. It will be a library without walls or national boundaries.

3.1.2.3 Digital Librarian Acts as Symbiotic Human- Machine Guru

The digital librarian acts as an intermediary in the task of massive digitization of information, its storage, dissemination, managing the archive, and making available digitized networked information to the end users. Digital librarians and computers depend on each other for processing and dissemination of digital information and both are inter-related.

3.1.2.4 Navigation, Browsing and Filtering

The navigation of the future would tend to integrate with the human assisted information retrieval from the networked universe and would support rapid information navigation and precision retrieval. The digital librarian is an expert in navigation, browsing and filtering, digital reference services and electronic information services from the digital information sources.

3.1.2.5 Multimedia Search and Indexing

A multimedia digital library requires not just standard indexing and retrieval, but also sub-documents indexing and summarization techniques more than that of paper documents.

3.1.2.6 Knowledge of Data Mining

The digital librarian will require a limited knowledge of data mining and discovery of knowledge from digital libraries to extract unmet information needs of users. For this purpose, unsupervised learning techniques such as clustering, and composite term discovery techniques etc, are useful.

3.1.2.7 Search and Retrieval Co-Ordination

It requires comprehensive knowledge of the retrieval engines and indexing structure so that the digital librarian can achieve the goal of creating information queries with respect to the search system.

3.1.2.8 Digital Librarian's Interface Functions and Roles in the Management of DIS

A fundamental role of a DL in digital libraries is to act as an intermediary who brings together users and information Digital library access tools are the right set of tools used in novel ways to tackle aplethora of challenges and opportunities for information access technology and faster access (Kikuchietal.,1996).

3.1.3 Components of a Digital Information System

The components of a digital library may include:

1. Personal library system for the users;
2. Organizational library system for serving groups of individuals;
3. New users as well as existing local or distant database users;
4. Database servers to handle remote requests; and
5. A variety of system functions to coordinate, manage the entry and retrieval of digital information.

3.1.3.1 Competencies and Skills of a Digital Librarian in The Management of DIS/ Digital Libraries

The competency of a digital librarian is represented by different sets of skills, attitudes and values that enable a digital librarian to work as a digital information professional or digital knowledge worker and digital knowledge communicator (Sreenivasulu,1998). There are skills and competencies that the digital librarian should develop. One is the ability to manage the digital libraries and digital knowledge in terms of digital knowledge management. The following are the skills and competencies required for digital librarian in the management of digital information systems and digital libraries:

1. Internet, WWW:

- navigation, browsing, filtering;
- Retrieving, accessing, digital document analysis;
- Digital reference services, electronic information services;

- Searching network databases in a number of digital sources and Websites;
- Creating home pages, content conversion, downloading techniques;
- Web publishing, electronic publishing;
- Archiving digital documents, locating digital sources;
- Digital preservation and storage;
- Electronic messaging, connectivity skills;
- Web authoring

2. Multimedia, digital technology, digital media processing:

- Multimedia indexing, image processing, object-oriented processing;
- Interactive digital communications and visualization;
- Cataloguing and classification of digital documents, digital content;
- Searching and retrieval of text, images and other multimedia objects;
- Speech recognition, image visualization;
- Advanced processing capabilities exploiting digital medium;
- Conferencing techniques including tele-conferencing, videoconferencing.

3. Digital information system, online, optical information:

- Interfacing online and off-ramps, twists and turns of digital knowledge;
- Development of digital information sources;
- Digitization of print collections;
- Competency to manage CD-ROM network station;
- Development of machine-readable catalogue records;
- Design and development of databases;
- Design and development of software agents for digital libraries;
- Conversion of print media into digital media;
- Knowledge in digital knowledge structures.

There are additional skills that the digital librarian should develop, one is the ability to think in terms of knowledge networks (Owen,1999):

1. Internal networks:

- Personal networks;
- Project teams, competence groups, GroupWare;
- Internal digital knowledge resource;
- Intranets.

2. External networks:

- External knowledge resources;
- External personal networks;
- Customers, suppliers, partners;
- Extranets.

4.0 CONCLUSION

In an era of digital information, the growth and popularity of electronic technology, WWW's, CD-ROM product and digital libraries are offering a huge range of multimedia information, everything from movies, speeches, images and photos to sounds, text and beyond. Hence the importance of managing these various specialized information systems. The roles of digital librarian are limitless in the management process. The digital librarian plays a distinctive and dynamic role in easy accessing of computer-held digital information including abstracts, indexes, full- text databases, sound and video recording in the digital formats. There are skills and competencies that the digital librarian should develop. Critical among them is the ability to manage the digital libraries and digital knowledge in terms of digital knowledge management.

5.0 SUMMARY

In this unit, you have learnt the various roles of librarians in the management of specialized information systems. Also, the need of librarians in managing digital information was adequately established. Competencies and skills were seen as key factors in managing specialized information system.

6.0 TUTOR-MARKED ASSIGNMENT

1. Identify 5 roles of digital librarians in managing a specialized information system.
2. What are the components of digital information system?
3. List the need of digital librarian in managing digital information system.
4. What are the competencies and skills needed in managing digital information system?

7.0 REFERENCES/FURTHER READING

Lu, G. (1996). *Communication and Computing for Distributed Multimedia Systems,* Artech House. Boston, pp.368-71.

Kikuchi, Hideki, *etal.* (1996). “User Interface for a Digital Library to Support Construction of a Virtual Library”, IEEE Proceedings of Multimedia '96.

Madhusudhan, M., & Nagabushnam, V. (2012). Use of Web-Based Library Services in Select University Libraries in India: A study. *International Journal of Library and Information Studies,* 2(1). Retrieved from http://ijlis.org/img/2012_2_issue_1/1_20.pdf.

Owen, J.M. (1999). Knowledge Management and the Information Professional, Information *Services and Use*, Vol.19, pp.7-16.

Sangale, D.B. (2015). ICT Application and Web-Based Services in Library and Information Science. *ASM’s International E-Journal on Ongoing Research in Management and IT*, 9-1.

Sreenivasulu, V. (1998). Computer Information Literacy: Challenges for the Modern Information Professional at the Advent of the XXIst century", Online CDROM Review: *International Journal on Online, Optical, and Networked Information*, 22(6),395-397.

MODULE 4 DIGITALIZATION IN LIBRARIES

UNIT 1 CONCEPT OF DIGITAL LIBRARIES

CONTENTS

1.0 INTRODUCTION

This unit will introduce students to the concept of digital libraries and the importance of information systems in providing different services in the library.

2.0 LEARNING OUTCOMES

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

- define digital libraries
- differentiate digital libraries from the conventional libraries.
- list characteristics of digital libraries
- identify the advantages of digital libraries.

3.0 MAIN CONTENT

3.1 Concept of Digital Libraries

Electronic libraries are another term used to refer to digital libraries where in a sizeable number of geographically distributed users can access the information resources of large and diverse repositories of electronic objects networked text, images, maps, sounds, videos, catalogues of merchandise, scientific, business and government datasets among others which further include hypertext, hypermedia and multimedia compositions (Yerkey and Jorgensin, 1996). A digital library enables information stored primarily in an electronic or digital medium. The digital information collection may include digital books, digital scanned images, graphics, textual and numeric data, digitized films audio-video clips, etc. The primary purpose of digital libraries was to promote scientific and technical research.

The digital libraries federation (2009) defined libraries as:

> "Organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities".

Arms (2000) described them as "managed collection of information, with similar services where the information is stored in digital formats and accessible over a network". A key concept on digital library is that they are managed, not simply a static collection of data. However, they are organized on computers, accessible over a network and employ procedures to select, organize, make available and archive information (Arm 2000). Through digital libraries a digital library service environment is created. In other words, a networked online information space in which users can discover, locate, acquire access to and increasingly, use information. Since the environment where users can access, own and use information is electronic the format of the information is rather insignificant and extends beyond text, including graphic, video, audio, images, data sets, and software.

There are some advantages of digital libraries namely; large amounts of information in digital formats can be consulted, with interaction by multiple users concurrently, updated quickly and available twenty-four hours a day. With the vast capacities and portability of computers and the growth of high-speed networks, digital libraries are becoming commonplace (Wright 2002). Nonetheless, they still require a number of

value-added services such as searching, user profiling, authentication services, and user interfaces. There is some expectation from Patrons on the performance of digital libraries which includes easy to use and reliable in terms of the search results. Even though digital libraries have several advantages, there are also some potential problems. Levy (1997) articulates that reading especially in-depth reading, within digital libraries might be quite different. He noted that intense attention is helped for careful and reflective reading. Although digital libraries can locate and display a great deal of information however, levy argued that the sustained reading needed for reflection and scholarship might be sacrificed.

Information technologies are incorporated into modern-day library service. Bearman (2007) noted that "acquisitions, cataloging, reference, and circulation have changed significantly". In sum up, many academic libraries have become institutional repositories of unique digital data or documents, giving them a particular status and identity and an optional means of controlling and accessing scholarly content irrespective of the involvement of publishers. In summary a digital library may be considered to be any of these according to (William, 1995):

- Machine- readable data files;
- Components of the emerging National Information Infrastructure;
- Various online databases and CD-ROM information products;
- Computer information storage devices on which information resides
- Computerized networked library systems.
- As practitioners today, we find this definition to be the most useful one:

A digital library maintains all, or a significant part, of its collection in computer-processible form as a substitute, supplement, or complement to the conventional printed and microfilm materials that currently control library collections (Williams,1995). The essential characteristics of digital libraries are the storage of information in digital form, direct usage of communication networks for accessing, obtaining information, and copying by either downloading or online/offline printing from a master file. Digital librarians facilitate managing very large amounts of data, preserve unique collections, provide faster access to information, facilitate dealing with data from more than one location, and enhance distributed learning environments. They enable searches that are not automated feasible and offer to protect the content of the owner's information (Husler,1996).

Figure 1: An Image of a Digital Library

4.0 CONCLUSION

Information stored access and managed primarily in an electronic or digital medium are called digital library. This collection may include digital books, digital scanned images, graphics, textual and numeric data, digitized films audio-video clips, etc. digital library is expected to provide access to the digital information collections. Scientific and technical research is enhanced by digital libraries. There are some advantages of digital libraries; large amounts of information in digital formats can be consulted, it can be shared by multiple users, quickly update and availability. The characteristics of digital libraries are huge such as, the storage of information in digital form, direct usage of communication networks for accessing among others.

5.0 SUMMARY

In this unit, we considered different definition of the concept of digital libraries. Hence, we can define digital library as the process of managing collections of information, with related services where the information is stored in digital formats and accessible over a network. Advantages of digital libraries include, large amounts of information in digital formats can be consulted, shared by multiple users concurrently, updated speed and its availability as related to time. This unit also identified the description of digital libraries. Lastly, this unit establishes that digital

library performs searches that are manually not feasible and offer to protect the content of the owner's information.

6.0 TUTOR-MARKED ASSIGNMENT

1. Define digital library according to Arms (2000).
2. Identify some advantages of digital library.
3. William, (1995) assert that a digital library may be considered in some certain ways. Identify 5 ways.
4. What are the characteristics of digital libraries?

7.0 REFERENCES/FURTHER READING

Arms, W.Y. (2000). *Digital Libraries*. MIT Press, Cambridge: MA.

William, B.K. and Saffady, S. (1995). Digital Library Concepts and Technologies for The Management of Collections: An Analysis of Methods and Costs, *Library Technology Reports,* Vol 31(5), 221.

UNIT 2 PRINCIPLES FOR BUILDING A DIGITAL COLLECTION

CONTENTS

1.0 INTRODUCTION

Having gone through the concept of digital libraries, this unit will focus on the principles for developing a digital collection which is critical success factor in the implementation of specialized information system services in the library.

2.0 LEARNING OUTCOMES

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

- examine and comprehend the guiding framework for developing a digital collection that is functional to the information needs of the users.

3.0 MAIN CONTENT

3.1 Principles for Building a Digital Collection

A body in the year 2007 by name National Information Standards Organization (NISO) framework working group, which is under the sponsorship of the institute for museum and library services, formulated guidelines for creating good digital library collections:

A collection was considered “excellent digitally” if such provided proof of concept or resulted in new institutional capabilities even if it significant was short lived or of nominal usefulness to the organization’s users. There are shift toward the creation of useful and relevant collections that served the needs of one or more users as the digital environment being to revolve. The level of usability, accessibility, and fitness for use appropriate to intended user groups was a description of excellence. The revolution of digital collection has matured and

presently in a third stage, where simply serving useful digital collections effectively to a known constituency is not sufficient, issues of cost/value, sustainability, and trust have emerged as critical success criteria for good digital collections. Objects, metadata, and collections must now be viewed not only within the context of the projects that created them but as building blocks that others can reuse, repackage, repurpose and build services upon. "Goodness" now demands interoperability, reusability, persistence, verification, documentation and support for intellectual property rights.

The framework of guidance provides criteria for goodness organized around four core types of entities: collections (organized groups of objects), objects (digital materials), metadata (information about objects and collections), and initiatives (programs or projects to create and manage collections). Below are nine principles for building and developing a digital collection according to National Information Standards Organization, (2007).

Nine Principles for Building a Digital Collection

1. A good digital collection is created according to an explicit collection development policy
2. Collections should be described so that a user can discover characteristics of the collection, including scope, format, restrictions on access, ownership and any information significant for determining the collection's authenticity, integrity and interpretation.
3. A good collection is curated which is to say, its resources are actively managed during their entire life cycle.
4. A good collection is broadly available and avoids unnecessary impediments to use. Collections should be accessible to persons with disabilities, and usable effectively in conjunction with adaptive technologies.
5. A good collection respects intellectual property right
6. A good collection has mechanisms to supply usage data and other data that allow standardized measures of usefulness to be recorded
7. A good collection is interoperable
8. A good collection integrates into the user's own workflow.
9. A good collection is sustainable over time

The guidelines specifically excluded services as a core type on the assumption that if quality collections, objects, and metadata were created, it would be possible to create high-quality services to take advantage of them. Cloonan and Dove (2005) in adapting principles from the twentieth-century library philosopher S.R Ranganathan, suggested five additional laws for digital library service:

1. Make sure online resources are available where and when they are needed
2. Eliminate the obstacles that prevent users from making effective use of electronic resources
3. Integrate electronic resources into virtual learning environments and other web pages of the institution.
4. Provide meta-searching capabilities so that users can search entire sets of electronic resources
5. Offer 24/7 anytime, access to libraries.

4.0 CONCLUSION

There have been constant changes over the years in the development of a functional digital collection. However, as these changes evolve, it is important to understand the pattern of information system and render potential best services to its respective users. Trust has emerged as critical success criteria for good digital collections. There are principles the serve as guidelines for effective development of digital collections. These principles were in support of library philosopher S.R Ranganathan argument of development a digital collection.

5.0 SUMMARY

In this unit, we discussed the National Information Standards Organization (NISO) framework guidelines on developing a digital collection. The increase maturity in the digital environment has helped to shift the focus of digital collection building toward the creation of useful and relevant collections that served the needs of one or more communities of users. This unit identified nine principles of developing a digital collection. Also, five laws for digital library service were also established in line with S.R Ranganathan.

6.0 TUTOR-MARKED ASSIGNMENT

1. Discus the guidelines for creating good digital library collections according to National Information Standards Organization (NISO) framework.
2. Identify the nine principles for building a digital collection.
3. Identify Cloonan and dove (2005) five additional laws for digital library service.

7.0 REFERENCES/FURTHER READING

Cloonan, M.V., & Dove, J.G (2005). Ranganthan Online: Do Digital Libraries Violate the Third Law? *Library journal (*34)2: 67-72

A Framework of Guidance for Building Good Digital Collection, 2nd Edition. National Information Standards Organization (2004).

McCray, A.T., & Gallagher, M.E (2001). Principles for Digital Library Development. *Communication of the ACM* (44) 5:48-54. Doi:10.1145/374308.374339.

UNIT 3 ICT APPLICATION IN THE LIBRARY

CONTENTS

1.0 INTRODUCTION

In this unit we will discuss some information communication technology applications used in the library. This can also be referred to as information system services.

2.0 LEARNING OUTCOMES

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

- identify some ICT applications in the library
- explain its features and function in the library.

3.0 MAIN CONTENT

3.1 ICT Application in The Library

3.1.1 Social Networking: Web 2.0 and Beyond

There has been an evolution of the internet especially in 21st century, an improvement in varieties of applications help in increasing the potential for social interaction and establishment of virtual communities. The internet became a dynamic network where the users contribute to content virtually which transmit to “architecture of participation. The phenomenon is sometimes called web 2.0.

The visibility of social networking site is a distinctive characteristic of Web 2.0, an online platform that enables a user to create a profile/identity and establish a personal network that aids interaction between him and her to other users. Example includes MySpace and Facebook and Linkedin, site that connects business people and

professionals. On these sites, individuals can submit personal profiles, music, videos, and photographs. Other common manifestations of social networks include blogs, wikis and RSS feeds.

A Blogs or weblog can be described as a kind of website that presents its content in continuing series of dated entries. Put simply, a blog is an online diary. Blog enables an individual or group of people to share their perspective on a webpage, authorize others to react and link to other websites. The content can either be reacted to by users or make contributions of their own content and view what other post as well. Libraries have used blogs to communicate news or information to the public making known of new services, new books and AV materials in the library and to motivate discussion, at the same time uphold the library and it services. In addition, blogs can be professional awareness tools and can provide links to reviews, book awards and book discussions.

Wikis, permit any endorsed user to alter and edit web pages and develop new ones with the use of web browser. It is also referred to as a server based collaborative tool. Wiki can be referred to a Web site or the software that runs it. Wikis do not require knowledge of coding or programming languages rather they use a simple text-based markup language that is easy to learn and allow any user attached with Web browser to include new pages, new content in existing pages, or delete information.

Librarians were among the first to make use of wikis from the purpose of information sharing and use. In 2005 a best practice of Wiki was launched wherein resources about technology issues like podcasting, social networking, and IM reference were collected in libraries. Traditional library services like collection maintenance, programming, and reader's advisory were gathered. Identified use of Wikis in the library are numerous which include; enhancing user services by updating a library's web site, serving as a communication tool with the public, linking library resources, developing subject guides, providing library instruction, serving as a resource, developing subject guides, providing library instruction, serving as a resource for best practices, providing information services to patrons, and providing a forum for a book club. Wikis can also serve as a means for internal organizational activities including committee and meeting work, planning activities, and a suggestion box. A particular interesting use of the wiki was in the development of reference tools, the most prominent example being Wikipedia. Underlying the creation of this revolutionary reference work was the belief that the community of users could also be creators and contributors to the content. Rather than relying on a limited number of experts to create the tool, thousands of contributors and reviewers have

collaboratively contributed to this massive, dynamic, ever expanding and changing work that is vetted in large part by the users themselves. Although Wikipedia has been met with skepticism by some librarians, it is likely that many find it a good place for patron to start a basic background research. Additionally, using the citations at the end of Wikipedia articles, Librarians can help patrons locate additional materials and teach them about issues related to accuracy and authority at the same time.

Really Simple Syndication (RSS) is an XML based document format for the syndication of web content so that it can be republished on other sites or downloaded periodically and presented to users. The flow of content from an RSS account is called a "feed" This enables sources online to send information to users promptly once subscription by the user is made to the feed and possesses the essential software. This is a highly valuable medium to maintain current awareness. Users might receive messages about news, events and activities sent to their designated communication devices. Announcement can be made to patrons about upcoming activities, the recent services or newest information resources materials being acquired by the library. The basis of podcasting is the RSS technology. Audio fillies that could be downloaded and played either through a computer or an MP3 player such as an iPod are podcasts. It is the syndication aspect that makes podcast unique. In other words, people no longer have to access the Web each time they want certain information; rather, once they have subscribed to a particular feed, new files are downloaded automatically. Podcasts became quite popular for news updates and music downloads. Obviously, as a current awareness resource for the librarian, podcasting can be used in a variety of ways. Such as training and development for patrons and staff, book reviewing, updates on the library, a source of presentations or lectures and library tours. The library not only becomes a place to access podcasts but can become a content creator. Although it has taken time to embrace the potential of social media, a number of libraries now have MySpace pages and Facebook accounts. They use twitter, post pictures on Flicker and videos on YouTube and host podcasts on their own Web pages. Additionally, a number of academic and public libraries are now offering IM reference services by using services like pidgin that allow patrons to use their own IM chat clients to IM a librarian. Some have even employed Skype to provide virtual service. Web 2.0 is still in its infancy, and its application to libraries will continue to grow. Among the many potential contributions are the following:

1. Providing information literacy through training and education to guarantee safe and effective use of these category of sites.

2. Employing IM Twitter, and other applications for reference and current awareness services for patrons.
3. Creating affinity group wikis on a variety of topics such as e-government or book clubs.
4. As an internal means of communication for staff, librarians and administrators.

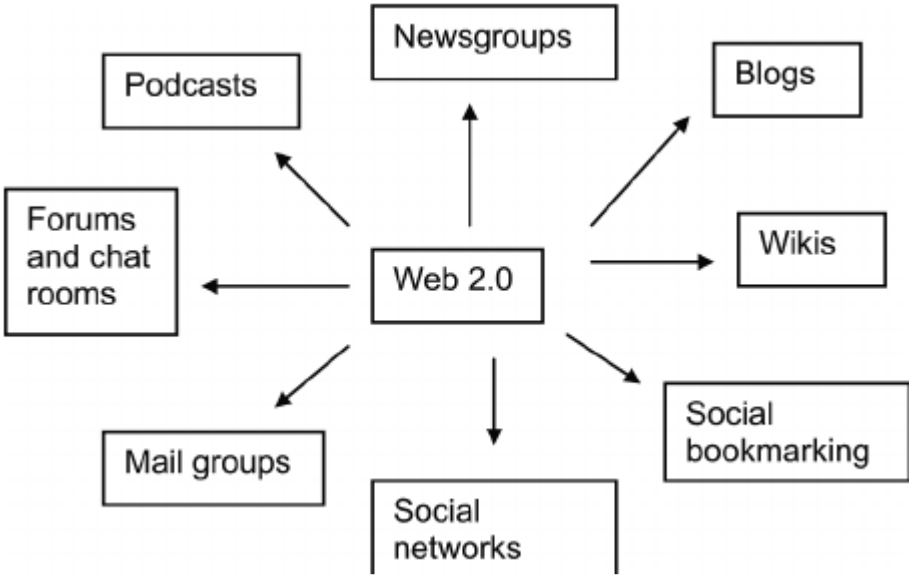


Figure 1: A Description of WEB 2.0

4.0 CONCLUSION

The evolution of internet has brought about social interaction and creation of online communities. The internet has become a dynamic network for users which create architecture of participation. Social networking site enable user to create a profile and develop a personal network that link him or her to other users which is an online place that connects him or her to other users is called web 2.0. Other examples include MySpace and Facebook and LinkedIn. Also, common manifestations of social networks include blogs, wikis and RSS feeds. Through the introduction of Really Simple Syndication, announcement can be sponsor by the library to patrons about upcoming activities, the latest services or newest materials being acquired by the library. It is noteworthy to know that academic and public libraries are now offering IM reference services by using services like pidgin that allow patrons to use their own IM chat clients to IM a librarian. Further, employed is Skype to provide virtual service. Hence, there are a lot of ICT application services that are resourceful for the library.

5.0 SUMMARY

You have learnt about some relevant ICT applications that are real time to the library service. In this unit we identified the internet as the enabler of key ICT applications such as web 2.0, metadata, RSS, Facebook, MySpace, LinkedIn, wikis among others.

6.0 TUTOR-MARKED ASSIGNMENT

1. Identify six ICT application services in the library.
2. Discuss the features of wikis, Really Simple Syndication RSS and a blog.

7.0 REFERENCES/FURTHER READING

Earnshaw, R.A., &Vince, J.A. (2008). *Digital Convergence–Libraries of the Future*. London: Springer.

Kaliammal, A., & Thamaraiselvi, G. (2005). *Role of ICTs in Library and Information Science*. Delhi: Author Press.

Kumar, P. S. G. (2004). *Information Technology: Applications*. Delhi: B. R. Publishing Corporation.

Gefen, D., & Straub, D. W. (2000). The Relative Importance of Perceived Ease of Use in IS Adoption: A Study of e-commerce Adoption. *Journal of the Association for Information Systems, 1*(8), 1-28.

Lim, EP. Chen, H., & Neuhold, E. (2004). *International Journal on Digital Library*. Springer-Verlag.

UNIT 4 IMPACT OF SPECIALIZED INFORMATION SYSTEM ON LIBRARY SERVICES

CONTENTS

1.0 INTRODUCTION

This unit will explain and examine the impact of specialized information system on library services as an organization. The changes in library services enhance by information system acceptance cannot be overemphasized. The library space, services, collections among others are areas which information system has repositioned.

2.0 LEARNING OUTCOMES

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

- identify and explain the impact of specialized information system on the library services.

3.0 MAIN CONTENT

3.1 Impact on The Library as A Place

The physical library has clearly been challenged by the virtual environment. The new technologies have forced a major redesign of library buildings, particularly wiring and placement of electrical outlets and lighting. It can be quite expensive and complicated to make such modifications in buildings that were built some decade ago, and many libraries have made an uneasy accommodation. Other changes are more superficial but nonetheless costly, such as new ergonomically designed furniture to avert potential health concerns associated with using electronic devices for long periods. Electronic information access resolves some of the liabilities of the physical library such as

duplications in collections or unequal access due to economic disparities in certain communities. For others, however, the idea that more and more information can be accessed remotely or provide through telecommunication lines and electronic databases raise apprehensions about the eventual demise of libraries. (Birdsall 1994) suggested that those who envision the end of physical libraries might be thinking more about research and academic libraries than public libraries. The importance of the library as place is integrally bound up in the notion of the library as a central focus of community life. Obtaining information is but one function of a public library, but information technologies might erode other aspect of the library as place.

a. The Impact on Library Services

One of the most profound impacts of technology has been the expansion of libraries' ability to access information remotely and to cooperate with other libraries in an electronic environment. In addition, libraries exploit electronic networking in many other ways including online catalogs, collection development, resource sharing from other libraries, and cooperative reference services. In some cases, these networks have saved money by reducing duplication of materials and human resources. At the same time, they have increased staff such as network liaison and interlibrary loan and document delivery personnel, and created new departments. Some of the major consequences of these developments are:

1. The next generation catalogs

The term catalog is probably no longer accurate for the catalog has become a portal to a universe of information far beyond the walls of the library. The next generation catalog has become a one stop shop for accessing the physical holding of the library, allowing a patron to assess their availability and reserve them, and in some cases, triggering a delivery system. The next generation catalog can also provide access to Web sites selected by the library on topics of special interest, and to specialists in various fields, to interlibrary loan and to reference librarians.

2. Impact on selection and acquisitions

Traditional library collection development has always involved the selection and acquisition of materials through publishers and vendors. Vendors have created new electronic systems that permit librarians to consult tables of contents, access their databases and identify items, read reviews, place orders, and download essential bibliographic material for cataloging purposes. These electronic processes not only streamline acquisition and selection processes but also provide fiscal control and financial reports. In addition, electronic technologies have increased the

number of information resources for selectors that provide advice and information on material selection.

3. Impact on circulation

Radio Frequency Identification (RFID) technology improves security and control of the collection: (RFID) uses the frequency spectrum (e.g radio waves) to transfer data on an item or product that is stored in a small microchip that is usually physically attached to the library resources. RFID tabs are activated by an electronic reader and the transponder on the tag then sends the reader its data (Adam et al 2002). RFID tags are easier to use than barcodes because they don't need to be aligned and can be read from considerable distances. There are two types of RFID tags: active and passive. Passive tags have no power source and on tag transmitter. Despite their usefulness, some have expressed concern that important privacy right could be threatened through the use of RFID.

4. Digital Reference Service

Traditional reference service was synchronous; that is a question was asked and answered at the same time. In a digital environment, reference can be asynchronous, permitting a patron to ask a question at any time and receive an answer later. Digital Reference Service (DRS) is not simply an additional service, it is a transformative activity. In the digital environment, the reference librarian functions more like an information broker than an intermediary who simply places a library user in contact with a resource. The DRS librarian links people to the entire world of information rather than just to items in the local collection. There are a number of challenges in building digital reference collections, including selection, financing, acquiring, licensing and maintaining such collection as well as developing Web techniques and design to present and use digital holdings effectively. Nonetheless, Digital Reference Service (DRS) offers benefits to both the patrons and the library. Patrons benefits by the potential availability of service 24/7 or well beyond typical library hours. DRS increases accessibility for individuals who prefer anonymous communication, who are home bound or who possess disabilities that make travel difficult. Young people who use electronic technologies every day, in particular, find DRS more user friendly as indicated by the fact that student use of the reference desk has been steadily declining. The library benefits by gaining access to experts who are not part of the regular staff or who might be geographically remote.

b. Impact on the library collection

One of the major challenges of new technologies will be the need to redefine the library collection. Traditionally, the collection was the physical objects. Today, vast amounts of information reside in computer databases and ends. How does the library effectively control such a

collection? To what extent can the library apply its traditional notions of selection? If the traditional tools no longer apply, we will need to develop new ones. Similarly, the library has the opportunity not just to offer individual web sites, but to build substantial electronic collections. Kovacs (2000) suggested that e-libraries can save patrons time, create an organized environment of accurate and credible resources and increase access to new users. The potential range of such collection is considerable, including core reference materials as well as collection on business, health, law, social and physical sciences and education. Remote access also creates new issues regarding collection evaluation. It is no longer enough to determine if the local collection is meeting users' needs. Rather, more attention must be paid to whether the library provides adequate access. The question is no longer how many volumes a library has, but how effectively the library can deliver needed resources from a wide variety of sources to users via new technology. Digital collections increase in number, breadth and use, evaluating their effectiveness grows in importance.

4.0 CONCLUSION

The impact of specialized information system on the library services is numerous and has changed the pattern of work and services in the library. This impact is not limited to the library space alone but to the collection, services such as, cataloging, classification, references, and circulation services among others. Electronic information access resolves some of the liabilities of the physical library such as duplications in collections or unequal access due to economic disparities in certain communities.

5.0 SUMMARY

You have learnt about the impact of specialized information system on library services and the importance of this service to the library resources.

6.0 TUTOR-MARKED ASSIGNMENT

1. Identify area in the library that specialized information system has impacted on.
2. Explain the impact of specialized information system on the physical space.

7.0 REFERENCES/FURTHER READING

Cook, A. M., & Polgar, J. M. (2014). *Assistive Technologies: Principles and Practice*. Amsterdam: Elsevier.

Díaz Andrade, A., & Doolin, B. (2016). Information and Communication Technology and The Social Inclusion of Refugees. *MIS Quarterly, 40*(2), 405-416.

Díaz Andrade, A., & Doolin, B. (2018). Temporal Enactment of Resettled Refugees' ICT Mediated Information Practices. *Information Systems Journal* 12(2), 23-30.

Margaret L. Hedstrom. (1997). *Digital Preservation: A Time Bomb for Digital Libraries*", Published in Computers and the Humanities.

UNIT 5 LIBRARY MANAGEMENT INFORMATION SYSTEM

CONTENTS

1.0 INTRODUCTION

This unit introduces students to the concept of library management information system and open source software as a specialized information system in enhancing services in the library. Library Management System supports services such as acquisition, cataloguing, circulation and other sections. The integrated system enables automated system in which all the functional modules share the same bibliographic database.

2.0 LEARNING OUTCOMES

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

- discuss the concepts library management system
- identify the features of library management
- understand the needs of library information system
- examine the selection process of Library management information system
- introduces to the concept of open source software
- list the advantages and the various open source library management software.

3.0 MAIN CONTENT

3.1 Library Management Information System

Library is referred to as the heart of an organization; hence, many organizations have the knowledge of the value of the library to its growth and their interaction with their users which are call patrons. Adamson et al., (2008) emphasized an integrated library system, to be also referred to as a library management system which is an enterprise resource planning system for a library, its function comprises use for tracking library information resources, following through orders made, bills paid, and facilitate users the process of lending services. There has been an extreme growth in the use of libraries in the last decade which has impacted on its processes, such as acquisition, cataloguing, shelving and the general management to an integration of technology. This is one of the reasons Younis (2012) made aware that library users encounter problems when finding, borrowing, localizing, renewing the borrowing, queuing for books. For most of the problems, solutions or ongoing researches are on to solve the problems. The area of integrating topic modeling into library management systems is still short of in-depth research. Liu et. al, (2016) states that topic modeling has been used extensively in the field of computer science with focus on text mining and information retrieval.

The activity in the library such as acquisition, cataloguing, circulation among others is supported by library management system. Various methods of keeping records in the library have existed long before the advent of computer in modern age. The process of shelving plays a key role in keeping records with each shelf labeled in an alphabetical or numerical order, to describe the categories of books available and arranged on different location on the shelves and are recorded by the library and when any information resource is to be referenced the document is being referred to, so as to locate the position of such book by the user that is in need of such resources. Many libraries have adopted the functionality of KOHA. In 2005, the 3.0 was released and the integration of the powerful Zebra indexing engine, KOHA became a viable, scalable solution for libraries of all kinds. LibLime KOHA is built on this foundation. With its advanced feature set of LibLime KOHA is one of the most functionally advanced open source Integrated Library System. One key challenge of Library Management System is that it is a web based which result to be prey to security threat which enables hackers to hack database and access or modify the information of such user. Capital's library software is another Library Management System which benefits aids support available for staff and users of any library service, provides efficiency, innovative system that's saves time and improves the user experience. A library management system usually

comprises a database, software to interact with that database, and two graphical user interfaces comprises a library management system. Most integrated library systems; there is usually a separation of software functions into discrete programs called modules, among most integrated library systems with a unified interface.

Examples of modules might comprise:

i. Acquisitions (ordering, receiving, and invoicing materials)
ii. Cataloguing (classifying and indexing materials)
iii. Circulation (lending materials to patrons and receiving them back)
iv Serials (tracking magazine and newspaper holdings)
v. The OPAC (public interface for users)

Preceding computerization, library tasks were done manually and independently from one another. Materials were ordered with ordering slips, catalogued items were done manually and indexed them with the card cataloguing with books signed out manually with indication of name on cue cards which were then kept at the circulation desk.

The process to automate, manage and look after the overall processing of a library is what is called library management system. The process to continually improve on library management systems, such as application login through smart cards, RFID enabled smart library for cataloguing, circulation of materials, centralized database, user identification through their smart cards, theft detection statistics and reporting web-based module is key to the objective of LMS). More specifically, the aim is to save time and cost by simplifying the library process. There has been a significant change since the inception of ALS. These changes are reflected in the conceptual differences between the ALS and the integrated library system (ILS) (Kinner, 2009). Uzomba, Oyebola and Izuchukwu (2015) observed the importance of integrated systems in library activities such as cataloguing, circulation, acquisition and serials management, etc is no longer contentious as majority of the libraries have realized the need to move from their manual practices into integrated systems and networked operations. An integrated library system is an enterprise resource management system that can continually adapt and fulfill the requirements and needs of patrons. According to Müller (2011), “In choosing ILS software, libraries must base their decision not only on the performance and efficiency of the system, but also on its fundamental flexibility to readily adapt to the future demands and needs of their patrons”.

Figure 1: Cycle of Library Management Information System

3.1.1 Features of Library Management System

A library management system is a system used to access the documents held, orders, payment or lending processed by the clients. Bibliographic database is shared in functional modules which is an automated system that has an integrated system. The following are features of library management system.

i. **Barcode serves as a device in managing book and member records:** With the aid of library Management software, it enables acquisitions of information resources with functions cutting across generating purchase order, terminating Purchase Order, prompt Purchase order, take delivery of Purchase Order, Invoice and instantly available in Reports. Search for items by Purchase Order number, Invoice number, and Supplier details.

ii. **Circulation:** Library Management Software enables an entire management of several Item issue and retrieval of books using Manual or Barcode Scanner.

iii. **Barcode**: Use of Bar Codes for Library Management eases the day to day tasks of Libraries, especially, where there are a huge number of transactions. generation and printing process is a Built-In feature of this Software in the Bar-Code.

iv. **OPAC:** Library management software facilitate admin/Member to easily search book author, Title, Accession No, Publication, and Language with features of filtering data with category wise.

v. **Suggestion of items by users**: User suggestion and request for new acquisition is handled by the software itself reducing the administrator's task.

vi. **Alert through Email**: sending of mail to members, vendors, users or any other people from the software.

vii. **Multiple Library Setup:** multiple setups by Library management software at different locations is enabled.

viii. **Export All Report into Excel, Word:** Details which are displayed in the reports into excel and word file can be cropped by the Admin.

ix. **Handles donated items, free items and keep track of donors:** **Some** library items are free or some person donates the item. So, Library management software keeps track of those items.

x. **Provide Multi User environment:** Library management software gives facility of multi user environment. Multiple users can login at the same time in the library management software.

xi. **Maintain Any Media:** one can define a number of things that one wants to keep track of as well as can maintain different kinds of media like Book, CD, File Documents, Video Cassette, and Audio Cassette. Also, one can maintain media with its own specifications rather than common and define the specification you want for that media, for book (pages, ISDN number, type, volume).

xii. Powerful Search Engine

xiii. **Custom Field Indices:** Library Software provides sorted data on required fields by clicking on the column header that is if clicked on publisher the data will be sorted on publisher.

xiv. **Lock System**: Lock the subject or group of the member, so that media can't be issued which falls under these criteria. One can in this way restrict the issuing of the media.

xv. **Circulation**: Easy operation of circulation by entering the code of media, get all the information related to the media and the number. (Name, group, media type).

xvi. **Easy Navigation and Updating**: Selecting an option from the given menu provide all the data related to that option in tabular format in a user friendly manner.

xvii. **Auto Filter & Auto Search:** On each master form, Library Software will search on the field where your cursor is and what you type is taken as a search value.

xviii. Customize: one can customize the system to feel easier for data entry also while adding records user can keep form in 'add' mode. Define Holidays. And set the criteria of issuing the book if member is requested for media or not.

xix. **Scrap-Type**: Define their own scrap type for scraping the media. Provides scrap runner utility to record the number of scrap media.

3.1.2 Needs for Library Management System

i. Access to accurate information which improves relationship among users.

ii. Elimination of duplication of effort among staff member resulting to increase productivity and job satisfaction

iii. The storing and keeping of information become more economic and safer.

iv. An accurate and faster results from statistical analyses enhances easy access to information

v. Reduces errors and eliminating of ennui of long and repetitive manual processing.

vi. Operations become more accountable and transparent.

vii. Improved efficiency and effectiveness in administration and management as it has unprecedented access to real-time information.

viii. Sensitive and confidential information are more reliable secured

ix. Appropriate knowledge–based action and intervention can now take place in a timelier manner.

3.1.3 Selection of Library Management Software

Selection of library management software (LMS) is not a simple task. Sometimes librarians go with either renowned software or maximum number of usages of the library. There are many LMS, which are very popular and being used by number of libraries. Librarians may have the comprehensive study about them before taking decision in this regard. While examining the software, librarian must have the followings information about the software which might help to select the right software for housekeeping operations as well as information retrieval. Bankar et al (2011).

How it matches the library's requirements:

- Product quality
- Features and functions
- Staff training and support service
- Operating system
- Hardware and software requirements

Functionality: What modules are available, values additions to existing functions
User interface: Navigation, error alerts, intuitive, customisation
Design: Flexibility, switching from one module to another, multifunction modules, does it enhance the productivity
Conforming to standards: MARC, Z39.50, ISO-2709, etc.
Scalability: Single user-multi use network. Can it be used in client server LAN architecture or fully web browsing architecture:

- User-controlled customisation
- Reports that help take decisions
- Security levels
- Migration of data or data transfer

3.2 Open Source Software

Open source software (OSS) is computer software whose source code is available under a license for users to look at and modify freely and permits users study, change, and improve the software, and to redistribute it in modified or unmodified form. The OSS differs from the closed source or proprietary software. (Kamble et al, 2012).

The primary difference between the two is the freedom to modify the software. Further, Open source software is software with source code that anyone can inspect, modify, and enhance. "Source code" is the part of software that most computer users don't ever see; it's the code

computer programmers can manipulate to change how a piece of software a “program” or “application” works. Programmers who have access to a computer program’s source code can improve that program by adding features to it or fixing parts that don’t always work correctly. Another side of Open-source software (OSS) is the fact that is the computer software with its source code made available with a license in which the copyright holder provides the rights to study change and distribute the software to anyone and for any purpose. (Sharma, 2018).

For many libraries, organizing their books and other media can be daunting task, especially as the library grows with more material. Years ago, we had crude card catalogue systems (remember the Dewey Decimal System) that kept things organized, but was difficult to maintain. With today’s computing technology, organizing our libraries has never been easier or more efficient. Gone is the card catalogue and in some libraries, it’s much easier to locate a book through and internet connection and picking it up upon your arrival, rather than wasting the time scouring the aisles looking for your next read. Because of this need for software (and the installation and training costs associated with any), and the lack of money available to spend on it, many libraries are left to fend for themselves when it comes to staying up to date with the latest technology. Unless, of course, they embrace the open source movement and use some of the countless software solutions available to help out. Most software that we all use every day is known as "**proprietary**", which in a nutshell means that it costs money and that the actual code of the software is restricted, in that the code of the software cannot be modified, copied, or changed from its original construction. The code is "unreadable" and pretty much is what it is.

3.2.1 Advantages of Open Source Software

- The OSS offers a radically different and exponentially better software development model.
- OSS provides cheap alternatives to expensive commercialised solutions.
- Source code of the software is always open and available to the libraries which is not possible in case of traditional commercial software.
- Libraries can modify or develop the software according to their requirement and for this they do not have to pay license fees to anybody.
- The OSS provides no restrictions on how the software is used. It reduces dependence on software vendors.
- The OSS is more reliable than closed source traditional commercial software.

- The OSS also provides security and technological independence to the libraries.
- It also helps the library professionals to deliver low cost or free services to users.
- It helps converting their libraries into digital form.
- Implementation cost of OSS is also more affordable to the libraries than traditional commercial software. Overall, open source is good for everyone.
- Support is available for open source often superior to proprietary solutions. First, open source support is freely available and accessible through the online community via the Internet. And second, many tech companies are now supporting open source with free online and multiple levels of paid support. For example, Liblime
- Frustration with vendor lock-in is a reality for all IT managers. In addition to ongoing license fees, there is lack of portability and the inability to customize software to meet specific needs. Open source exists as a declaration of freedom of choice.

3.2.2 Open Source Library Management Software

Open source LMS is a valuable catalyst for change in terms of exploring possibilities and pushing boundaries for the library. There are many open source LMS being used in the libraries. According to Kamble et al, (2012) some of open source LMS are:

Koha
Koha is a promising full featured open source integrated library system (ILS) created in 1999 by Katipo Communications for the Horowhenua Library Trust in New Zealand, and currently being used by thousands of libraries all over the world, it includes modules for circulation, cataloging, acquisitions, serials, reserves, patron management, branch relationships, and more. Koha has web-based Interfaces. Koha is built using library ILS standards and uses the OPAC (online public access catalog) interface. In addition, Koha has no vendor-lock in, so libraries can receive technical support from any party from they want. It is distributed under the free open source general public license (GPL). It supports MARC 21 and UNIMARC support, Z39.50. It also has a provision for online reservations and renewals. Koha is a perfect alternative. Koha is built using library ILS standards and uses the OPAC (open public access catalog) interface. In addition, Koha has no vendor-lock in, so libraries can receive tech support from any party they choose.

NewGenlib
NewGenLib, an integrated LMS is open source under the most widely used free software license, GNU GPL. NewGenLib is the result of

collaboration between specialists in library automation and software specialists. The software was developed over a four-year joint effort between a professional charitable trust, Kesavan Institute of Information and Knowledge Management (KIIKM) and a fledgling software development company. Some libraries still do not generally use international metadata and interoperability standards (e.g., MARC-2l, Dublin Core, OAI-PMH) and it is believed that this puts them at a great disadvantage when it comes to sharing metadata and building union catalogues and networking. The fact that libraries are not networked and hence are handicapped in sharing costly bibliographic and full-text resources among themselves, the importance of providing software that would allow both library management and the creation of institutional open access repositories increases.

PhpMyLibrary

PhpMyLibrary is a PHP/MySQL web-based library automation application meant for smaller libraries. The software has the facilities of cataloguing, circulation, and OPAC module. The software also has an import export feature. It strictly follows the USMARC standard for adding materials. This software is compatible with the content management system and has as facility of online reservation system for library and also supports import from ISIS database with an ISIS2MARC program.

OpenBiblio

OpenBiblio is an easy to use, open source, automated library software written in PHP. This software has facilities of OPAC, circulation, cataloging, and other administrative work. OpenBiblio is well documented, easy to install with minimal expertise and designed with common library feature.

Avanti

Avanti MicroLCS Software is developed by Avanti Library Systems in Java language. This is a small, simple, and easy to install and use open source software. it is a platform independent, and can run on any system that supports a Java runtime environment. This software is useful for small libraries; it has a powerful and very flexible architecture that allows it to be adapted for use in libraries of any type. This software incorporates standards such as MARC and Z39.50 as modules and interfaces.

Greenstone Digital Library

The Greenstone digital library software is an open source system for the construction and presentation of information collections. Greenstone is a suite of software for building digital library collections. It is not a digital library but a tool for building digital libraries. It provides a new way of

organising information and publishing it on the internet in the form of a fully-searchable, metadata-driven digital library. It has been developed and distributed in cooperation with UNESCO and the Human Info NGO in Belgium. It is multilingual software, issued under the terms of the GNU GPL Greenstone runs on all versions of Windows, and Unix/Linux, and Mac OS-X and is very easy to install. It has two separate interactive interfaces, the Reader interface and the Librarian interface. End users access the digital library through the Reader interface, which operates within a web browser.

DSpace

DSpace was developed by Massachusetts Institute of Technology (MIT) libraries and Hewlett-Packard (HP), as an open source application that institutions and organisations could run with relatively few resources. It is to support the long-term preservation of the digital material stored in the repository. DSpace accepts all manner of digital formats, such as articles, preprints, working papers, technical reports, conference papers, books, theses, data sets, computer programs, visualisations, simulations, and other models, multimedia publications, administrative records, published books, journals, bibliographic datasets, images, audio files, video files, reformatted digital library collections, learning objects, web pages, etc.

E-Prints

E-Prints has been developed at the University of Southampton School of Electronics and Computer Science in 2000 and released under a GPL license for building open access repositories that are compliant with the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). It shares many of the features commonly seen in document management systems, but is primarily used for institutional repositories and scientific journals.

Fedora

Fedora software gives organisations a flexible service oriented architecture for managing and delivering their digital content. Digital objects exist within a repository architecture that supports a variety of management functions. All functions of Fedora, both at the object and repository level, are exposed as web services. These functions can be protected with fine-grained access control policies. This unique combination of features makes Fedora an attractive solution in a variety of domains. Some examples of applications that are built upon Fedora include library collections management, multimedia authoring systems, archival repositories, institutional repositories, and digital libraries for education.

Figure 1: Types of Open Sources Software

4.0 CONCLUSION

There is a tremendous growth in the use of libraries over the last decade. Change has catch up with its processes, such as acquisition, cataloguing, shelving and the general management of information evolving with emphasis on the aspects of digitization and in fact knowledge management. The general requirement of the library is supported by library management system. KOHA and LibLime are types of library information system. Open source LMS is a valuable catalyst for change in terms of exploring possibilities and pushing boundaries for the community. There are many LMS, which are very popular and being used by number of libraries. Librarians may have the comprehensive study about them before taking decision in this regard. The design of a Library Management System is to felicitate, automate, manage and look after the overall processing of a library most especially as it relates to distance learning. The features of library management system entail OPAC, barcode, Easy Navigation and Updating and circulation among others. The need of library information system improve patrons services through access to precise information and dependable security for sensitive and confidential information.

5.0 SUMMARY

The knowledge on the concept, features and needs of library management system was explicitly discussed in this unit. Also, the concept of open source software, advantages and types of open source software used in the library was established.

6.0 TUTOR-MARKED ASSIGNMENT

1. Explain the concept of library management system.
2. Identify five features of library management system.
3. List five needs of library management system.
4. Identify and explain any five open source LMS being used in the libraries.
5. Mention 5 advantages of open source software.

7.0 REFERENCES/FURTHER READING

Annual Report. Indian Council of Agricultural Research, New Delhi, 2009-2010. pp. 108-09.

Ashutosh,T & Ashish, S. (2012). Online Library Management System. *IOSR Journal of Engineering (IOSRJEN). 2* (2),180-186.

Adamson and Veronica. (2008). *JISC & SCONUL Library Management Systems Study*. Sheffield, UK: Sero Consulting. p. 51.

Bankar, C.V., Dayal, Ram. & Gajbhiye, M. (February 2011). Open source initiatives in libraries. In Proceedings of National Conferences of Agricultural Librarian and User Community 2011, edited by A.K. Jain; H. Chandrasekharan; P. Visakhi; Hans Raj & Nabi Hasan. (Paper presented) *at Agricultural Libraries in Knowledge Web*, 24-25. Indian Agricultural Research Institute, New Delhi. 2011. (pp. 182-85).

Kamble, V.T., Raj, H & Sangeeta. (2012). Open Source Library Management and Digital Library Software. *DESIDOC Journal of Library & Information Technology*, Vol. 32 (5) pp. 388-392

Kinner, L.A. (2009). The Integrated Library System: From Daring to Dinosaur? *Journal of Library Administration*, 401-417.

Neelakandan, B., Duraisekar, S., Balasubramani, R. & Srinivasa, S. (2010). Implementation of Automated Library Management System in the School of Chemistry Bharathidasan University using Koha Open Source Software. *International Journal of Applied Engineering Research, Dindigul,* Vol. (1), pp. 149-167.

Prabhakar K., Rahul K., Rajat S., and Vikram Singh. (2014). Library Management System. Division of Computer Science School of Engineering Cochin University of Science & Technology Kochi-682022.

Sharma, Y., Sharma A., & Sharma. M. (2018). Open Source Integrated Library Management Software KOHA: Over view & Features. *Journal of Advanced Research in Library and Information Science*. Vol 5, (4) Pp 14-19.

MODULE 5 LIBRARY AUTOMATION AND NETWORK

UNIT 1 LIBRARY AUTOMATION

CONTENTS

1.0 INTRODUCTION

In this unit, we intend to examine the concepts of automation especially as it is related to library services. Furthermore, the prospects of library automation development will be extensively discussed. It is important to note, that computer and information processing hardware are critical in the process of automation because of its role in decisions in impact, govern or control the process from the information collected by the computer concerning the position of the process.

2.0 Learning Outcomes

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

- define automation as a concept, library automation and the prospect of library automation development
- discuss the areas of library automation
- explain the organization of library automation.

3.0 MAIN CONTENT

3.1 Automation

The name of 'Automation' has its root from a Greek language named 'Automate' which signify something which has the ability of unplanned motion of self-movement. In the context of the library, automation implies the mechanization or computerization of various library activities and routine services. Automation is the process of making plenty of works simply with the help of automatic machine. It is used similarly with the mechanization. Automation pertains to the theory, technique or art of making a machine, advices or purpose more fully automatic.

According to Encyclopedia Britannica, "The name given to an automatic system of working. The distinction between automation and mechanization is especially one among degree" "The technique of creating equipment or a system that operates automatically". In general automation is the automatic, as opposed to human, operation or control of a process, equipment or a system; or the techniques and equipment's used to achieve this. In libraries automation refers to the method of automatic in-house functions like circulation, cataloguing, Acquisitions, Serials Controls etc. Presently, it is used in co-occurrence of computerization. A major role played by computer and information processing is in the process of automation by reason of the intrinsic ability of a computer to facilitate decisions in impact, govern or control the process from the information obtained by the computer regarding the position of the process.

3.1.1 Library Automation

In the current era of information explosion, automation of library services is, consequently, imperative for effective working and efficiency of a library system. Appropriately, computerization brings about nearly a revolution in the functioning of a library. Computer is very productive not only for management and library operations but also similarly useful for library users. Processing of even huge quantity of data becomes easier through computer. Traditional method of information dissemination and data processing is now becoming old. This conventional method of working is too time wasting and burdensome. Hence, computer enables and establishes a much easier processes for material preservation, cataloguing and data processing-all among others, with less stress. There for it ware, a touch of timelessness and availability of material through computers supply an added impetus and energy to the entire library network. While, many uses of the information provide into the computer is possible mostly, as it were, in a jiffy. Automation of library facilitates most efficiency and accuracy and library staff find a lot of support of

equipment utilize in automation and their regular work performance. So, plenty of facilities such as COM, use of database regardless of geographic distance with the help of telephone and telex, satellite, etc., are accessible for uncomplicated operationalization, e.g., On-line Computer library Center database can be used by approximately ten thousand libraries in thirty-nine countries. (Gupta Sangita 1995). Library automation covers use of computers and other semi automatic tools. These are semi automatic because human intercession is involved in grater in expand, so when we talk of library automation, in present, it is significantly the use of computers, associated peripheral media i.e., optical media, magnetic disk etc., computer based services and product in library work. In current times, even the related topics such as networking of automated system and information retrieval systems are also regarded as part of library automation, Although computers have a important role to play in library automation, reprographic and telecommunications technology have an same important role because of the extend of support they offer. (Singh Gurudev 2007).

Figure 1: A Library Automation System

3.1.2 Definition of Library Automation

Uddin, (2009) express his view on Library automation as the use of automatic and semiautomatic data processing machines or devices (computers) to perform and execute traditional library housekeeping activities such as acquisition, circulation, cataloguing and reference and serials control which are core library processes. In the contemporary

library, “Library Automation” is a term used to describe the mechanization of library activities using the computer”.

3.1.3 Needs of Library Automation

Libraries are the lighthouses for information. The thirst of information is increasing on a daily basis of varied levels and on various subjects. There is an excellent demand to produce much data quickly on demand that an economical and correct devices or tools are introduced, that relies on mechanized method. The factors necessitating automation of libraries according to Keshav (2019) are as following:

- Capability to handle any quantity of knowledge and information;
- Speedy processing of information and its retrieval;
- Flexibility in information search;
- Standardization of library procedures;
- Participation in network programming and resource sharing;
- offer higher list management at native, regional, national and international level;
- High rate and better quality in performance;
- Avoid/eliminates duplication of works;
- Facilitate interdisciplinary nature of research and information;
- Facilitate interdisciplinary nature of research and information;
- Economic implications of latest information technology;
- Overcome geographical and other barriers to communication; and
- Improve the standard of existing services and to scale back routine and time overwhelming clerical works.

3.2 Area of Library Automation

Automation has revolutionized the libraries nature, concept, approach as well as its away of functioning. Computers are being applied in different library routines. For good management of funds, automation in different acquisition operations is very important. These operations may be ordering, preparation of other slips, generation of reminders to vendors, verification of books with order file and budget control, invoice, maintenance of the accounts of every monetary transaction, print outs of received and non-received documents. Serial control in libraries is generally extremely complex, due to the availability of serials in different formats and media. The following are areas of Library Automation; Acquisition; Cataloguing and Indexing; Circulation; Serial Control; Library Administration and Management; On Line Public Access Catalogue; CDROM Databases Searches; Resource sharing through Library; Network/INTERNET and information Retrieval.

In the computer based serial control system, serials are assigned with particular identification codes one of the codes which is assigned to serials on a world-wide basis is six-character alphanumeric CODIN Code. Different routines to such as preparation of orders for subscription, generation of reminders to suppliers for non-receipt of issues, maintenance of records of serial holdings, preparation of renewal titles for subscription, updating the record file, can be automated. Due to requirement of additional access points and comprehensive search facilities, the necessity for computer-based catalogue is realized. An individual library or a group of libraries may undertake the computerization of different processes such as preparation authority file or subject heading list, shelf list and arrangement of the catalogue according to classified, alphabetical or any other the library decides. Growth of Micrographics has made it possible to renovate the computer printed catalogue into COM catalogue. COM catalogue is economical, compact durable and. Circulation was the earliest library operation to be automated. The basic features of computer-based circulation system are charging, overdue controls, discharging, and reserves among others. This system should be capable to perform different library activities such as registration of library members, issuance of borrower cards, charging and discharging of library resources, reminders of over dues, updating to record files, identification of items on lone, identification of items and due date slips and generating the orders for stolen books automatically. In an online computer-based circulation system, can retrieve up-to-date information immediately through the terminal.

Computerized Information Retrieval System exploits information contents in all types of documents to provide a variety of information services to library clientele. The purpose of Information Retrieval System is to make comparison among the representation of enquiries and representation knowledge for example, information entities. The procedure of comparison is commonly referred to as matching. Speed and efficiency are the two most significant criterion of Information Retrieval System. An index is an effective retrieval tool. Computerized indexes can be complied more speedily than their manual counterparts. The format of output from computerized indexes offers better flexibility than do the printed ones. Selective Dissemination of Information is an alerting information services through which users receive regular notification of new literature in their area of interest. A computer maintaining a machine retrieval bibliographic database selects and prints out the items which are matched to a user's profile. The whole operation of Selective Dissemination of Information is in five phases, viz. Profile generation, Database generation, searching database with users' profile, sorting the answers and supplying list of bulletins. The Selective Dissemination of Information search has diminished as interactive searching has become readily available at a reasonable cost. Presently most searching is

retrospective. User's request is compared with the entire database maintained in the library and a list of matched items is generated.

Thesaurus is a significant tool for effective vocabulary control in computerized Information Retrieval System. Computerized thesaurus in specific fields displays hierarchical relations among the terms. The subject strings obtained by facet analysis and expressed in natural language are manipulated by computer to generate the links for reprinting the relation between the identified concepts. Computers have brought about a revolutionary metamorphosis in the dynamics of library system. It would not be exaggeration to say that ours is an age of computer. The pervasive impact of computers will no doubt emerge, in the years to come, as a main breakthrough in library and information science. (Gupta Sangita 1995)

3.2.1 Organisation of Library Automation

A good management determines a successful library automation project. Thus, the system librarian must know and understand the task to be performed and the individuals involved in the project and must have the confidence of his or her personnel. Constant change is a reflection of library automation which involves transformation in the ways an organization conduces itself and represents itself to those to whom it provides services. Like any activity that involves change, planning for it, implementing it, and managing it are not simple tasks. Change cut across all individual roles, organizational structure, and service patterns within an organization as a result of automation. Management faces the same challenges experienced by any newly automated organization. In this case there are two dimensions for management the line responsibility of managing an organization with ongoing service responsibilities and project management of selection or design and implementation of automation system. A manager can receive valuable assistance in planning and implementing a library automation system from a new key individual in an organization but consultation within a wider group is critical. Any organization considering automation should create a group that represents the constituencies that will manage, fund, use, operate, and maintain the system. Such a group serves many functions and may exist for a long time. The group can provide valuable information on specific requirements for the system, evaluate the comments of others about the necessity and feasibility of certain features and serve as a sounding board for the individual who manages automation project.

The importance of such an advisory group cannot be overemphasized because systems are neither selected nor used in a vacuum. The sooner, all can participate in the process, the more likely its success. The duration of such a policy group can vary widely. It might be formed to provide

advice on function and features of a proposed system, but could remain active to evaluate alternative designs, vendor proposal, prototype systems, testing, and implementation to give continuing advice on systems operation. When any type of computer system is installed in an organization it changes the way operations are performed the task of the staff and the relationship between the library and external units. Staffs that work on the automation project are involved in the day-to-day task of bringing the system once it is operational need to know about it and how it will impact their lives. The way these staff members conduct themselves within the organization and while providing services to users is a complex process which requires thoughtful management. This is especially true when the changes raise the possibility of economic insecurity and fear of the unknown or threaten social relations and habitual practice. The organization must take into account that individuals perceive events around them differently that people are motivated in widely different ways and the attitudes are formed by complex sets of variables and events. Project team staffs face other issues. They are part of a group whose members have certain roles and status. The group as a whole is accountable for the project, but the members of the group must do the work. Individuals on the team may have personal goals different from the group goals or they may be in complete harmony with the project team. The structure of an organization may change as a result of automation activities. The installation of a new system or change over from one system to another requires skillful management. Departmental structures may change and some departments may disappear.

New organizational units may be formed and new staff functions created. Such changes may be difficult to implement because of organizational inertia. Realignment of departments represents a threat to existing managers, but may present an opportunity to improve performance and service. For example, a streamlined piece of software may render existing organizational task divisions illogical. If boundaries need to be redefined, managers must consider the needs of individuals as well as the goals of the organization.

Patterns of communication between departments may also change. For example, usually the library is not a discrete enough unit to manage its own pool of funds, but relies on another organization to handle the burden of management and disbursement of funds for an acquisition system for instance. The link between departments may also change. For example, usually the library is not a discrete enough unit to manage its own pool of funds but relies on another organization to handle the burden of management and disbursement of funds for an acquisitions system for instance. The link between the library and the unit that manages the bank accounts must be renegotiated to take into account the effect of the new computer system. This link may involve routine exchanges of data, but

managerial intervention in the initial stages is crucial to success. Implementing a library automation system is commonly the same irrespective of converting an existing system or introducing an automation system for the first time. Activities such as planning are not confined to development of functions and features. Once need is determined and required features have been defined, the manager of the project can decide how to proceed with the help of top-level managers the library board, executives of other governmental units, staff and the advisory committee. A timeline is developed, funding obtained, staff recruited, physical space obtained, contracts issued and the system installed, tested, and implemented. Staff must be trained to use it and library users educated in its features if appropriate.

An organization needs a clear statement of what it wants to accomplish in terms of a needs or requirements assessment. If there is a need for a new library automation system, the next planning task is to assess the functions and features that this system should contain. If a new online catalogue is considered what should be the nature of the user interface? Should the catalogue be accessed through computer networks? How many bibliographic records should the catalog is designed to manage? How many terminals should be attached to it? This type of list is endless. The examples given here are general, but a completed list is much narrower and more specific. Assessing the system requirements, defining them precisely, and testing the acquired systems fulfillment of the needs are critical to a successful automation venture. A statement of objectives includes the desirable function and features of the system such as user, management, hardware and software requirements. A particularly desirable approach to this task is to be guided by what one wants to accomplish, not by what one thinks is feasible. (Malavya U.C., 1999).

3.2.2 Automated Library Services

Information services area unit provided to help individuals and alter them in resolution their issues and deciding. Trendy libraries and knowledge providing a spread of documentation and knowledge services to support analysis and development, selling and trade, management and every one different programmes associated with the event of establishment. Mahapatra (1985) as cited in Keshav (2019) has given the subsequent machine-controlled services are:

1. Current awareness Service (CAS)

Current Awareness Services are those services that keep the users informed about the developments and advances in their fields of specialization or in areas of analysis within which they're engaged. This technique is restricted to a number of information because it isn't meant to come up with comprehensive review of all activities in any subject

field. CAS is given in varied forms like by title, current content list, compartmentalization and abstracting etc. during a library by creating use of computers the embers is provided CAS by causation emails, through varied databases, CD-ROMs etc.

2. On-line Search Service

Online search is achieved through on-line terminal. The search includes series of keywords along with Boolean logic. The search strategy or the search statement ought to be framed before logging-on. Once communication is formed by logging-on, knowledge of the system is displayed on the screen of the terminal and also the user is requested to pick out the specified info. As search yield the interaction between the machine and also the user goes on and also the user offers a series of commands that the pc responds.

3. Selective Dissemination of Knowledge (SDI)

In SDI service, the knowledge during a library is matched against the topic interests of the users; which implies that the user receives solely that information that has relevancy to his analysis work. In processed SDI service, a user profile is built at the same time; document profile is additionally created once documents are received within the library. Each of these profiles are matched by the pc and sent to the user. Feedback is received from the user just in case the user isn't happy then the profiles are checked and adjusted on the idea of user's analysis.

4. Stock Verification

Stock verification is a vital activity in any library. It's one in every of the foremost tedious jobs to be done that involves a great deal of time. Historically, stock verification in the library takes a huge time for a standard assortment however with the impact of knowledge technology, this has been overcome and less time is needed relatively. By bar-coding technology, all accession numbers are saved within the barcode scanner memory. The foremost economical and quick means of getting into accession variety is to use a mobile code reader to scan accession numbers of books from code tags in books. This optical device scanner is left out the barcoded books within the stack. The accession numbers of books offered within the stack are recorded within the memory and also the accession numbers, that aren't in show, are checked if they're on loan and thereby, the quantity of missing books is understood. It's additionally doable currently with the proliferation of non-public laptop to only key all told accession numbers as and once checked to consolidate the loss in terms of missing accession numbers.

5. Reference Service

Initially, the reference librarians' uses written compartmentalization and abstracting services, listing sources and directories to perform literature

search and answer queries of factual or listing nature. However nowadays it's seen that the necessary reference books like encyclopedias, directories, bibliographies, are offered within the non-print format either within the kind of read only storage or are displayed on the internet. They'll be used as a link for accessing data for responsive queries.

4.0 CONCLUSION

Automation pertains to the theory, technique or art of making a machine, advices or purpose more fully automatic. Presently, it is used in co-occurrence of computerization. Computerization brings about nearly a revolution in the functioning of a library. Computer is very productive not only for management and library operations but also similarly useful for library users. Processing of even huge quantity of data becomes greatly easier through computer. There for it ware, a touch of timelessness and availability of material through computers supply an added impetus and energy to the entire library network. The emphasis being placed on library networks that is systems involving more than one library is part of the development of library automation. The continuous change in the library system has permit library automation as needful and resourceful for all the services provided in the library which includes circulation, references, technical and shelving among others.

5.0 SUMMARY

Automation refers to the mechanization or computerization of all library movements. Library automation entails the applications of computers and other semi-automatic tools. These are semi-automatic because human intercession is involved in grater in expand, hence, library automation, is significantly the application of computers, associated peripheral media i.e., optical media, magnetic disk etc., computer-based services and product in library work. Automation comprises all services provided in the library. Organization and management of library automation remains critical for the efficient information service delivery.

6.0 TUTOR-MARKED ASSIGNMENT

1. Briefly explain the concept of automation and library automation.
2. Discuss the prospects of library automation development.
3. Identify and explain the areas of library automation.
4. Discuss the organization of library automation.
5. Some factors necessitating automation of libraries. Mention five of these factors.

7.0 REFERENCES/FURTHER READING

Gupta, S. (1995). *Manpower Needs Automation Libraries* p. 2-3. New Delhi: EssEss Publication.

Jageesh. S. (1998). *Library Automation Using FoxPro 2.0.* p. 43. New Delhi: EssEss Publication.

Keshav, G.B. (2019). Library Automation. *Library Philosophy and Practice (e-journal)*. 2274. https://digitalcommons.unl.edu/libphilprac/2274.

Malavya U.C. (1999). *Library Information Technology for the Next Millennium*, p.25. New Delhi: EssEss Publication.

Tiwari Purushotham (2010). *Library Automation*. APH Publication Corporation, p.18. New Delhi.

Uddin, Hanif (2009), *Library Automaton*: *A Study of the AIC, INSDOC and National Libraries of Bangladesh*. p.10.

UNIT 2 TASKS OF LIBRARY AUTOMATION

CONTENTS

1.0 INTRODUCTION

In this unit, students will be exposed to the various tasks of library automation and understand techniques of library automation. Advantages and disadvantages of library automation are important to the adopter of this specialized information system especially in the library.

2.0 LEARNING OUTCOMES

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

- identify key tasks and steps of library automation
- understand the techniques of library automation
- identify the advantages and disadvantages of library automation.

3.0 MAIN CONTENT

3.1 Tasks of Library Automation

The application of a library automation system is considered the same irrespective of it been transformational i.e an existing system. A logical step is involved to determine the objective and limits on the project, an examination of processes or existing systems, selection or design of a new system, appraisal of the system, testing a new system, conversion to the new system and staff and user training. This step entails an assessment of the prerequisite for an automated solution or recognition that existing automated system is insufficient. An approach which is an informal technique is use for the assessment. However, what the methods or approaches employed; the result is recognition of the requirement for

change or acceptance of the status quo. The activities involving planning are not sure to development of features and function. Once the need is determined and essential features have been defined, the manager of the project can make a decision how to proceed, with the help of highest-level managers, executives of other governmental units, staff, the advisory committee and the library board. A timeline is developed, obtained, funding, staff recruited, contracts issued, physical space obtained, and the system tested, installed, and implemented. Staff must be trained to use it and library users educated in its characteristics if appropriate. The work of library automation at following:

1. Objectives

An organization requires a clear statement of what it wants to fulfill in terms of a requirements or needs assessment. This is essential for a new library automation system, the upcoming planning work is to assess the functions and features that this system should contain. If a recently developed online catalog is considered, should the catalog be accessed through computer networks? How many bibliographic records should the catalog be designed to manage? How many terminals should be attached to it? Should be the nature of the user interface? This type of list is unlimited. The examples given here are common, but a completed list is smaller narrower and more specific. Assessing the defining them precisely, system requirements, and testing the acquired systems fulfillment of the requirements are critical to a successful automation project. A statement of objectives includes the desirable features and functions of the system such as management, user, software and hardware requirements.

2. Constraints

Next analyze what is practical. Reality sets in during this stage. Is there sufficient time to complete the project? Are there adequate funds to pay for staff, building space, equipment, hardware and software? Is staff with the exact skill mix available? Objectives may have to be modified to meet constraints, if resources are inadequate to meet objective.

3. System analysis design

Some constraints are mediated by specified set of objectives; the precise step is to analysis the operation of the present system to see how it workability and as certain its features and functions. The system to be examined is either one currently used in the organization such as a manual circulation function or one proposed by a vendor or an automated circulation system. The required outcome of this phase is a best, wall documented understanding of how the present system works its acceptable features and those requiring redesign. The resulting document serves as a basis for upcoming phase of the project the design of a new system or the selection of a particular vendors offering. System design is

many times long and complex operation that assesses user demands, constraints and existing system operation. It should result in a separatist for a new system that meets individual needs and formal requirements. Since most libraries do not improve their own automation systems, the process of improving an entirely new system is excluded. However, some planned activities are often encountered in configuring vendor systems to meet specific user demands. Testing is a continual process when a programmer initiates a code, when the staff informally reviews the system, when the product goes through various stages of quality assurance and when other programmers use the code. Testing continues even on a finalized configured product ready to be hand over by the vendor. Whether a system is designed within the organizations or purchased, it should be implemented on a trial basis specifications developed at the start. Sometimes preliminary testing of a system configured to the libraries requirements is done in the vendors offices using the libraries data. Occasionally a vendor's system is transferred to the library and the system is configured there. The testing process can be really rigorous depending on the requirements of the organization. Both software and hardware must be tested. While there are comparatively standard methods for making sure that hardware is functioning properly the testing of library automation software is not so codified. There are machineries for testing large online systems which include a computer system being connected to each other computer whose function is to imitate a set of terminals every submitting request to the machine being tested. The emulator stores system of commands to issue and anticipated responses it logs, date and timestamps all communication with the test machine. Generally testing is not this formal. Many times, a group of library staff members are distributed the task of unofficially trying out the function of the system. They log on paper or with screen tip any anomalies that occur. Problems are then communicated to the vendors and designers.

4. Conversion

If the library transforms a manual system to a computerized one significant conversion activities are required. For a circulation system all borrower records are keyed into the automated system new library user cards are issued with barcode Identity (ID) numbers attached, the bibliographic description for all book in the collection is recorded in a computer file a barcode is set up in all book to identify it specially and each bar-coded books are connected to a bibliographic description. Borrower types must be identified and borrowing privileges for each borrower category and materials category must be established. These works are not trivial and may take 100 of hours for a large library. The results must be nearly error free. For the time of preparation for automation the manual system should continue operation. When use of the automated system started, backup safeguards must be in place to protect the honesty of transaction. Conversion may look simpler when a

library proceeds from one automation system to another but there are disadvantages and advantages to this scenario. The advantage of the staff has experience using an automated system and may learn the underlying concepts. On down side no 2 vendor hardware or software system operates the same way unload or load information in the same format handles every field or structures their files in the similar way. The conversion becomes complicated when it requires informal knowledge of not one but two library automation systems. Often it demands knowledge of two hardware platforms and two operating systems as well.

5. Operation

After a stable system exists, can be placed in operation. There should be a comprehended with a system that is meticulous and procedures written and followed by staff. Among the additional significant activities to be documented are how to activate and stop the system, how to suit it down under urgent situations, how to detect problems, how to make backups of the files and who to notify under a variety of situations.

6. Training

Training remains a prerequisite for most individuals who will operate the system. The common characteristic of the system is important to knowledge of the management. This involves how it works efficiently and its variances from the present system. A periodic status report on system operation is required by management. Training is required by system managers in the hardware on which system is suitable in running the operating system and the library automation application. There is a desire on the part of libraries to shift the responsibility for understanding a library automation system into the consultants, developers and vendors. This is a mistake and can guide to an implementation difficulty when the library thinks the system should perform in a confident way which is different from how the developer and vendor believe it operates. The staff that will operate the system required large training in its use for all the fact that developers frequently think that the operation of the system they have established is self-evident and once in use will be without problem. Normally this is not the case. Therefore, the additional documentation obtainable in written form in videos and in assistance programs integral into the system from vendor technical support workers and from human beings serving as instructors the grater is the likelihood that the workers will receive and use the system successfully.

1. Evaluation

Once a system installed and has been operating for a sensible period of time inferences can be made about its capacity, reliability and performances. The majority library automation systems generated reports such as the overdue notice sent, number of orders processed, serial titles checked in and so forth. But other measurements give significant

information about the internal operation of the software itself, such as percentage of space on the system disk drives that is filled, response time for online requests, disk input/ output operations performed by time of day, memory utilization, central processor capacity utilization by time of day, and communication line utilization and error rates. An additional qualitative form of evaluation should also be taken on that involves comparing the objectives established for the system with result from its operation. This evaluation takes place at least two times, once when the library is about to receive delivery of the system and again after the system has been starting. Most library managers will select to purchase rather than built their individual library automation system. Since a broad variety of systems is available on the market for large libraries, medium, small and tiny, only libraries that are extremely large, have special requirements, or have the funds and interest are likely to pursue designing and implementing their individual systems. Even so don't stop reading this book now. The more that is noted about how these systems works, the greater the probability of choosing the best system and implementing it successfully. Of most important concern is the quality of the product and how well it meets library's needs. This can be ascertained by the libraries individual evaluation of the system and by making contact with present and past customers of the vendor. User groups can supply a forum for interchange of thoughts, sometimes apart from the umbrella of the vendor. Cost factors present another concern the porches price of the software and hardware, conversion costs, maintenance costs for both, cost of additional training, and type of training and customer support provided. These entire elements will be incorporated into a contractual agreement between the vendor and the library that will include a schedule for purchase, installation, and testing. Prior to signing any contract, library officials should look into the financial stability of the vendor, since a considerable deal of time and effort will be expended in converting the present system to the new environment no library wants to goes insolvent of ceases involuntarily from a vendor who goes insolvent or ceases operation. (Gopal Krishna 2005).

3.2 Techniques of Library Automation

The connection between the library and the computer is a changing one. Computer science has been changing quickly ever since its origins twenty years ago and now the library itself are beginning to be changed under the effect of the machine. In changing world, librarians have a duty not only to be aware about the ways in which libraries can utilize the techniques of automation but also to know of the changes automation can carry to library services in the near and maybe the more distant future. It is uncomplicated in this 20th century to strive for change easy for its own sake just as it is even easier to attempt for retaining the status quo. Those librarians whose work it is to decide for or against the specific change of

automation require especially being on their guard against these two attitudes. They require making their decisions in the light of facts, facts about their libraries as they are at the movement what services are provided to what general public by want library staff and at what price and similar facts about any present system of library automation. In this library is no changed from any other factory or office considering the use of a computer to work a given job of work most economically. Where the dissimilar does arise however is in the idea of libraries services. A company may change a certain price for its artifacts and so confident make an overall profit on its operations. In such circumstances a computer can be display to act either to increase or to lessen profits. But there are hardly any libraries today which leave in order to make a profit for their proprietor and few are essential to balance an income from subscription against their charges. How then can a price be fixed against the services which a library can give and how can this price be calculated so that automation may be seen to be explained? An answer to those questions can be in two ways. Firstly, anyone industrial librarian noted that this job is to fulfill his company's information requirements. He a specialist in information task can supply information to company employees extra effectively than they can obtain it themselves and so that importance of his library's services can be expressed in phrase of hours and minutes of saved time and hence in financial terms. An analogous quarrel can be used of the reader services function in university and public libraries. Secondly the advantage of libraries services can also communicate quantitatively in terms of the chief librarians bargaining authority at meetings of the library committee and so in terms of the difficult cash vote to him to authorize him to run his library. It is easy therefore although hard to express the value of automated library systems in quantitative terms and so to contrast an automated library with its conventional equivalent. The resolution to automate or not to automate can then be taken in the full light of the reality. That is decision seems frequently to have been taken in comprehension of the realities does not invalidate the arguments kernel services merely to throw into clearer reassurance the well-known truths that librarians are as a busy class that libraries try hard for enough money to buy every book, they want let alone finance an actual automation feasibility study and that it is easier to obtain money to purchase computer equipment than to purchase books.

The final situation then in majority cases will be that developed library services have been bought at a price. It the librarian has been capable to justify this to have committee then as per my argument the automated system has in case broken even. We should look a little more closely into the reasons why librarians strongly consider utilize a computer in his library in order to make better its working in some way. And the first kind of cause which we shall term emotional is one regrettable outcome of the automation revolution through which the developed countries of the

world are now passing. Because as per the emotional argument computers are efficient and modern a library which utilize a computer in some way must necessarily also be competent, forward looking and almost certainly therefore a better library. It is really true to say that those libraries which have started computer systems are forward looking and modern. The library automated systems may well be efficient and the library may be a better one. But it is surely not necessarily true to say as the emotive argument does that, if library uses a computer then it will do all these activities. That this reason exists at all even if only as a view of mind is a direct result of the false attraction ascribed to the computer and the superficial thinking and writing of those accountable for automating aspects of library procedure in the future now is really the time for some libraries to analysis with ways and means of allowing computers to take their actual place in library work.

From what we aware about computer application in other areas we should expect automation to be practicable only in big libraries or in cases where a number of little libraries amalgamate together to form one big unit for processing purpose. However we know also that computer time is developing steadily chapter as never plenty of advanced machine are belittle whereas the time of human clerks is becoming steadily plenty of expensive. So we forecast that automation will slowly become feasible in smaller libraries. This tendency will be accentuated somewhat by the appearance of cheap, very small computers but it must be remembered that plenty of library applications required a big machine. The development of online techniques which are especially suited to some sections of library work will make it practical for libraries to expect to have online access to a powerful and big machine rather than consider purchasing a small machine for their individual use.

A satisfactorily set of procedures exists leading from the point we have at the moment reached that of having general and specified terms the benefits which might be expected to accrue from using a computer to that of installation, checking and running an automated system in a library. To follow all these procedures constantly might seem pedantic perhaps unnecessary in lot of circumstances but it is mandatory if the job is to be done honestly, cultivating reason, working in quantitative terms and avoiding emotion. Because procedures will be listed and discussed in one specific way it does not mean that this is the just way or that different amalgamation and distributions of these procedures might not result in extremely dissimilar patterns of overall working only that the fundamental ideas must follow one another in this way. The first step in the direction of introducing an automated system is to conduct a feasibility study. This may be complete at any level of detail but the reason is to find out whether or not a computer can be used to do a specific job more efficiently than heretofore. It can be an extensive stage and may

be broken down into two parts the first one to find out if the feasibility study itself is value undertaking. It is understanding that may such studies have seen that a computer was not shelf that may such studies have seen that a computer was not really necessary at all and that the information obtained from the possible study was sufficient to develop the previous system so as to make it more competent than the automated one first contemplated. It is during the possible study that systems analysis takes place.

The system be it the entire library itself or just one department is analyzed its technique of working is systematically taken apart bit by bit so that in and all the bits are known and understood as are the ways in which they suitable together to make the complete. If only one department of the library is being investigation in the relationship between it and the different departments and the library it must be known and understood. Calculation will also take place so that the concluding result of the study can be in quantitative terms. Numbers will be calculated the numbers of items catalogued, bought, lost, damaged, circulated and the way be expected to modifications in the future will be discovered. As well counted will be the number of people necessary to do the different jobs in the system and the time to do every one jobs in the system and the time to do every one job will be measured. It is very significant that the ends result of all this library movement be estimated or calculated. This can be not easy difficult because it is difficult to apply a measure to a book, student reading, chemist pleased with a mouthful of information and a housewife experimenting with new and different dishes described in a cookery book borrowed from the near local public library.

It should be attempted however because any library automated system as well have seen is possible to change the pattern of service as the number of books purchase each week or the time it takes to discharge an overdue book. From all these calculations the costs of the existing system will be calculated. They will nearly certainly be expressed as unit costs the cost of cataloguing the average book or answering the standard reference question. With each other details of the services performed by the existing system and in particular any problems and difficulties associated with it any appearance which are like to become disappointing in the light of future developments will be suggested and all will be used by management to make an educated resolution about the introduction of automation. by the reason of the introduction of computerized working is not the only and not necessarily the better solution to the problems that will have been brought to light the next step of the study is just to find the better solution automated or not automated. It is very desirable therefore that the study must be carried out by persons who have no directed attentive in seeing that a computer system is installed it may be even using a specific maker of computer. They must be perfectly free to advice on

the optimum course of action. Like sage the investigators should have considerable experience of the same studies and be will informed on all tasks study techniques and data processing. Needless to say, there is a considerable shortage of such people. Feasibility studies therefore are not inexpensive and so are often omitted and skimped entirely. If the introduction of automation is advisable and this is the only case that actually concerns us here then the second part of the study will involve the choice of a computer and the different necessary ancillary items of stationery and equipment required by the system.

There are appreciable differences between the different metals and makes of computer on the market so that the choice of the machine almost all suited to the purpose on hand will have a market impact on the final operating ability of the system. The conclusion result of this second part of the study is a broad system specification. It will indicate the machinery or hardware required and in common terms how everything will work. The all over work load handled will be given as will the approximate costs. Manpower requirements will almost definitely be different from those of the former system for keypunchers will put back clerks and it will be required to have a senior staff member with data processing knowledge in charge of operations and one or two programmes may be essential on a permanent basis. Staff requirements will be extremely different where a library installs a computer for its individual use from the case where it only uses a short time each week or somewhere else machine. Because computers work in ways completely different from human beings the movement of work in an automated system can contrast with quite considerably from that in the commensurate manual system. Old departmental problems can therefore be broken down of the introduction of automation as same processes in different departments are combined and as repetition of work is eliminated. The inclusive organizational structures of the library can be significantly altered and this will be appreciated and stated in the practicable study. The automated system is considered in any detail it is clear that it offers a range of feasible products and services considerable winter than doe’s orthodox system. The compilation of all types of statistics is but one example of this. A library can anticipate therefore to enlarge the scope of its operations by introducing mechanized routines and it is attractive either that them doing the study include a better knowledge of library staff tasks closely with the them in order that possibilities of winter activity are realized. From the concluding report of the feasibility study, it should be a comparatively simple issue for the library management to make a decision on a course of action. Only in the big libraries would a feasibility study be likely to specify clear overall cast diminutions through introducing automated methods. In other libraries the position would almost certainly be that at the moment a computer aided system would cost increased but would bring additional benefits. It is up to the management to plan whether these

benefits justify the rise costs bearing in mind that in time costs will tend to change in be to the advantage of automation.

The method for implementing an automated circulation system e.g. will be different from those essential by a system embracing everyone library technical processing routines. In a university situation the library would require to make use of a central university computing facility more than purchase its individual machine or use the services of a business bureau. This will affect not only the kind of machine used which is likely to be best suited to mathematical than to library task and the languages programmes are written in because programming may well be finished in the computing laboratory it will assume the staffing need in the library. The general computing policy of the organization of which anyone library is a part will also assume such factors as e.g. the frequency with which computer runs can be made, is planned to be available, whether online working is, and so be an significant factor in the design of the library system. In big organization it frequently that a library in another division and has already automated some of its work. If may be possible to take these programmes over just as they stand or with only little modifications. (Verama Kusum 2008).

3.2.1 Advantages of Library Automation

There are some advantages for the adoption of library automation via computer application in library services provided. Below are identified advantages of library automation according to Mcpe and Gowtham (2019).

1. **Speed** - Work flow in the library is improved because of the fast pace in information processing
2. **Accuracy -** The degree of precision and accuracy in processing the information is 100% percent. However, it is dependent on the accuracy of information fed to the system.
3. **Cost effectiveness** – Operating costs are reduced as less man power is required. It can be further reduced if the system is well designed and well managed.
4. **Reduction in library workloads** – Library workload can be reduced as the computer can do vast amount of work in a fraction of second.
5. **Improved services to users** – Better quality performance is possible through the use of computers. No delay in processing.
6. **Eliminates duplication of work** - Duplication of work is avoided
7. **Easier access to external database.** The data is easily accessible.
8. **Access and search of information-** Online access and search of information is possible. (Kumar 2012).

3.2.2 Disadvantages of Library Automation

Even though you may have doubtless about automating your library, it is significant that you be aware of the drawback library automation may bear. These include the Following:

1. It is time consuming, planning, selecting, and implementing an automated system need important, long-term commitment of staff time. Once choose and implemented, an automated system must be kept in good condition on a regular basis. Having the automated system networked to libraries Local Area Network (LAN) adds additional demands on the media specialists and information professional's time.

2. It is costly, start-up costs, hardware, software, writing, network cabling, ongoing barcode labels, expenses such as supplies for printers, furniture, annual maintenance, technical support and conversion of libraries shelf list into a Machine Retable Catalogue (MARC) may be more than various media centers and small libraries can provide.

3. The requirement of the automated system may not leave staff sufficient time to provide up to date services or to work with teachers, students and other clients. In fact, automation eliminates some work but generates new ones. End user training, ongoing troubleshooting of software and hardware, and database maintenance place requirement on the information professional and media specialist.

4. Access to the automated system is unavailable for the time of system downtime. This will hamper user access to the collection, mainly if the card catalog or the shelf list no longer exists in the library and media center. Awareness of the advantages and pitfalls of library automation will help you good prepare for the changes in your task duties. Library automation, like technology, is costly in terms of money and time, and frustration and agony are typical symptoms of techno stress.

4.0 CONCLUSION

There are steps to be established in developing and establishment of Library automation some factors and measure must be concealed before and after automation services render in libraries. The objectives, constraints, conversion, operation, training and system analysis design among others are tasks that aid functional implementation of library

automation services. Like every system. Library automation has advantages and disadvantages that relevant to its overall performance

5.0 SUMMARY

This unit examines the tasks that are relevant to library automation. Recall that library automation has become the new normal in the 21st century library. Discussion was made on techniques required in the library automation. Furthermore, some advantages and disadvantages were affirmed in this unit.

6.0 TUTOR-MARKED ASSIGNMENT

1. Identify and discuss the tasks of library automation.
2. Briefly explain the techniques of library automation.
3. List five advantages and disadvantages of library automation.

7.0 REFERENCES/FURTHER READING

Gopal Krishna. (2005). *Modern Library Automation*, P.20. Delhi: Authors Press.

Gupta Sangita (1995). *Manpower Needs Automation Libraries*, p. 2-3. New Delhi: EssEss Publication.

Malavya U.C. (1999). *Library Information Technology for the Next Millennium*, p.25. New Delhi: EssEss Publication.

Sampath Kumar G.K. (2012). *Resource Sharing and Networking in Digital Libraries*. New Delhi: Anand Publication house.

Singh, Manvendra (2006). *Computerization in Libraries* p. 1. New Delhi: Mahaveer & Sons.

Verama Kusum. (2008). *Computer Application to Library*, p. 91. Delhi: Vista Publication House.

UNIT 3 BENEFITS AND BARRIERS OF LIBRARY AUTOMATION

CONTENTS

1.0 INTRODUCTION

The peculiarity of automation is that it develops library services and increases accuracy, efficiency and productivity in the conduct of a variety of library operations is a reflection of the peculiarity of automation. The benefits of library automation are numerous such as it encouraging collaborative collection development and resource sharing and it allowing patrons to utilize search strategies that beyond those that can be used with card catalogs among others. A Computerized library is always better than a manually operated library in terms of processing, organizing and dissemination of information to the users efficiently and affectivity.

2.0 LEARNING OUTCOMES

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

- recognize and identify the benefits, barriers, characteristics and need of library automation.

3.0 MAIN CONTENT

3.1 Benefits of Library Automation

The Web is building library automation the convention for all types of libraries. Any library or media center that is seeking to start a presence on the Web must have its catalog automated. What is most obvious about automation is that it develops library services and increases accuracy, efficiency and productivity in performing a variety of library operations. Some added benefits of library automation are follows:

1. Search strategies that are beyond those that can be used with card catalogs are enabled by users. Card catalogs can be shared only by subject, title and author Online Public Access Catalogue (OPACs) can be accessed by subject, title and author and keyword. In addition, users can expand their search by using Boolean operation (AND, OR, NOT) and by combining search strategies for example; subject and author, title and author. In addition, OPAC users may restrict their search result by such features as publication date, type of material for example; video, book, and magazine, reading level and language, and they can sort bibliographies by publication date, author, and title.

2. The windows based OPACs permit for hyperlink searching, a new feature that was not possible in character base system for example; Disk Operating System (DOS). Through a hyperlink search a user can find connected records in the automated systems database under a subject or word. The user can also locate related resources that appear on the Web via the Machine Retable Catalogue (MARC) field 856 when this field is activated. Author search feature that was not feasible in character based system is the optical search. An OPAC that has a Graphical User Interface (GUI) capability permit clicking on icons that represent function instead of clicking on command buttons only. The visible representation of search functions is really attractive to young children mostly, because visual interfaces that are based on pictures or icons are generally augmented with colors and uncomplicated to read text.

3. It allows users to search the library's collection can be searched by users irrespective of their location outside the library's walls, patrons who are equipped with a computer and a modem can dial into the OPAC from remote location, an office and home. Majority automation software is compatible with the Z39.50 standard. Having the Z39.50 standard permitted users to search OPACs on the web using search features and common interface. This means that concerning of the automation software, operating system for example; Windows NT, Windows, UNIX or computer platform users have, they can search these OPACs using usual search interface.

4. It gives users with timely access to library collection can be placed on shelves as soon as items are processed and MARC data are downloaded into a database. When MARC data are purchased with material orders, they remove require for time consuming original cataloging.

5. It supports new means of information retrieval by introducing users to global information. The success and popularity of OPACs make them perfect to coexist with CD-ROM database, the Web, and other information system a on a libraries computer. A Z39.50 acquiescent OPAC allows users to search Z39.50 acquiescent database using the search syntax of the OPAC, thereby eliminating require learning all databases search syntax.

6. It eliminates routine work or performs them more effectively. The circulation function, with include overdue notices, check-in, check-out, and inventory, repetitive, is tedious, and time consuming. Automating these functions can save excellent amount of time.

7. It simplifies and expedites in inventory of library collection. The automated inventory is performed by scanning all items barcode using a hand head device, downloading scanned documents into the automated system, and generating a variation of customized reports. In a non-automated condition, this procedure involves checking a shelf list card against the specific item on the shelf, flagging the shelf list cards for misplaced items, and generating inventory reports manually. The collection inventory that works two months to complete in a non-automated environment may take two weeks in on automated environment.

8. It encourages collaborative collection development and resource sharing for example; inter library loan. Automated libraries and media centers can develop a union catalogue and join bibliographic consortia and utilities. A user who does not find a book or item of interest in the libraries local OPAC plenty of identity the libraries in the consortia or union catalog that have it. The user can then borrow the item through Inter Library Lone (ILL) or by checking in out from a designated library.

9. It enables libraries and media centers to develop and export MARC records. Records obtained from book suppliers or other sources on disk are imported into an automated system to save cataloguing time. Records can be exported from one system and imported into a recently develop automated system without incurring new cost for retrospective conversion.

10. It decreases the amount of time spend on budget administration, record keeping, serials management and material acquisition.

11. Users are inspired and equipped with problem solving, information retrieval skill, and provide them with long-lasting learning

experience. In addition, reinforces a positive view about the library and upgrade the image of the information professional or library specialist. Patrons view the library or media center as an essential place for gaining access to global information and consider information professionals or media specialist a powerful information provider.

12. It permits for cataloguing Internet resources and for upgrades them into a local system. Automated system also includes tag 856 to link Uniform Resource locator (URLs) to MARC 21 records, although these features enhance a library's collection or media centers, they do present some problems. Internet resources are stateless and volatile, so they need validation on a regular basis. If such validation is performed in house, it becomes differ time consuming. Various automation suppliers or vendors have provided solution to this quandary. One of these is to subscribe to an off line URL service to obtain acceptable URLs on CD-ROM arrives, some of the URL's services. A suppliers or vendor hosts the URLs on a server and updates them always. Every URL that is activated in libraries local automated system passes through the supplier's server of URLs for validation before it is requested from the Internet. This service is more advanced than the offline services, but may be more costly.

13. It can be used in collection mapping. Plenty of automated systems have the ability to create collection maps to use for collection growth. In consortia, creating such maps manually becomes very boring and time consuming.

3.2 Barriers of Library Automation

1) The various library activities like books acquisition, technical processing, and circulation and reference services as brought about fear as it relates to employment and technophobia. In other words, that human interference is required everywhere. The various activities in the library still required a level of manpower. The data which is entered at the time of ordering can be used for cataloguing with some changes. It will eliminate multiple card preparation and subsequent filling. This saved manpower can be utilized for analytical cataloguing or introducing new services. This way there will be no effect on employees.

2) The cost implication of the technology has resulted to a level of fear with understanding that hardware and software would be expensive and unaffordable. Actually, cataloguing system is the most important which forms the base for other library activities.

For this purpose, UNESCO has developed PC based software CDS / ISIS and is available at a very low price in developing countries. It works on IBM compatible PCs or UNIX platform. WINDOWS version is also available. The data can be exported in ISO 2709 format without difficulty. INFLIBNET has also developed a public domain library software ILMS which is suitable for DOS and UNIX platform. Lately the PCs and other accessories like printers etc. have become cheaper and so they are affordable.

3) The library staff has to undergo extensive training The training for the operating the computer system and the programme is required which is given by the software developers but training for CDS/ISIS is available at INSDOC, INFLIBNET and DRTC. For cataloguing a minimum training for one or two weeks will be enough for the librarians. The user can transfer the same data to network environment. If there is a systems department with computer professionals' maintenance becomes easy.

4) Lack of support from the management, may be owing to budget constraints If the management support is not enough then it may be the barrier for development of the library. In this situation librarian has to take more efforts in convincing the management that users will benefit by the automation. Also, the initiative and communication skill play a major role in convincing the management to get more attention.

5) Retrospective conversion of data the manpower saved by computerized automation can be utilized for conversion and also for analytical cataloguing. This can be achieved in a time bound project. (Tiwari Purushotham, 2010).

3.2.1 Characteristics of Automation

The important characteristics of an automated system are follows:

1) The processes/ operations are carried out automatically.
2) Reduced or avoid human action and thus save labor and time.
3) It speeds up efficiency and speed in operations.
4) Spends the range and raises quality of existing services.
5) Immediate answer to multiple quarries.

4.0 CONCLUSION

Automation helps in developing library services and increasing accuracy, efficiency and productivity in performing the various library operations. Some benefits of library automation include, allowing users to search the

library's collection from location outside the library's walls, users who are equipped with a computer and a modem can dial into the OPAC from remote location, an office and home and encouraging collaborative collection development and resource sharing for example; inter library loan. A library whether academic, national, public or specialist main functions and objectives are to collect disseminates information to its users efficiently and effectively application of Information Technology in the organization and services of libraries.

5.0 SUMMARY

This unit discussed the benefits, barriers, challenges, characteristics and need of library automation.

6.0 TUTOR-MARKED ASSIGNMENT

1. List and explain five benefits of library automation.
2. Identify some barriers of library automation.
3. Briefly summary the need of library automation.

7.0 REFERENCES/FURTHER READING

Gopal, Krishna (2005). *Modern Library Automation*, P.20. Delhi: Authors Press.

Gupta, Sangita (1995). *Manpower Needs Automation Libraries*, p. 2-3. New Delhi: EssEss Publication.

Singh, Gurudev (2007). *Introduction to Computers for Library Professionals*, p.107. New Delhi: EssEss Publication.

Sangale, D.B. (2015). ICT Application and Web Based Services in Library and Information Science. ASM's International *E-Journal on Ongoing Research in Management and IT*, Vol 5(2) pp 9-14.

Tiwari P. (2010). *Library Automation*, p.242. Delhi: A.P.H. Publication Corporation.

Younis, M. (2012). SLMS: A Smart Library Management System Based on an RFID Technology. *International Journal of Reasoning-based Intelligent Systems*. Vol 16(1) Pp 54-68.

UNIT 4 NETWORKING

CONTENTS

1.0 INTRODUCTION

The concept of networking is related to telecommunication itself. There has been an enormous development of communication which is due to the advancement in communication technology such as blue-tooth and WAP technology. There is a shift towards a seamless environment where every forms of communication are merging. Networking are of different types; Local Area Network, Metropolitan Area Network and Wide Area Network. These networking types are unique based on their respective environment. There are some hardware and software requirements of library network.

2.0 LEARNING OUTCOMES

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

- define the concept of networking.
- identify and the types of networking
- describe the identified types of networking
- identify and explain the hard and software requirements of library networking.

3.0 MAIN CONTENT

3.1 Networking

The uniqueness of technology lies within the speed. There is increasing invention of mind blowing electronic revolution and computers which has influenced our lives making it easier and simpler. The concept of

networking is not new as its existence is comparable with telecommunication itself. Computers enable interactions over wide assemblages of wires, microwaves and fiber optics. The connotation of a computer network is based on any set of computers or devices connected to each other, a collection of hosts that are capable of communicating with each other using a single technology can be described as a computer network. It often depends on the services of a number of specific hosts that transmit data between the participants. Sites are referred as small collections of hosts. The increasing complication of the network environment, together with the increase in user access as physical computer, brings into sharper focus in issues on; use of access tools and navigational information discovery. The design of a dependable network services, which are appropriate for direct use by a non-specialist without experience, training and support remain importance with a shift from uncertain implementation of technical characteristic.

3.2 Types of Network

1. LAN (Local Area Network) In a Local Area Network (LAN), requires the linkage of two or more computers within an appropriate defined area such as office building, campus and room. It Requires a quite few numbers of users. It is broadly used to connect personal computers and work station aimed at exchanging information and sharing resources. Three characteristics differentiate the Local Area Network from other types of networks namely; size, topology and transmission technology. LAN links a number of computers (work station) together to permit many people to utilize the same computer programs and share information. Each and every user can access the network form an individual computer work station. It provides multiuser environment which permitted sharing of data as well as expensive resources like printer and storage. It also provides connectivity, modularity, security superior performance and reliability in its operation. It can suitable any site requirement and in it any number of users can be tailored to suitable any type of application. Main advantage of LAN is the reduction of software and hardware costs because users can share several computers, secondary devices such as LAN platform software, modem, hard disks and color plotters. Another advantage is that the users can share the same data (Mandal, Datta &Podder 1998).

2. MAN (Metropolitan Area Network) The MAN network is a larger version of LAN. It is called metropolitan because of its level of coverage. In other words, it covers an area of a large city which might be either public or private. Diverse transmission media and hardware are frequently used in MANs because it has to efficiently

cover a distance of tens of kilometers. A Metropolitan Area Network (MAN) can sustain both voice and data, and could be linked to the local cable television network. One or two cable makes up a MAN and does not include switching elements, which shunt packets over one of the potential output lines.

3. WAN (Wide Area Network) A WAN is composed of a number of autonomous computers that are distributed over a huge geographical area, often a continent or country. It can be implemented with the support of public networks as well as private networks. Private networks are developing within a one corporation. The implementers lease circuits for private use which are normally telephone lines and construct a network. On the other hand, public networks are developing by government telecommunication agencies. The switching and transmission facilities are shared by several corporation and organizations. The majority of WANs, the network contains numerous telephone lines or cable. It has various uses and it makes file transfer simply. They are useful in data collection. In addition to these, WANs have plenty of other users, including software distribution, the capacity to use expensive resource, such as high resolution color graphic printers and computer servers, importantly and remotely, the capacity to manage networks centrally. Wide networks are normally limited to use by the large government agencies and organization due to high costs involved in maintaining and building them. It is a satellite based wide area network with national coverage. For example: MALIBNET, PUNENET, BALINET,

3.3 Hardware and Software Requirements of Library Networking

A) Hardware Requirements

All of the member libraries must have at least some of the following hardware. However, the central library (Host) may need most of the hardware mentioned below, but with additional disk space. Hardware specifications are given below:

1. Server:

i. 1.2 GB HDD
ii. Pentium @ 233 MHz with 64 MB RAM
iii Windows-NT Operation System
iv. Color Monitor (SVGA) v.32 x CDROM Drive
vi. MS-SQL Server 6.5

2. Client:

i. 1.2 GB HDD
ii. Pentium @ 233 MHz with 64 MB RAM
iii. Windows-98 Operating System
iv. Monitor (SVGA)
v. 1.44" Floppy Drive

3. Other Hardware:

i. Modem (With dedicated phone line)
ii. Fax (With dedicated phone line)
iii. At least two determine printers
iv. DD-ROM drive
v. Cartridge tape drive
vi. One letter quality printer (preferably laser printer)

B) Software Requirements

All of the participating libraries must have the following software need:

i. Software for effective network operation as well as the library automation
ii. UNIX (latest version, to begin with, it may be optional)
iii. DOS (latest version)
iv. World processors
v. LAN (Novel/Ethernet, to begin with, it may be optional)
vi. DBMS packages
vii. Software for E-mail (at list PROCOMM)
viii. IR packages CDS/ISIS
ix. Programming languages: C/C++
x. Library automation: Granthlaya / Libsys / any other similar packages.

4.0 CONCLUSION

The interaction of computers in a space or outside the physical space is aided by networks. When computers are wide assembled by wires, microwaves and fiber optics it's simply a process of networking. The simple meaning of a computer network is, any set computers or devices attached to each other, However, a computer networks as a collection of hosts that are capable to communicate with each other using a single technology, frequently by relying on the services of a number of dedicated hosts that transfer data between the participants. The types of networks; Local Area Network, Metropolitan Area Network and Wide Area Network determines the extent of coverage and connection of such network. Hardware and software are requirements of library networking and each has its specification.

5.0 SUMMARY

Remain we have looked at the concept of networking as it relates to the library; similarly, this unit identify the types of networking and also explore the hardware and software requirements of library networking.

6.0 TUTOR-MARKED ASSIGNMENT

1. What is networking?
2. Distinguish the types of networking.
3. Identify the specification of hardware requirement of library networking.

7.0 REFERENCES/FURTHER READING

Arora, Jagdish. (2001). *Web Based Digital Resources and Services: Trends and Innovations*. CALIBER- 2001. Pune. http://hdl.handle.net/1944/105.

Deka, Prasanta Kumar. And Singh, Sanjay Kumar. (2007). *Web Technology for Library in Digital Environment with References to College Libraries of Guwahati*, 5th Convention PLANNER 2007, Guwahati University, Guwahati.

Gahale, P. D. (2013). *Library Network and Digital Library*, p. 12. Kanpur: Garima Prakashan.

Kinner, L. A. (2009). The Integrated Library System: From Daring to Dinosaur? *Journal of Library Administration*, Vol 23(1) pp 401-417.

Singh, Manvendra (2006). *Computerization in Libraries*, p. 1. New Delhi: Mahaveer & Sons.

UNIT 5 LIBRARY NETWORK

CONTENTS

1.0 INTRODUCTION

The increasing complexity of the growth in user access as physical computer brings into sharper focus the need for easy to use navigational information discovery and access tools. A clear trend is towards a situation in which the end user interacts directly with the information source, rather than through a human intermediary. Providing information services to group of libraries through sharing of resources of the participating libraries are the main and basic purpose for developing a network. The essential functions of networking should include the promotion of resource sharing, union catalogues, and systematic entries of acquisitions and implementation of international standards for making of records uniformly.

2.0 Learning Outcomes

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

- explain the concept of library network
- understand the aims and objectives of library network
- identify the functions of library networks and need for library network.

3.0 MAIN CONTENT

3.1 Library Network

The springing increase in the network user's population has resulted into a number of non-technical people who have learned the advantages of creation network applications, such as electronic mail and interested in

travailing the increasing availability of networked information resources. The increasing complexity of the growth in user access as physical computer brings into sharper focus the need for easy to use navigational information discovery and access tools. Information resources appear to be available faster on electronic format than on printed. Hence, there is a shift from the speculative and undecided implementation of features that as technical and towards the blueprint of consistent network services, which permits and enable non-specialist to use directly without support and training. A clear trend is towards a situation in which the end user interacts directly with the information source, rather than through a human intermediary. Tools have begun to emerge, they are at present developing from technical and computing tend to lack a sophisticated view of the information transfer process. In this concept some of the main information discovery and retrieval tools are discussed as examples of these emerging trends it is clear however that these are merely the ancestors of future approaches which will more truly address the underlying problems.

One area in which librarians have been active has been in the complication of resource guides to network facilities this has been a particular feature of the research networks environment. The oriented guide or online text document is no well suited to comprehensive converge of the fast changing network environment. A database which can be queried from any network node can change resources and location. The scale of the problem is such that no single centralized and updated guide is likely to be feasible in providing these mechanisms. A resource guide can consist of a central database which can be updated from local sources with local information or a distributed database which can redirect queries to the local site for processing in a web of co-operating databases. A distributed X.500 directory would seem an attractive option here, although there is doubt whether the present standard is capable of providing an adequate solution at the scale which the problem requires. The distributed approach presupposes a level of agreement on standard descriptions for classes of item and on protocols for the routing of queries between local databases. To provide the user with immediate access to the resource the guide would need to contain routing information as well as a description so that sought items could be retrieved in full without further action by the users.

Several proposals have been made on schemes for organizing and uniquely identifying resources particularly in the internet world. There are however a number of problems with electronic information item in such an uncontrolled environment the possibility of loss of information in different versions and at content between different instances of the same record the problem of version controls the identification of name changes in for example filenames for items with the same content. The use of MARC format cataloguing records has been proposed as a more

traditional solution and the feasibility of this approach has been investigated by the OCLC organization. The final report proposed the creation of a new field for location and access information but suggested that the relative scarcity of formally published information made the extension less attractive. No clear scheme has emerged as having majority agreement and it may be that a traditional universal citation and mapping approach is not an appropriate solution. Most attention at the present time is focused on the creation of directory tools.

The Top node project is an attempt to create an overall directory of directories, catalogues, resource lists, network services and tools together pointers to other sources of information. Top node has developed a proposed record format which includes pathway information for locating an item as the structure for a centralized database which will update local copies of the data. A newly formed Internet Network Information Centers proposes to develop a similar directory of directories and maintain resource description files with regular updates. This will be a distributed information base and will be able to dispense resource information in discipline specific packets.

Hytelnet is a terminate and stay resident hypertext browser which provides an IBM-PC user with information on access to library catalogues, campus-wide information system, free-nets, bulletin boards and other network resource tools which may be contacted through the internet. The program gives information on using the Telnet IP protocol to access these systems but does not make the connection itself. Despite this it is widely available in the public domain and is updated regularly. The package is a useful adjunct to the desktop workstation user, acting as an aide-memory rather than masking the complexities of internet communications. Online directories which do exist have much more limited aims and cover only small, specific areas. The WHOIS sever is presented on many internet sites, containing information on network users on a limited scale, by offering directory services related to the organization to which it belongs there is no attempt to share a common directory with other organizations. Servers of this type however can be accessed from other points on the network either by remote log in or through electronic mail. Bulletin boards and campus information systems may also contain directory information of this short on a rather ad hoc basis and with often unsophisticated searching mechanisms. Much of the work on more structured information discovery and information management tools has again emerged from the internet, reflecting the great amount of freely available information and a user community with the interest and skills to develop the tools. For this reason, such tools are designed to run across TCP/IP based networks and normally demand a direct connection from a host system or for the user to have remote access to one. They have usually developed from research project and many are

in the public domain rather than being commercially available as products although there is a tendency for the most successful to move in this direction. Information discovery tools are software programs which perform specialized task for one particular kind of resource: retrieval of text documents identification of software programs or management of user access. They are designed to perform two main interrelated tasks to manage and make available the contents of large databases and disk directories from one location and to assist a remote user in finding and accessing information from various sources at different locations.

The tools described here use a client-server model to achieve these two functions. The server is responsible for maintenance and management of the information base dispensing answers to queries submitted by a client. The client is responsible for interacting with the user in the most appropriate way managing the user interface and passing queries back to the server in an agreed format without requiring the user to know what this is. A protocol binds these two parts together forming the common language into which both queries and results are coded foe transmission across the network. Since these tools have evolved from the internet environment, purpose built protocols of this sort are predicated on the use of TCP/IP as the underlying transmission medium. (Sing Manvendra, 2006)

3.2 Aims and Objectives of Library Networks

The main and basic purpose for developing a network is to provide information services to group of libraries through sharing of resources of participating libraries of the network. This may guide member libraries to depend on access to document held in the other member libraries than depending only on their respective collection. The important and main aims and objective of library network are stated as the following.

1. To upgrade resources utilization and service level at the particular libraries by providing automation provision in the following areas

a) Fund accounting and acquisition.
b) Circulation
c) Serial control
d) Cataloguing - assist member libraries in cataloguing of serials, books, catalogue production and non-book materials
e) User services – implementation electronic services in the libraries for speedy communication of information

2. To providing resource sharing and co-operation activities between libraries by providing reliable and efficient resource sharing, for example:

a) Document Delivery Services – providing the copies of the document which is not accessible in their respective libraries
b) Inter library loan (ILL) for maximum use of resources
c) Access to international and national database
d) Refresher course facilities and manpower training – stimulating, promoting and co-ordination research and training programmed for network members and library staff
e) Communication link through publication and inter – personal communication

3. To started referral centers to monitor and maintain a central on-line union catalogue of serials, books, non-book materials and facilitate catalogue search of all the participating libraries.

4. To manage efforts for appropriate collection expansion, growth and reduce unneeded replication wherever possible. The purpose is
a) To reduce the operational cost of the collection development
b) To develop collection by mutual cooperation
c) To control the rate if easing cost of the collection development

5. To create a specialist bibliographic database of non-book materials, books and serials for search and access.

6. To harmonize with other relevant networks which could be either be international, national or regional networks for exchange of documents and information for the use of libraries and user.

7. The provision of online information services helps to develop a database of specialists.

8. To advance standards and consistent guidelines in method, techniques, procedures, software and hardware services so as to promote adoption in definite practice by every library, which facilities towards optimization and facilitate pooling, sharing and exchanging resources.

3.3 Need for Library Networking

1. The problem is the increase prices of publications, which has pretentious collection development in libraries.
2. The ratio of increase of knowledge and information is faster than before and it is ever increasing. Therefore, it has become not possible for all libraries to acquire every document that is published in the library.

3. Due to the emergence of recently developed subjects, readers need pin-pointed and exact information that may be available in other libraries.
4. The budget and funds of the library is not raise and this makes it complicated for the individual library to provide services from its individual collection.

At some places library networks have been established for sharing of resources due to redundant wastage of finance that can be avoided. Sometimes all the networks especially those that has essential functions do not conform to other libraries. The essential functions should include the promotion of resource sharing, union catalogues, and systematic entries of acquisitions and implementation of international standards for making of records uniformly. Considering this the functions of a typical library networks might fall into the following three categories.

A) Information Services

1. **Inter library loan service –** it means that every member library may need having the facility to photocopy for delivering the documents.
2. **Reference and referral service –** every member library may need the facility of having dedicated E-mail services or/ and telephone.
3. **Access to databases –** to prepare backdated bibliography for the purpose of browsing to know whether or not a document is accessible.

B) Management Services

The management services i.e. function that supports the network administration are:

1. Evaluation of the networks, this is done through
a) Collection of statistics
b) Analysis of performance of the network
c) User studies

2. Establish an operational system that implements the function mentioned above

3. Training activities. These are done through
a) Staff development programs
b) User oriented programs

4. Communication of activities such as
a) Holding of meetings. etc

b) Publication of newsletter

5. Cost analysis. It involves
a) Fess to be collected, determination of cost, etc.
b) Allocation of budgets

C) Technical Services

Function that serves the libraries i.e. the technical services are:
1. Technical processing involved in acquisition
2. Co-operative collection development program
3. Circulation control system
4. Cataloguing and other means of resources to identify and to locate documents. (Gahale P.D. 2013).

4.0 CONCLUSION

An indecisive implementation of technical features and the design of consistent network services is changing, this is because it is apt for direct utilize by a novice with none or less extensive support and training. A clear trend is towards a situation in which the end user interacts directly with the information source, rather than through a human intermediary. It should be noticed, that in order to provide information services the development of network is key to group of libraries through sharing of resources of the involved libraries of the network. This may aid member libraries to depend additional on access to document held in the other member libraries than on depending only on their respective collection. The functions of library networking should be able to promote resource sharing, union catalogues, and systematic entries of acquisitions and implementation of international standards for making of records uniformly.

5.0 SUMMARY

In this unit, the concept of library networking was adequately explored, likewise the purpose of networking in libraries, functions of library networks and need for library networking.

6.0 TUTOR-MARKED ASSIGNMENT

1. Briefly discuss networking in libraries.
2. Identify some aims and objectives of library network.
3. What are the functions of library network?

7.0 REFERENCES/FURTHER READING

Arora, Jagdish. (2001). *Web Based Digital Resources and Services: Trends and Innovations*. CALIBER- 2001. Pune. http://hdl.handle.net/1944/105.

Deka, Prasanta Kumar. And Singh, Sanjay Kumar. (2007). *Web Technology for Library in Digital Environment with References to College Libraries of Guwahati*, 5th convention PLANNER 2007. Guwahati: Guwahati University.

Gahale P. D. (2013). *Library Network and Digital Library*, p. 12. Kanpur: Garima Prakashan.

Jackson, M. (2002). The Advent of Portals. *Library Journal*, 127 (15), 36-39.

Madhusudhan, M. & Nagabushnam, V. (2012). Use of Web Based Library Services in selected University Libraries in India: A Study. International *Journal of Library and Information Studies*, 2(1). Retrieved from http://ijlis.org/img/2012_2_issue_1/1_20.pdf.

Singh, Manvendra (2006). *Computerization in Libraries*, p. 1. New Delhi: Mahaveer & Sons.