CONTENTS

UNIT

1

DATA: DEFINITION, TYPES, NATURE, PROPERTIES AND SCOPE

STRUCTURE

1.0 OBJECTIVES

After reading this Unit, you will be able to:

- Explain the meaning of data:
- Describe their types, nature and properties:
- Examine the scope of data in different fields:

1.1 INTRODUCTION

A study of this unit will be useful in getting yourself acquainted with the meaning of data, their types, nature and properties. It will also enable you to assess the scope of data in different fields of knowledge and to recognize how important it is to acquire data in order to enrich library service.

1.2 MEANING OF DATA

The word 'data' is Latin in origin, and literally, it means anything that is given. Different sources have defined the word in different ways. Webster's Third New

International Dictionary defines data as "something given or admitted: facts or principles granted or presented: that upon which an inference of argument is based, or from which an ideal system of any sort is constructed"

UNESCO defines data as 'facts, concepts of instructions in a formalized manner suitable for communication, interpretation of processing by human or automatic means'

1.3 TYPES OF DATA IN SCIENCES

Data with reference to time factor:

Based on time factor, data can be classified into the following two types

(a) Time- independent data

(b) Time –depent data

Data with reference to location factors:

(a) location independent data –

(b) location dependent data –

Data with reference to mode of generation :

(a) Primary data –

(b) Derived (reformatted) data –

(c) Theoretical (predicted) data –

Data With reference to nature of quantitative values : These are categorized into the following two classes :

(a) Determinable data – Data on a quantity, which can be assumed to take a definite value under a given condition, are known as determinable data.

(b) Stochastic data - Data relating to a quantity, which take fluctuating values from one sample to another, from one measurement to another, under a given condition are referred to as stochastic.

Data with reference to terms of expression : The categorization in this case yields three classes of data :

(a) Quantitative data – These are measures of quantities expressed in terms of well –defined units, changing the magnitude of a quality to a numerical value.

(b) Semi –quantitative data – These data consist of affirmative of negative answers to posed questions concerning different characteristics of the objects

(c) Qualitative data –

Data with reference to mode of presentation :

(a) Numerical data –These data are presented in numerical values, e.g., most quantitative data fall in this category.

(b) Graphic data –Here data are presented in graphic form of as models. In some cases, graphs are constructed for the sake of helping users grasp

a mass of data by visual perception. Charts and maps also belong to this category.

(c) Symbolic data –These are presented in symbolic form, e.g., symbolic presentation of weather data.

Types of Data in Social Sciences

(i) Data with reference to scale of measurement:

(a) Nominal Data –

(b) Ordinal data –

(c) Interval data –

(d) Ratio data –

(ii) Data with reference to continuity:

(a) Continuous data -

(b) Discrete data -

(c) Data with reference to number of characteristics :

(d) Univariate data –

(e) Bivariate data –

(f) Multivariate data –

(iii) Data with reference to time:

(a) Time series data –

(b) Cross sectional data –

(iv) Data with reference to origin :

(a) Continuous data –

(b) Secondary data –

(v) Data with reference to characteristic :

(a) Quantitative data –

(b) Qualitative data –

1.4 NATURE AND PROPERTIES OF DATA

1.4.1 Types of Data in Social Sciences

- Numerical data
- Descriptive data
- Graphic and symbolic data
- Enumerative data
- Descriptive data

1.5 PROPERTIES OF DATA

1. **Amenability of use:** From the dictionary meaning of data it is learnt that data are facts used in deciding something. In short, data are meant to be used as a base for arriving at definitive conclusions. They are not required, if they are not amenable to use.
2. **Clarity:** According to the CODATA definition, data are a crystallized presentation. Without clarity, the meaning desired to be communicated will remain hidden.
3. **Accuracy:** Data should be real, complete and accurate. Accuracy is thus, an essential property of data.
4. **Essence**: In Social Sciences, large quantities of data are collected which can not be presented, nor is it necessary to present them in that form. They have to be compressed and refined.
5. **Aggregation:** Aggregation is cumulation or adding up.
6. **Compression:** Large amounts of data are always compressed to make them more meaningful. To present the essence of the matter, it is necessary to compress data.
7. **Refinement:** Data require processing or refinement. Conclusions can be drawn only when data are processed of refined.

1.6 SCOPE OF DATA

1. **Utility of Data** – Data have great utility of their use in the growth of knowledge. No research, investigation, experiments, etc. is possible without reference to data already existing. Nor does any research end without generating new data. No decision making system can work, nor can a problem be solved, without adequate use of data. No planning is conceived without enough data.
2. **Sizes of Data** – According to an Aslib statement, scientific data include:
   - The properties and attributes of an individual entity;
   - The values of one property over many entities ;
   - Variations of one property of one entity under different conditions;
   - Classification of entities based on properties; and
   - Quantitative relations between two or more entities.

   There are equations and formulae, properties and values, actions and reactions and conditions and variations.
3. **Period of Data** – Data collection for any research problem must indicate the time span. It should be clearly stated whether data period is current or cumulative. In sciences the interpretations and conclusions are mainly drawn keeping in view the whole text of the subject.

SUMMARY

Data constitutes the basis for drawing conclusions, taking policy decisions and formulating and implementing plans. In order to know the nature of data, it is first necessary to categories them into various types.

By nature, data are either quantitative of qualitative. Quantitative data are numerical and qualitative data are descriptive.

All techniques used in research are aimed at collecting objective data, which lead to the creation of new knowledge. The scope of data in library service can not be over emphasized. Data sources form an equally important part of library resources.

QUESTIONS

Q-1 Write a note on the parameters used in categorizing data in Science?

Q-2 Write a paragraph explaining the meaning of data describes its scope?

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UNIT

2

KNOWLEDGE: DEFINITION, TYPES, NATURE, PROPERTIES AND SCOPE

STRUCTURE

2.0 INTRODUCTION

Knowledge has always been a prime source through which human societies have advanced materially and elevated themselves spiritually. Knowledge is also seen as personal and public knowledge, as tacit/implicit and explicit knowledge, pooper sees knowledge as three words viz., physical, subjective and objective knowledge.

Knowledge structure growth and development has a pattern. This aspect of knowledge formation its structural growth and related aspects are studied by scholars.

2.1 KNOWLEDGE: DEFINITION

The meaning if "knowledge" as given by the Random House Dictionary (RHD) and words synonymous with 'knowledge' are:

- Acquaintance with facts or principles, as from study or investigation ; general erudition;
- Familiarity or Conversance, as with a particular subject or branch of learning;

- Acquaintance or familiarity gained by sight, experience, or report; as for example 'knowledge of human nature';
- The fact or state of knowing , clear and certain perception of fact or truth ;
- Awareness, as of a fact or circumstance;
- That which is or may be known; information ; and
- The body of truths or facts accumulated by mankind in the course of time, as for example 'man's knowledge of the moon '

2.2 KNOWLEDGE: NATURE, CHARACTERISTICS/ PROPERTIES

We shall present below some of the important characteristics of knowledge;

- Knowledge is infinite.
- Knowledge is dynamic, continuous, and ever expanding.
- No final word can ever be said of any discipline; they are at best provisional, subject to criticism, correction, contradiction, change or modification.
- A gifted man may acquire wide knowledge, deep wisdom and spiritual insights but all these are lost when he/she dies except those that he/she had recorded.
- Knowledge once parted to others, results in no loss to the person.
- Knowledge becomes obsolete.

2.3 KNOWLEDGE: TYPES AND SCOPE

Personal and public Knowledge

Knowledge is broadly divided into two groups, personal knowledge (private knowledge) and social knowledge (public knowledge). Personal knowledge is the knowledge of the individual and as such is available to others only if communicated.

Tacit and Explicit Knowledge

The above two groups of knowledge is expressed slightly differently by Michael Polayani. Explicit knowledge is that expressed to others, orally or in a recorded form and tacit knowledge is personal knowledge that may or may not be expressed by an individual.

However tacit knowledge is as important as explicit knowledge. In the new discipline of knowledge management, it is this tacit knowledge, which is valued very highly, constituting the real strength of a company. It is this knowledge of individuals that need to be extracted by various means and methods, to build up the organizational strength of a company to be competitive in a market.

The following are the five preliminary modes of formation of subjects and isolates initially identified and expounded by Rang Nathan.

UNIT

3

INFORMATION DEFINITION, TYPES, NATURE, PROPERTIES AND SCOPE

STRUCTURE

3.0 INTRODUCTION

Human mind is a generator of ideas. These ideas are based on certain facts. These facts are derived by continuous observances and experiences. When these facts hold the test of time. They become data i.e. something which occurs, which can be seen, felt and observed. When these data's are arranged in an organized manner and presented or told or passed on to some one, it becomes 'information', e.g. lightening had been observed from the very beginning of civilization, as an event that occurred before rain. After this lightening came the thunder which proceed the light. So the facts that were deduced were lightening, thunder, rain. Thus, the piece of information could be stated as, usually before a heavy rain we get lightening and thunder. But this information is raw, later when it will be scientifically tested, will it be proved that as lightening travels faster than sound, it is seen first but the sequence is that the thunder occurs first, resulting in lightening and rain . Now, this is accepted information which can be told and retold with authenticity.

Information originates from an idea that creeps in the mind, as a result of observation. These idea/facts when organized or processed to convey significant

meaning about something, is information. Stores of information represent a new kind of translatable

Commodity, ranking in future human importance alongside material and energy resources.

"Information" must be *differentiated from data*. "*Data*" *whether it is numeric* or bibliographic, relates to facts, figures, or recorded documents, expressed in the form of symbols. But for 'data' to transform itself to 'information' should be processed, organized and presented to a person or agency, at the time needed for taking some action. Thus, information comprise three main characteristics of timeliness, person affiliation and action orientation.

3.1 CONCEPT OF INFORMATION

The term 'Information' originated from 'formation' and 'forma'. Both these terms define the size and format of any entity, along with the indication towards the construction of a pattern.

The dictionary meaning of the term is, "the knowledge communicated or received concerning a particular fact or circumstance." In other words, information means "to inform or to tell or a thing told". Information may also be termed as knowledge, as knowledge is what we know or the portion of information which is in our knowledge.

3.2 INFORMATION DEFINED

The term 'information 'came into existence in USA, as an alternative for documentation that could be more co-extensive with the recent developments in mechanization, viz. the advent of computers and its use in information management. The use of this term during late sixties spread over to Great Britain.

The term 'information' has been defined by Eliahu Hoffman as: 'Information. is an aggregate (collection or accumulation) of statements, or facts or figures which are conceptually (by way if reasoning, logic, ideas, or any other mental "mode of operation" interrelated (connected)

According to J.H. Shera "Information, both in the sense, it is used by the biologist and in the sense we librarians use it, it is 'fact'. It is the stimulus we receive through our senses. It may be an isolated fat or a whole cluster of facts but it is still a unit, it is a unit of thought." J.becker opines about information as "facts about any subject" whereas in N. Belkin's view "Information is that, which is capable of transforming structure."

3.3 THEORIES OF INFORMATION

Mathematical Theory of Information

Early theory of information was based on the classic research of Shannon and

Weaver, who suggested that the amount of information in a message is related to the size of the vocabulary available in it. As they were working in the context of communication engineering, computers and telegraphy, the amount of information was measured in 'bit.'

The mathematical theory of information, thus evolved, stated that the amount of information in a message, is related to the probability ratio of the message i.e. if a message has lesser number of terms, there is possibility of 50% of information reception, as there are equal chances of guessing either correct or incorrect. And if, the number of terms is more, the probability of getting more and correct information is high. But if, the recipient has prior knowledge of the same, it will reduce the amount of information in a message.

Semantic Theory of Information

According to this theory, information in a message is increased by the prior knowledge of the recipient. This theory was referred to by Fairthorne as the phlogiston theory of information, in which an earlier knowledge of the message would increase the information content for a particular recipient , as he would be able to extract more or fully because he knows the basics of that concept.

Whittemore and Yovits Theory

The two models elaborated earlier are not fit to work as an information unit, so Whittemore and yovits generalized another information system. They suggested that, information is data of value, for decision making.

Brookes Information Theory

Brookes tried to differentiate between information and knowledge. He opined that the individual knowledge, that has been collected by himself, when it is collected together and presented for public use, does it become knowledge.

1. Language, symbols, alphabets, codes and syntax.
2. Content, which enables us to know about the information.
3. Structure, the format or organization of information and its logical relationship between statements or elements.
4. Quality, which is characterized by completeness, accuracy, relevance and timeliness of information.
5. Quantity, which can be measured by the total number of pages, words, characters, bits, documents, etc.
6. Life, the total span of time during which value can be derived from the information.

These parameters of information further lead us towards certain characteristics of information. These characteristics are very much related to various features of information which may assist in differentiating it from knowledge. They are:-

1. Information is the flow of message-information is actually a piece of message.

2. Information is transitory by nature-Another important feature of information is that, it is short lived or transitory in nature i.e. as information, when it gets collected and logic is applied to it, it is systematically organized to be known as knowledge or it converts itself to knowledge.
3. Information inherits meaning – Every bit of information has some kind of meaning inherent within it.
4. Information is particular- This characteristics of information is quite appropriate, as if it is information it cannot be vague, it has to be specific or particular.
5. Information is fragmented – This feature is self – evident as information is 'facts' and these facts are based on occurrences observed or experimented from time to time.
6. Information is dynamic – By nature, Information is dynamic i.e. it is not a static process, it keeps on being generated and including, itself in knowledge
7. Information is timely –Information is characterised by timeliness. It is bound by time limit, as a fact known, is information and after sometime it will be termed as knowledge.
8. Information is purpose oriented-Any fact/data/information has some purpose behind its origin or generation. It exists to serve a purpose.
9. Information can be recorded –As information is fact, it can be recorded in any form.
10. Information is quantitative- information can be measured by the disseminated modes.
11. Information needs person affiliation – The known facts when told to other person or passed through any mode becomes information, i.e. needs someone to carry the known material to others.
12. Information is structural –An important characteristic of information is its structural form.
13. Information is explanatory or descriptive- An important feature of information is that it explains or describes a happening.
14. Information can be abstracted or extracted –It has the quality of being abstracted or extracted – It has the quality of being abstracted or extracted as the situation may be for better and beneficial usage.
15. Information can be translated – It also has a chief property of being able to be translated
16. Information can be surrogated in place of others – It can be surrogated in place of similar occurrences, to yield the same result.
17. Information can be changed into other mediums-information has the quality of being transferred into any media.
18. Information is mainly related to abstracts and behaviors – Usually, information is related to abstracts and behaviors pertaining to an occurrence.

19. Information may be destroyed- It is characterized by the property of destruction.
20. Information may be interpreted wrongly-Information is the product of observation and experimentation; it may be generated by anyone at anytime.

3.4 NEED FOR INFORMATION

Information has become a vital resource in the present day context. With the advancement in research and social requirements, its need in an organized manner, to be possible to disseminate it for further utility has become the need of today.

Earlier, research was a result of inner urge in few men of genius and the result was not utilized for any social need. But, after the Second World War, the government also took active part in accelerating the rate of research within the country. Along with this. It gave port to the R & D institutions. All this resulted due to the following factors:-

Increase in population

Our country is the second largest, in population. This poses a great threat not only to the social development but also to the existing natural resources. With the steady rise in population, the basic necessities of life i.e. food, clothing and selter, are affected.

Increase in research and research personnel

The progress of a nation depends on its research work, which in turn depends on the available information. After the Second World War, the government took an active part in promoting R&D activities for the intellectual and national development.

Vital Source for researchers

Information is a vital source for researchers, as the entire work of a research scholar would be based on the available information. For further consultation or progress he will rely on the present information. The quality and quantity of known information would affect the research work of a scholar.

Increasing the standard of living

With an increase in research work, especially in science and technology, has helped in increasing the standard of living in the country. The results of these researchers being conducted in various institutions and research centers, help in producing better products either edible or electronic gadgets of various kinds which assist in our daily life.

National progress

The increase in awareness among the general public regarding the application of the results of research in their routine work, uplifts their standard of living. With the increase in literacy rate and utilization of available sources of information, in turn, help in the progress of a nation.

The nation can move towards independent survival, peace and prosperity.

3.5 CHARACTERISTICS OF INFORMATION

Information has a number of characteristics uncommon to other resources. Some of these characteristics are that it is:

- Shareable not exchangeable and can be given away and retained at the same time;
- Expandable and increase with use;
- Compressible, able to be summarized, integrated, etc.
- Processing a definite value, depending upon their use which may be quantified and treated as accountable asset;
- Varying in value over time in an entirely unpredictable way; and
- A source of economic and political power;

Blaise Cronin sums up the characteristics of information as follows;

"it is fashionable to speak of information as a commodity, like crude oil or coffee beans. Information differs from oil or coffee, however, in that it can not be exhausted. Over time

Certain types of information lose their currency and become obsolete, but equally, certain types of information can have multiple life cycles. Information is not depleted on use, and the same information can be used by me and be of value to an infinite number of consumers. Furthermore, information has the characteristics of a public good; more for me does not necessarily mean less for you."

3.6 INFORMATION–TYPES

According to shera, information may be categorized into the following types:

Conceptual Information

The ideas, theories, hypotheses about the relation ship which exists among the variables in the area of a problem.

Empirical Information

Experience, the data of research, may be drawn from one's self or through communication from others. It may be laboratory generated or it may be a product of 'Literature search'

Procedural Information

The methodology which enables the investigator to operate more effectively. Procedural information relates to the means by which the data of the investigation is obtained, manipulated, and tested, it is certainly methodological, and from it has been derived, the 'scientific attitude'

Stimulatory Information

Man must be motivated and there are but two sources of such motivation, himself and his environment. Stimulatory information that is transmitted by direct-communication the contagious enthusiasm of another individual-but whether directly or indirectly communicated, it is probably the most difficult of all forms of information to systematize.

Policy Information

This is the focus of the decision- making process. Collective activity necessitates the definition and objective and purpose, the fixing of responsibility, the codification of rights and privileges, and the delineation of functions.

Directive Information

Group activity cannot proceed effectively without coordination, and it is through directive information that this coordination is achieved. The different types of information are categorized on the basis of the characteristics of information. These characteristics of information help in identifying the importance and usefulness of information.

CONCLUSION

In the fast developing world, information or data is treated as "POWER". Thus, information is considered as the most powerful resource like men, material and money. For any research work, the pre-requisite is collection of all the available information relating to research areas of study. Information is essentially required commodity in any kind of research activity, only because of its immense value in forming the policy and decision making. Therefore, it is necessary that those who 'have' information play a vital role in all kinds of human activity and is an important factor for the overall progress and development of society.

QUESTIONS

Q-1 State the different kinds of barriers to information?

Q-2 Give briefly the scope of information and design its nature.

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UNIT

4

GENERATION OF INFORMATION: MODES AND FORMS & RESOURCES

STRUCTURE

4.0 INTRODUCTION

The human civilization has passed through different ages such as Stone Age, Iron Age, industrial gage, and so on. Now it has entered the information age. The countries rich in information are today in a much more advantageous position compared to those poor in information. In many cases the poor countries are obliged to purchase information from the vendor sometimes at a very high cost. The advent of internet has proved to be a great boon for accessing any information from any part of the world practically in no time. Even here in many cases, we are to pay for obtaining information. In other words information has become a commodity. The generators of information are churning out various information products, marketing them, and earning profit. The information age has given birth to information industry. The society we are living in has already been termed as information society.

4.1 GENERATION OF INFORMATION

All the while, information is being generated in the world, nay in the universe. You may be interested to know whether the generation of information follows any well –defined rule or it generates at random without any regards to any rule.

If you just take a newspaper and try to find out how the news have generated you will notice that they have generated following certain modes. The Hindustan times of 21 July 2004 contained the following headlines in its first page: i) HIV vaccine could come from AIIMS; ii) 'Soften Hurriat with foreign trips' iii) It is almost clear, monsoon's a failure, iv) NCERT's recipe for confusion. On going through the news it will be clear that the first news has resulted dew to experimentation, the second news due to deliberation, the third news due to observation, and the fourth news again due to deliberation. In many cases, generation of information involves more than one mode. For example, Newton saw the falling of an apple from a tree. This observation immediately switched his thought process on which ultimately resulted in his propounding the theory of gravitation. In the case, the combination of observation and thought process gave rise to information.

In the next section we intend to discuss various modes of the generation of information

4.2 MODES OF INFORMATION GENERATION

Information usually generates following such modes as observation, Thought process, Deliberation or Imagination, Experimentation, Processing of data, happening of various events, and so on. In certaub cases like language, information generates following the path of evolution. Now, we shall discuss all these modes one by one.

4.2.1 Observation

By the word 'observation' here we mean not only seeing with eyes, but also hearing, smelling, tasting and feeling with skin. We can get information about the sky whether it is sunny, cloudy or hazy by looking at it. Many a time, an ornithologist can identify a bird just by hearing its call. Often chemists can recognize a chemical substance, e.g. phenol, by smelling it. Our tongue gives us information about the taste of a substance is hot, cold or warm.

Observation may be termed as the most potent mode of generation of information.

Thought process, Deliberation and Imagination

Thought process is the mother of generation of information. The ancients observed that during eclipsed sun or the moon is gradually swallowed by something and again it comes out. Hence, the ancient Hindus reasoned that during an eclipse the sun or the moon is gradually gobbled by the beheaded Rahu. As it gobbles the celestial body through the mouth it comes out through the cut out throat. Considering the level of knowledge human beings possessed at that time, the reasoning was quite logical. After centuries of observation and reasoning, now we know the real cause of eclipse. The information we generate through our observation, experimentation, reasoning, etc may not always be absolutely true. In many cases, it is subject to correction at a later date. In Arthur Conan Doyle's novels we have seen both Dr. John Watson and Mr. Sherlock Holmes have visited together the site of the crime.

It was always the superior thought process of Sherlock Holmes that was able to pinpoint the culprit.

Be it a house hold, an office, an organization or institution, the process of deliberation is encountered everywhere. While studying in class xii, many students are to appear in a number of entrance tests. When a student qualifies in more than one test, the student and the parents are to deliberate a lot to arrive at a decision as to the course the student is going to pursue. The moment the final decision is taken and is made known to others, information is generated.

4.2.2 Experimentation

If we go through abstracting and indexing services devoted to physics, chemistry, biology, medicine, engineering, agriculture, and other scientific disciplines, we shall find that about two million articles are being included in these databases every year. Most of these articles are based on experimentation. Just from this, one can make out how much information is being generated per year through experimentation. It is however to be noted that experimentation is always attended with observation and thinking process. The results of experimentation usually appear in the form of research papers, short communications, and patents and so on.

4.2.3 Processing of Data

You have already learnt that data collected through questionnaire and other methods gives rise to information when processed. Now, we shall see how the processing of data gives rise to information with a concrete example. Let is take the students of a BLIS class of an Indian university as a sample.

4.2.4 Events

The concise oxford Dictionary defines an event as 'a thing that happens or takes place [pearsall, Judy(ed), 1999]. A scholar releasing a book, an artist inaugurating an exhibition, a philosopher explaining the concept of time, a saint giving a discourse on a religious matter, a political leader campaigning of vote, legislators debating in a parliament, a lawyer passing a judgment, the prime minister of a country taking oath of office, a war breaking out at a particular region of the world, a patient dying in a hospital due to neglect, a new train being flagged off by a minister, two buses colliding causing death and injuries to a number of passengers, a terrorist hijacking a plane, a comet appearing in the sky, a physicist bombarding an atom with alpha particles a chemist conducting an experiment to create a new material, a geologist drilling a bore hole to prospect petroleum deposit, a paleontologist spotting the skeleton of a dinosaur, a geneticist giving birth to a high-yielding variety of rice, an inventor filling a patent application, a surgeon performing an open heart surgery, a director shooting a new film, umpteen number of sports and games being held every day all over the world, adventures venturing to conquer a mountain peak, etc. are all examples of events.

Let us go through some of the headlines figured in The Hindustan Times of 30th July 2004.

1. IA diverts flight, saves Pakistani baby.

2. Bofor's Ardbo dead (p1)
3. Aravali bio-diversity park takes off
4. PM files, spares traffic [PM's journey to the airport by a helicopter while preceding to Thailand]
5. 16 lockers cleaned out at Safdarjung Enclave Bank

4.2.5 Evolution

Man started communicating by speech some 100, 00 years ago [Oldham's colour library of knowledge: Language and Communication, 1968]. In those dizzy old days of human civilization, the vocabulary of human beings of a particular race was only limited. They had only that many words which were required to express their ideas. As they invented newer and newer devices, encountered objects not known before, they started naming them for the purpose of easy identification. This led to the enrichment of vocabulary. When they moved from an old area to a new area they encountered numerous new things such as trees, animals, fruits, tubers, and so on. They also named them. In the course of their endless journey sometimes they encountered

An alien race, which resulted either in fighting for friendship. For the exchange of ideas between two different races, need arose for interpretatation. How and when the art of interpretation came into being is shrouded in mystery.

4.2.6 Dream

It is common with every human being to dream. Some of the dreams we remember other we do not. The dream that we *remember and convey about the same to others* or record it in our diary, information is generated. Psychologists extract a lot of information about the subconscious mind of a patient through the interpretation of dreams. At times dreams provide the necessary information or clue for solving a problem. Kekule, an organic chemist, was trying to find out the structural formula of benzene for quite sometime, but failing again and again. One night, he dreamt that six snakes had created a ring by biting the tail of each other. This dream immediately gave him the information or clue that the structural formula of benzene would be ring –shaped.

4.3 FORMS OF INFORMATION

The form of information is different from the form of documents. In a document, the information may be in hand –written form, printed form, coded form, simplified form, disguised form, and so on. Here, we are going to deal with oral farm, hand-written form printed form, digitised form. Condenced form, coded form, simplified form, translated form, and disguised form. This is not an exhantive list.

4.3.1 Oral Form

When we talk to a person sitting or standing in from of him or through telephone, the information exchanged between the two is oral form of information. this form

of information is extensively used in our day-to-day conversation, in the lectures delivered by teachers, speeches delivered by ministers, notes and letters dictated by officers, cross examination undertaken by lawyers, interviews conducted by interviewers, commands given by military officers, and so on. In our Vedic period also this was the most predominant form of information. People used to listen (shruti) and remember (smriti). they also did not have and system f writing , illiterates all over the world use this form of information to express themselves. Using this form of information does not require the knowledge of the scripts and the spelling of words. There are tries in the world who speak languages that do not have any script. Obviously, those trives use oral form of information for communication.

Information in sign Language

Deaf and dumb people cannot use oral form of information. Hence, sing languages have been developed for them whereby they communicate. In this case, information is generated using hands, fingures, and other parts of body. For example, using our forefinger and middle finger we produce the shape of V to indicate victory. Many a time we indicate our consent with a nod. People all over the world use sign languages to communicate. Some primitive tribes use sophisticated sign languages for communication.

4.3.2 Hand-written Form

People of ancient Egupt, Indus Valley. China developed systems of writing much before the advent of Christian era. With this development the written form of information came into being. Different languages of the world developed varied scripts and alphabets. Sometimes a.group of languages adopted the same script and alphabet with slight change here and there. For example, languages like English, German,-Spanish, Italian, Portuguese, and Rumanian use the Roman scripts. Even in our country, Roman scripts are used for writing in languages like Mizo. Some ethnic groups like the Romans preferred writing from left to right; the Arbs preferred writing from right to left, and the Chinese from top to down. For recording hand-written information numerous recording materials like papyrus, parchment, vellum, bhurjapatra, palm leaves, terracotta tablets, bamboo strips, etc. were used.

4.3.3 Pictorial Form

In newspapers, everyday, we see cartoons conveying some message in a humorous or satirical way. General maps and atlases present information in pictorial form about places, rivers, lakes, mountains, universe, and so on. Anatomical atlases present information about various parts of the body. There are other types of atlases as well. A photograph of Taj Mahal, a portrait of Shakespeare, a statue of Gandhiji, etc. tell us about their look. Children like to read comics such as Amar Chitra Katha. In many cases, say in comics and cartoons, words and /or sentences are also added to make it more comprehensible and interesting.

4.3.4 Printed Form

The Chinese developed the technique of block printing by 8th century AD or before since the oldest known example of block printing recording Buddhist charms date

to around 765 AD. The Chinese and Koreans also developed the technique of printing form movable types. However, their technique remained confined within the region. The technique of printing form movable types that spread the world over was developed by the German printer Johannes Gutenberg in mid -1450s [9]. The impact of Gutenberg's technique was so great that by the end of 15th century some 9,000,000 books compraising mostly religious writings, and classical works of Greek and Roman authors were in circulation all over Europe.

4.3.5 Digitised Form

With the advent of computers, digitized form of information came into being. Here information is recorded using only two digits 0 and1. For digitization, there are codes like ASCII and EBCDIC, ASCII stand for American Standard Code for information Interchange and EBCDIC for Extended Binary Coded Decimal interchange code. ASCII is 7-bit code, and EBCDIC 8 –bit code.

4.3.6 Condensed Form

We are all aware of abstracts and summaries. These are nothing but condensed form of information. An article of twenty pages may have an abstract of half a page only. Abbreviations like ILA, BLA etc. are also condensed form of information. In fact, condenses form is secondary form of information as it is always derived form the primary form of information.

4.3.7 Coded Form

In the coded form of information, usually numbers, letters and symbols are used. Sometimes, they are used singly, and sometimes in combination with one another.

We find coded form of information in a number of subjects including our own. When we represent the subject of a book on science with a class number like 500 or A, we put the information in a coded from. A Class number like 954 or V2 immediately tells the classifier that the number signifies 'history of India' The above examples show us that the information can be codified simply with numbers, letters, or a combination of both.

4.3.8 Simplified Form

Writings in many subjects are pretty difficult to understand for a comman man. One requires special knowledge to grasp. Moreover, an expert in a subject may be a total novice in another. Hence, simplification of information becomes essential for laymen, school children, and in certain cases even for scholars.

4.3.9 Translated Form

There are numerous languages in the world, which are extant. There are also languages, which are extinct languages of the world had even written form, e.g. hieroglyphics of Egypt. The people of Indus Valley civilization had also a language in written form.

4.3.10 Oral to Oral Form

In the UN Assembly, international conferences, and in many other occasions the speaker delivers his speech in a particular language and immediately it is translated into several other languages by interpreters.

4.3.11 Oral to Written Form

In Purnea Zila School where I studied in early 1950s, the teachers in subjects like social studies used to deliver the lecture in Hindi.

4.3.12 Written to Oral Form

In India and many other countries of the world an English teacher in a non English medium school orally translates the poems, short stories, essays, etc from English language to local language (Bengali, Hindi, etc.) to make the student understand the thought content of the piece of writing.

4.3.13 Written to Written Form

Every year thousands of books are translated form one language to another. For example, Nehru's Glimpses of World History has been translated into Arabic, Assamese, Bengali, Croatian, German, Gujarati, Hindi, Japanese, Kanarese, Malayalam, Marathi, Mongolian, Oriya, Persian, Russian, Swedish, and Urdu and so on. Apart from books journals, articles are also translated.

4.3.14 Disguised Form

In a disguised form of information, sentences appear pretty innocuous to a common man. Only the person, for whom the information is meant, can get the real meaning of the sentence. One of our drivers at INSDOC used to stop the car at a particular point on the road and say, "Sir I am going to fetch my medicine."

4.4 IMPACT OF INFORMATION TECHNOLOGY ON INFORMATION GENERATION

Information technology has impacted information generation in a number of ways; let us take the case of a fledgling author. The author writes an article and tries to get it published. In many cases, he has to move from pillar to post to see his writing in printed form. Sometimes, he is successful, and sometimes not. Where he is successful, information is generated. Where he is not the article with the passage of time vanishes from the world remaining totally unknown to anybody. Now, the author has options. He can place the article in his own website, if he has one. Otherwise, thre are websites where he can place his articles. The article will come to the notice of thousands of people. Thus information will be generated. To what extent information contained in the article is authentic and may be devoid of authenticity. The user will have to judge it. In Internet, there are many articles written by school children, where you will find spelling mistakes, grammatical errors, factual inaccuracies, and so on.

SUMMARY

In the beginning, we have learnt about various objectives of the Unit. Subsequently, we have seen how the concept of 'information' connotes different meanings in different disciplines. We LIS professionals generally deal with the information that is recorded in some media. Information generates through various modes such as observation, thought process including deliberation and imagination, experimentation, processing of data, and occurrence of various events. The generation of information in different areas follows different modes. To illustrate this point, the generation of information has been discussed in areas like classification, philosophy, anatomy, physiology, health, pharmacology, surgery, sports, literature, geography and history.

QUESTIONS

Q-1 Define generation and its modes?

Q-2 Describe the Impact of information Technology of the generation of information?

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UNIT

5

INFORMATION POLICIES: NATIONAL POLICIES

STRUCTURE

5.0 INTRODUCTION

A policy with reference to any activity of a country is usually formulated by the Government and hence a policy statement will have to include all perceptions of information in all its dimensions. So it will not be just a single statement of policy on any particular activity.

A discussion, therefore, on the perception of information, as normally understood in the context of library and information systems and services, is essential to put our study of information policy in right perspective.

The concept of a National Information Policy as defined by UNESCO is "A hierarchy of Levels of Steps" viz. Goals, Strategy and Programme is seen as a series of compatible steps for devising a framework for formulating a National Information Policy for Information.

5.1 RESTRICTED MEANING OF INFORMATION

In this unit, we are primarily concerned with what information constitutes to the library and information professionals, with respect to making information and knowledge available to users according to their needs. In this sense:

Information is viewed as data processing in the broadest sense, particularly in the collection, storage, processing, servicing organized data and information that become essential for all economic and social exchanges.

Knowledge is viewed as an organized set of facts or data, derived form information and presenting a judgment or an experimental result, which is transmitted to others through some communication medium in some systematic form. It appears in the form of monographs, treatises, research papers, etc. which are collected by libraries and information centers.

5.2 WIDER MEANING OF INFORMATION

In the present changing context, however, information is comprehended in a much wider sense. Accordingly 'information' encompasses a whole range of activities that include several overlapping elements. Thus a National Information Policy may incorporate a wide range of endeavors such as:

Discovery, Creation, and Collection of Information: This covers work and activities of scientists, scholars, artists, raw data collectors and many others.

Storage, Retrieval, Processing, Disseminating and Duplicating Information: Agencies engaged in these activities are publishing industry, motion films and television industries, data processing organizations, libraries and cognate bodies like bibliographic, indexing, and abstracting databases, reviewing and archives agencies, etc.

Distribution of Information: This Category includes broadcasting and television networks, circulation of news papers, books and journals, film distributors, communication channels like postal, telegraph and telephone services, etc.

Hardware Suppliers: These comprise agencies, which produce goods for hardware industry such as computers and peripherals, telecommunication equipment, printing presses, paper, ink, electronic sensing devices, translating and display of equipment, cameras, projectors, and raw films.

Information Markets : This include enterprises which use information hardware to support their primary activity not forming a part of the information industry, for example information in education, transportation ,business and industry, health care, demography, public safety, national security, etc. both at the institutional and individual levels. A number of business enterprises have sprung up that provide information services through a variety of electronic databases and networks.

5.3 MEANING OF POLICY

While the word information has such a wide rage of interpretations, the meaning of the term 'Policy' is also often left vague and undefined. However, an examination of some of the existing statements of National Information Policy show them to be, in many instances, descriptions of structural, functional and/or characteristics of governance. In these statements, policy means an instrument seeking to concretize of legalise a system design or a plan. Fundamentally, a policy may be stated to be a statement of guidelines for a course of action.

A course of action is, however, formulated with different levels of generality and specificity. Depending upon these levels, a hierarchy of steps for a course of action may exist. Each level within the hierarchy has to be compatible with the next higher level as components in a system that is interrelated. This system as a whole has to be conducive to the realisation of the overall objectives.

5.4 DESIGNATION OF LEVELS OF HIERARCHY

It is useful of designate the components of the levels of hierarchy as series of steps in the formulation of a course of action to formulate a policy. Goal, Policy, Strategy and Program represent the levels of hierarchy with the following characteristics for each of them.

A **Goal** is the ultimate destination to be reached. It is an enduring statement of purpose towards actions over an indefinite period of time.

A **Policy** is a statement of commitment to a generic course of action, necessary to achieve the goal. It expresses a determination and an agreement to follow the set course in realizing the goal. Policies are invariably transitory.

A **Strategy** is a predetermined course of action, usually selected from a number of alternatives or options.

A **Program** is a scheduled set of activities or tasks taken to implement a strategy in keeping with a predetermined strategy, a program is a set of tactical actions of a goal-seeking process.

5.5 DEFINITION OF NATIONAL INFORMATION POLICY

"A National Information policy is a set of decisions taken by a government, through appropriate laws and regulations, to orient the harmonious development of information transfer activities in order to satisfy the information needs of the country. A national Information Policy needs provision of necessary means of instruments such as financial, personnel, institutional, for concrete implementation." INISIST II – Main Working Document)

Having understood the meanings and interpretations of 'Information Policy' a formal definition of National Information Policy, and the levels of hierarchy as

useful steps for the formulation of such a policy, let us examine what type of policy is needed, with particular reference to India.

5.6 NEED FOR A NATIONAL INFORMATION POLICY

Information is for use. This simple statement encompasses a whole range of information transfer processes; stemming form the recognition that information is a basic resource that transforms natural resources into value added tangible and powerful wealth.

The value and importance of information and knowledge, therefore, demand their care, harnessing, management and exploitation for use.

The ultimate purpose of information and knowledge is to put them to use, and in turn, to provide for a higher quality of life to people. The vital role of information in national development has to be seen in this perspective.

Seen from this angle, the primary objective of a National Information Policy is to achieve a progressive upliftment of the socio-economic development of the country through the provision of access to and availability of information and knowledge with speed and efficiency to all those who are involved in activities for national development. In the context of India, a National Information Policy must necessarily be governed by and form an integrated and harmonious part of the social, economic, educational, research and development and other related policies which get formulated at various stages of our national development.

5.6.1 Information as Wealth

Generation of new knowledge and putting it to use to create wealth, places a country at a decidedly vantage position in the present context of fierce international struggle for economic and political power.

5.6.2 Diverse Participants

We have learnt that the generation, dissemination, transfer, communication, distribution of knowledge and information take place through diverse channels and media, in a variety of contexts and environments. Many groups of people viz. researchers, practitioners, entrepreneurs, technicians, technologists, shop-floor workers, farmers, traders, health-care specialists, planners, bureaucrats, parliamentarians and legislators, and others operate in an information-communication of their own.

5.6.3 Information Revolution

The cause of these rapid changes is the information revolution which is turning out to be as fundamental as the industrial revolution a couple of centuries ago is changing the life-style of people. It is thus seen that the entire range of the information revolution field cannot be easily comprehended by one single group of people or institute involved in the production and distribution of knowledge and information, so as to take advantage of the information revolution for securing maximum benefits to all sections of society.

5.6.4 Use of Information

We have noted that there are several users of information and knowledge to fulfill whatever need they may have. It is only in the field of education, research and a few others that information systems have been developed to disseminate, provide access and availability to information to meet the varying needs of information users. In many other fields wherein information support facilities are needed, there are hardly any organized information systems that have been developed in India. Only a holistic approach on information would ensure the possibility of giving attention to the needs of other categories of users and their needs.

5.6.5 Organisational Structure

When a variety of institutions are to be involved in the entire transfer process of information, it is necessary to create structural links between them to avoid duplication and wastage of efforts and resources. Information institutions have sprung up in most countries according to the exigencies of circumstances and not necessarily base on a systematic plan. Therefore, there has been a haphazard growth of such institutions without proper linkages. It is only through an information policy and program that unplanned growth of information institution can be checked to enable a harmonious development. Particularly in the present context of information institutions through networks so that the resources of all the different types of institutions could be shared without loss to anyone.

5.7 NATIONAL INFORMATION POLICY: ASPECTS AND ISSUES

A few groups that have been concerned with the necessity of formulating a national information policy are:

Scientific, Technical and Societal information (STSI) for general education, professional and higher education, research and development, industry and business and socio-economic development;

Mass media dealing with the right to access public information necessity for newspapers, TV, Radio broadcasts, and such others;

Publication and book trade dealing with all publications, including electronic publications;

Information Technology handling hardware and software problems;

General public who need to have freedom of access to government generated information.

5.7.1 Issues and Aspects in the Limited Context of Library and Information Systems and Services

As we are, in this Unit, studding those aspects that are limited to issues pertaining to library and information systems and services in a country in the growing recognition of the centrality of knowledge and information as primary factors in national development, we shall identify only those aspects that are more relevant to our professional perspectives.

We will, therefore, focus our attention to policy issues and aspects within the framework of our limited library and information area. Broadly they are:

- Users, their identification and information needs;
- Resources: Document and Non – Document, Information and Communication Technology (ICT), Institutional, Human and Financial;
- Organisation and structure;
- Products and services;
- Standardisation;
- Regional and international cooperation.

Users, Their Identification and Information Needs

All activities and programmes of information handling are to be based entirely on the needs of users, as customer needs and behavior are central to any business activity. Different categories have different information needs, depending upon their functions, responsibilities and duties and the extent of their involvement in their respective nature of their programme of work.

The user groups as has already mentioned include among others:

- Government officials in a wide-ranging spectrum from the top –policy and planning levels down to the hierarchy of officials operating at the implementation levels;
- Parliamentarians and legislators;
- Judges and the judiciary;
- Industrial entrepreneurs and business managers and executives;
- R&D persons in science, technology and social sciences;
- Specialist in the application of technologies;
- Teachers, students and educational administrators;
- Practitioners in medicine and health care;
- Lawyers and other legal professionals;
- Agriculturists and farmers;
- Grass root level workers in urban and rural settings; and
- The general public.

User Studies

User studies have so far been confined largely to the assessment of needs in the context of education and research and R&D environments. Very few studies have been made to assess the needs of users in other contexts, particularly in India.

Resources: Documents and Non-Documents

Information resources comprise published and unpublished records of information in all fields of knowledge. They may be textual, numeric, graphic, images, and

in any other form, in any physical format, in any language, produced within the country and outside. These types of materials may include know – why, know-how, and show-how information, each having its own set of intrinsic characteristics. Only a part of this information is available in the market place; the rest has to be collected carefully in relation to user needs by the respective information systems in relevant subject areas.

Primary Information

Indigenously published materials like books, journals (the first issues of a title) are deposited in four libraries in the country by the Delivery of Books Act, 1956. For most other items such unpublished research and technical reports, theses and dissertations of universities and other cognate bodies, and other types of special materials, there is no provision of legal deposit. This makes the task of collecting these materials very difficult, if not almost impossible for most institutions that need them. There is, however, an obvious need for a legal provision or executive orders of a competent authority, whereby these resources of national origin are available in the country in a few selected institutions.

Secondary Information

Secondary publications (databases) provide access to primary information in the form of bibliographies, indexes, abstracts, current awareness bulletins and a host of others. For indigenous primary publications. There is at present no adequate bibliographic control for all categories of publications. Secondary publications of foreign origin, almost all of them are available in electronic modes, in addition to paper- print.

Tertiary Publications

Tertiary sources of information such as referral directories of on–going research, bibliography of bibliographies, guides, etc. are also available in CD-ROMs and other on –line services which can be shared by libraries and information institutions.

Other Sources

Individuals and organizations do serve as good sources of information. Although these sources of information cannot be brought under the formal categories of information sources, they are useful and may indeed be vital in specific situations.

Vendors, suppliers, contractors, customers, consultants, advisors, guides, and such others can be very often as excellent courses of information.

Highly specialized training courses, trade fairs, exhibitions, fashion shows, get- togethers and such other generic information that may not be available any where else.

Traditional skills and capabilities available with rural artisans, farmers and others may be invaluable sources of information.

Oral communications in formal meetings, seminars, symposia, etc. are important sources of information. Audio records of contemporary events, activities, personalities, deliberately captured, also constitute useful sources of information.

Information and Communication Technology

Information and communication technology (ICT) holds the key to the success in modernizing information services. Not only does ICT introduce new ways of information handling. It also brings about changes in the very structure of information and its communication.

Concepts like universal bibliography, accessibility to and avaibility of documents, irrespective of location, highly personalized services matching user needs/interests with document databases, full text searches, storage and retrieval with speed and accuracy, etc. have all been accomplished to a great extent.

The Internet, the most important communication tool the world has ever had so far, powerful microprocessors, high-capacity digital services, low-cost memory , digital storage and retrieval and broadband networks are redefining the world, more particularly in information handling.

Institutional Resources

Information institutions in India, today, comprise libraries, documentation centers and information centres, a few information analysis centers, data centers, scientific and economic and social statistics publishing houses and similar others. There are other types of information institutions that are likely to spring up in the future. The existing institutions are also likely to change with the increasing application of ICT and sooner or later emerge as digital libraries or electronic libraries and cognate bodies. Various types of information systems and services networks are also likely to come up when the freedom of information Act 2012, takes concrete shape with new type of information institutions. It is, perhaps, only though a National Information Policy that a proper grid of information institutions could be conceived and effected.

Human Resources

Progress and sophistication in the design, development and operation systems in the country can come about only with quality manpower, adequate in quantity and capable of achieving targets in the changing context of information and knowledge. The National Information Policy statement must give attention to these resources, focusing attention on the following aspects:

- Assessment of man power needs in terms of types, quantity, levels, for the next ten years, keeping in view the fast-changing information environment;
- Curriculum development oriented to different types of information and identifying institutions to take up responsibilities and to conduct courses.
- Training a high quality faculty to impart instruction at different levels with library and laboratory
- Provision for the preparation and production of quality learning and teaching kits;
- Attracting candidates with fine academic records, interest in information, motivation and aptitude, ensuring good career prospects;

- Continuing education and training programs to keep pace with the advancing knowledge and practices, including programs to absorb existing manpower;
- Instituting award/reward schemes to recognize and patronize professional practice of excellence ;and
- Establishing exclusive research programs, both fundamental and applied research, in information handling for innovative systems and services.

5.8 NATIONAL INFORMATION POLICY

Policy is the only way to direct, manage and develop library and information services in a country. National Information Policy means a set of decisions taken by a government, applying laws and regulations, to orient harmonious development of the information dissemination services, to satisfy the information needs of the country. A National Information Policy would ensure access to professional and specialized knowledge at the global level as the development of any country, directly depends upon the planning and polices followed by the government of that country.

The concept of library and information policy is new. Today information is treated as a very important source in all areas of development whether it be social, political, economic, cultural, etc. it is because of the ever increasing demand for information from all walks of life that the importance of a policy is felt. And since, this information is being imparted of disseminated via the libraries, they are the means for collecting, storing and organizing information. Thus a policy had to be formulated on libraries and information systems.

5.9 THE NATIONAL POLICY ON INFORMATION FOR INDIA

Historical evolution

As early as 1944, the need for an integrated library system for India was felt by Dr. S.R. Ranganathan. In his book entitled post-war Reconstruction of Libraries, he suggested that "the library edifice of post-war India should be so planned that primary libraries are attached to regional centres, regional centers to provisional central libraries, these again to the national central libraries of other countries and international library centres. As a result of his efforts. Three states had public libraries act- Tamil Nadu (1948), Andhra Pradesh (1960) and Karnataka (1965). Today we have seven more states added to his efforts, having followed his intitation.

The government of India made various attempts to improve library services in the country. The name of the imperial Library was changed to National Library under the National Library of India Act, 1948, Delhi Public library was established in 1951, in 1952 Indian National Scientific Documentation Centre (Insdoc) was established. The Delivery of Books (Public Libraries) Act was amended in 1956. The five- years plans included funds for improvement of libraries and the community

development Programme promoted rural libraries. Advisory committee for Libraries was setup in 1957, which recommended library service "free to every citizen of India" and a pattern of library service in the country. Committee on plan projects and the Working Group on Libraries followed Raja Ram Mohan Roy Library Foundation, an autonomous organization was set up in 1972, to promote and support library movement in the country, to provide funds to public libraries and "to enunciate a national library policy."

National Policy on Library and Information System was formulated by the Raja Ram Mohan Roy Library Foundation and also by Indian Library Association The Department of Culture, Government of India, set up a committee on National Policy on Library and Information Systems, in 1985. The final report was submitted to the government in 1986.

Objectives

The national policy on information has the following objectives:

1. To collect information related to scientific, technical and other developmental activities of the country.
2. To improve the existing facilities in the country.
3. To take steps in the improvement of existing information technologies.
4. To provide computer facilities for fast information access and retrieval.
5. To promote the collection and utilization of national and international information resources needed to meet the present and future information requirements.
6. To encourage international co- operation in the use of information.
7. To develop and use efficient tools and techniques of document and information handling.
8. To provide financial support to the information organization and its use.

Salient features

There are a number of features that constitute the national information policy:

1. To establish, maintain and strengthen the free public libraries. A network of libraries would result with the district library, being the apex library in a district, with public libraries at city, town and village levels. These would, then, form part of the national network with each state having their own library legislation.
2. Every School or collage established should have a library and a qualified librarian.

   The policy states that since libraries are essential part of education, there must be a state level agency for proper development of school libraries of the state and a national agency fir co-ordination at the national level. The policy gives University Grants Commission, the authority for college and university libraries and suggests that all these institutes from a network and share the resources.

3. Expansion of national, regional, sectoral and local levels of NISSAT. The policy recommends that the national, regional, sectoral and local levels of NISSAT schemes should be further strengthened and expanded.
4. Similar systems be organized in Social Sciences, Humanities and in Languages.
5. Development of information systems and data banks in different fields.
6. Parent bodies should be committed to provide support and infrastructure for libraries.
7. The policy recommends for a system of national libraries consisting of The National Library at Calcutta, national depository libraries, national subject libraries and national documentation/information centres, national databases of manuscripts, etc. A national Library Board should be set up by the National Library of India for effective inter – relation among all these national libraries and also between libraries, archives and museums.
8. Manpower, planning and development. The policy also recommends specialized information personnel who could apply modern management techniques to information services.
9. Library legislation and regulation of information flow. To meet effectively, with the changing information needs of society, the policy recommends a national library act to be enacted and supplemented by model library legislation at the state level.
10. Use of technology Information revolution is undisputably caused by the unprecedented advances in technology. These advancements have made accessibility to world information and knowledge possible, almost from any part of the world.
11. Removal of communication barriers.

    Information, being an important resource, any barrier in its free flow should be removed for easy access and maximum use.
12. National network of libraries.

    The national information policy recommends the setting up of a National Commission for Libraries and Information Systems by the Government.

PROBLEMS AND SUGGESTIONS

India, being an agriculture based country for many years had been an economically prosperous country. But with industrialization creeping in, our way of life started revolving around factories and products, which has a diverse effect on our society.

Even then the education and its status varied from state to state, village to village. As the entire society had been stratified into the capitalists and the ordinary man. Education, also was stratified as knowledge imparted at highly sophisticated missionary schools, public schools etc. which provide all the facilities and took care of the over-all development of the students, but which were out of reach of the ordinary man. On the other hand.

Our education system is so lethargic in nature that one feels ashamed of facing the fact of producing citizens who hardly know what libraries are, what to say of its use. We are not talking of the metro –cities within the country, but other areas which do not have strong educational infrastructure, to in corporate the changing trends.

Another flaw in our system, especially in U.P., M.P., Bihar and Rajasthan, is that, we try to impose or rather pose the Hindi , being our national language, is very important and no importance is given to any other language even an international language i.e. English. Today, in this world of, Hi-tech, where does one stand, without a common language. Most of the communication takes palace in English even in India, so why don't we accept the fact ad teach our children to study English, also. Only then, will they be able to utilizes and expose their talent for further enrichment.

Besides tracing out the weak points in a system, it is the responsibility of the government to see that they join hands to remove these weaknesses, for the development of the national prosperity. The required action for the implementation of the National Policy of Library and Information System, has yet to take place.

We are expanding international co- operation and conducting international conferences for facilitating better services in providing information and on the other side, we have nearly taken ten long years in deciding whether the national information policy for library and information system should be implemented or not. A library and information system is the foundation stone for every development, so it forms an essential part of any establishment.

Even then, if we think deeply we can conclude that the National Policy on Library and Information systems would prove to be a boon for the nation. The only major aspect is that the infrastructure should be a precise one, various factors as type and number of users, resources available, mode of dissemination, manpower development, apparatus required, should be well defined. Only then can we provide better service, efficiently, within limited funds available.

CONCLUSION

The above discussion may be concluded that, as the objectives and recommendations made in the policy for library and information systems are tailor made according to today's requirements, which would serve to be fruitful for the present community. It ensures maximum use of the existing resources through network which would facilities easy access of the sources. But, the essential part is building up the environment for its implementation. We should mould our education procedure to cope with the changing trends.

Once we get started, there is every possibility that this policy would take our country to greater heights with intellectually powerful scholars and citizens, ready to meet any challenge in this ever competitive world.

QUESTIONS

Q-1 Give reasons for a restricted meaning of Information?

Q-2 Define National Information Policy? What is its aspects and issues?

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UNIT

6

SOURCES OF INFORMATION

STRUCTURE

6.0 INTRODUCTION

Information is recognized as a vital source and the basic need, for the progress of humanity and the basic need, for the progress of humanity and the development of a nation, as a whole. It means that every piece of information should be extracted from wherever it is available, and provided to the users at the right time, in the right proportion, without delay of time. Only then, can that piece of information be put to its maximum use.

6.1 INFORMATION SOURCES

Information is available in a number of forms. It may appear as a word meaning, background information of a term regarding its origin, use of words, the pronounciation of words, etc.

It may also be as state –or –the –art report, annual report, research-in-progress, agreements or contracts, indexes, abstracts, biographics, guides and atlases etc. All these are some or the other forms in which, information can be found.

Thus it again becomes difficult to analyses as to which source would give what information. For this, some kind of categorization was needed.

6.2 EARLIER ATTEMPTS

The documents could be arranged according to any of the basic characteristics, it may be its physical form, information content, purpose, nature of presentation, etc.

Thus, according to S.R. Ranganathan, the main categories of documents are

1. Conventional –Books, periodical publications, maps, atlases etc.
2. Neo-Conventional –Standards, specifications, patents,data.
3. Non-Conventional –Microcopy, audio, visual, audio-visual.
4. Meta-Document-Direct record unmediated by human mind.

As categorized by C.W.Hanson

1. Primary – Books, journals, patents , thesis, trade literature, standards.
2. Secondary –Abstracting and indexing journals, citation indexes, subject bibliographies, reviews and surveys.

According to Dennis Grogan

Primary – Periodicals, research reports, conference proceedings, patents, standards, trade literature thesis.

Secondary – Indexing and abstracting services, reviews of progress, reference books (encyclopedias, dictionaries, handbooks, tables, formulac etc.) treatises, monographs, text books, etc.

Tertiary – Yearbooks and directories, bibliographies (list of books, location lists of periodicals, lists of indexing and abstracting services.), guides to the literature, lists of indexing and abstracting services.), guides to the literature, lists of research-in-progress, guides to libraries and sources of information, guides to organizations, etc.

GREY LITERATURE

The above discussion states that documentary sources either conventional of non-convinental, are equally important, as all of them certain information which is useful to some or the other sections of the society.

6.3 DOCUMENTARY SOURCES OF INFORMATION

Let us, now, discuss some of the main sources of information.

6.3.1 Primary sources

A Primary sources or document is one in which the information contained is original or first disseminated formulation of any new observation or experiment. It will consist of new information for the very first time thus, the term primary means, the basic sources of that particular information, in documentary form.

Primary sources may further be divided into

- Conventional Primary Sources
- Non –conventional Primary Sources

Conventional primary sources

Periodicals

The most important form in which new information is disseminated is the periodical. Periodicals were originated in the middle of 17th century, with the dawn of modern science, when the need arose, for rapid dissemination of brief reports based on the experiments and observations that were beginning to engage the attention of a part of the scholarly community.

Research reports

After periodicals the research report is among the important primary sources. Research reports are the unpublished reports of sponsored research.

Conference papers

Another very useful medium of communication for the scientific community is the conference papers. The papers are presented by specialists in different fields and contain a new concept or solution to problems, which may be of much importance.

Patents

Patent are also a very important source of primary information. They contain the information about new discoveries and inventions. This is not generally published in any other form or in accepted printed media. They are frequently used by scientists and technologies to gather information and knowledge about the quality of a product of materials of engineering and technology and of methods of testing.

Standards

Standards are a different kind of information source which is equally important for specific requirements.

Trade literature

Information, which is in the form of product catalogues. Information on processes and materials, guides, manuals, house journals etc., the main purpose of which is product advertisement, is also a source of primary information.

Thesis

Another primary source, which is of much importance, is thesis and dissertations. They are the results of PhD. Work and M. Phil. Degrees.

Reprints

Latest information of material available in journals can be had in the form of reprints. They also constitute a good source of information especially in research or scientific libraries, instead of acquiring all of them only those which are not available in the original periodical form should be selected for acquision.

Prints

Information is, at times, stored in the form of art reproductions that are available on sale, which may be useful for libraries attached to cultural institutions, fine arts academics, etc. They may be in the form of paintings, graphic arts and drawings, sculpture, decorative arts, etc. they may be encased in hanging folders so that any particular picture may be located and produced for use, by readers.

Newspapers Clippings

Newspapers are the current source of information on events, topics and other matter. An important service of any special or academic libraries isto collect news items related to the institutions activities for reference. These clippings may be stored for further consultation in the form of ready reference.

Plans and Charts

Information of any kind arranged in tabular form or graphically by means of curves, as well as anything drawn on a plane, the structure of a building, landscape, design, etc,.may be termed as 'plans' and 'charts Information stored in these forms also help in understanding the material quickly and presenting the concepts clearly.

They form an important part of special libraries, dealing with art and architecture, etc.

Manuscripts

A manuscript is any work written by hand on paper, parchment, palm-leaf, etc. most of which remain unpublished. They are considered as primary material for research work and many research libraries have a rich collection of such material.

Dissertations

They are the product of research work conducted in academic institutions. Some of them are published in the form of monographs, but most of this type of material, which isnot printed, is not even mentioned in trade catalogues, although they are cited in subjects bibliographies and specialized indexes.

They are sources of primary information and are of great importance to research scholars and academicians.

6.6 INFORMAL SOURCES

Informal sources constitute yet another important type of non- documentary information sources. Although, these sources are outside the purview of the librarian, yet he is acquainted with these channels, for providing effective service.

These sources are as follows:

1. Attending conferences and meetings.
2. Membership of professional societies, institutions, etc.
3. Technological gatekeepers.
4. Unpublished works i.e. thesis, dissertations.
5. Conversation with colleagues, visitors etc.
6. Message obtained through telephones, correspondence, etc.
7. Work in progress.
8. Reprint of papers to be presented at seminars.

Conferences and Meetings

Conferences and meetings play a vital role in strengthening world wide informal communications, in spite of their being expensive and time consuming to attend. Such conferences and meeting are also regarded as opportunities for discussions, as a large number of scholars and scientists get together and exchange their views on a topic.

As the topics chosen for discussions are usually on some of the prominent problems, the members attending the conference are benefited.

Membership

Membership of a professional society usually provides access to the society's meetings, library and its other activities. These activities enable the participating membership to know about the progress made in that area, by attending these meetings.

Technological Gatekeepers

The concept of technological gatekeepers was postulated by T.J.Allen, who insisted upon their existence in research and development laboratories.

Usually, technological gatekeepers are persons other than scientists, working in an organization to whom others turn for technical discussion and consultation, and since they have good contact with professional societies, and technically trained friends outside the laboratory they provide information about the progress within the organization. Such gatekeepers have good network of their own within the laboratory, they also attend conferences quite frequently. So, information which is authentic can be obtained from these gatekeepers who though not specialists, yet are specialists.

Unpublished Works

There are a number of documents which do contain information but are not formally published, are said to be unpublished works. Although, such works contain solutions to problems, study or new innovations. May be of great use to the users in a subject area. Such works include dissertations, thesis, reports etc., which if published would be of great importance.

Conversation with colleagues, visitors etc.

Another informal way of gathering information is through the conversations between colleagu3es or visitors, who try to contact the organizations for information. The scientists while conversing with each other discuss various aspects of the subject dealt with, so they exchange information through their interaction with their colleagues or visitors. This information is not recorded any where although it is quite meaningful and useful.

Messages obtains through telephone, correspondence etc.

Yet, another means of obtaining information is through the correspondence made between scientists, as even in their letters, they may discuss certain ideas, that may be useful similarly, they may discuss a number of things on telephone, which has become a very convenient form of communication these days.

Work in progress

The progress of research work can be obtained only when the work is completed, in the form of report. But, if the progress is gathered by an author, the information can be sought informally and published in reviews. This would give the information of the progress in work and other details.

Reprints

The reprints of the manuscripts to be presented in the seminar may be obtained and provided to the colleagues, friends and scientists. This will assist them in preparing themselves for the seminar, where they may be in a better position to put up questions and understand the on- going discussions, effectively.

6.7 NON –CONVENTIONAL SOURCES

Besides the documentary and non- documentary sources. There is a prevalent feeling that new mechanism is needed to make information more readily accessible and that better techniques are needed to channel it to the ultimate consumer. Thus there are a number of non convensional sources which are in machine readable from. A few of them have been discussed below:

Radio

The onset of non-conventional media as sources of information began with radio. It has been a speedy means of information communication for years. Radio is still an effective medium for this purpose as it transmits both primary and secondary type of information.

Although this medium is not popularly used because of the new developments in communication, yet it has had its importance and is still used in rural areas.

Audio –discs and tapes

They may be used to store and retrive information as and when required, and is a handy means of information communication. Audio tapes and discs are being used

in some cases as auxiliary forms of publication for books and journals, particularly when it is difficult to transmit the information in any other form. Some audio-tapes and discs used as publication media also represent secondary publication in the form of abstracts and reviews of the literature in a particular field; they also represent primary publications for example, original panel discussions, conferences or lectures are recorded for subsequent duplication and distribution.

Film Media

Motion –picture films

Motion picture films also represent a medium for dissemination of original information that lends itself primarily to visual representation, but in most cases films are used principally as teaching aids. Films are also extensively used to store images of text in miniaturized from for ease in duplication, storage and dissemination.

Micro-film

It usually records bulky and rate documents which require occasional reference. Information stored in the daily newspapers of one year can be reduced and recorded in one 100 feet reel of 35mm.film i.e. the size of two cigarette packets.

Micro- Fiche

It is a transparent film of 6" * 4" size, recording thousand of pages, which can be stored in card cabinet's field in drawers. Many national government agencies and international bodies such as the General Assembly of the United Nations have produced report and proceedings on microfiche. The entire Encyclopedia Britannica can be stored on a 6" *4" microfiche.

Micro –card

It is a useful media to store old sets of journals, out-of –print and rare series documents. It is an opaque card, like microfiche, and takes 26 pages of a book or article on one side microfiche, and takes 26 pages of a book or article on one side of the card. it can be field like the ordinary catalogue card.

Magnetic tapes

Magnetic tapes have vast storing capacity. It is made of half an inch plastic with magnetic exide coated surface on one side. On every centimeter of the tape about 2500 characters can be stored. *It is highly compact in comparison to punched cards.* In case of incorrect data it can be erased and new information can be entered into the same tape.

Floppy disc

Floppy diskette or floppy disc is another low cost storage medium. It is made of plastic, coated with magnetic surface and allows random access. Information stored in these discs can be retrieved easily. Current contents is now available on floppy disc.

CD- ROM (compact disc read only memory)

CD-ROM is plastic disc storage medium. Unlike other storage mediums. Such as tapes, floppy disc. Hard disc etc., which is based on the principle of magnetism, CD-ROMs are based on the use of light. But, nothing can be written on it. Scientific periodicals, Books in print, BNB etc. are now available on CD-ROM.

CONCLUSION

The above analysis of the sources of information has been done on the basis of the present situation. Information, stored in a number of media, is disseminated in different ways and presented in a systematic and organized manner in these sources. With the incoming of newer technologies they are becoming more and more important and complex in nature.

The knowledge of these sources and there inherent contents, is very essential in the fast changing world this is also important for the correct location and use of information at the right time, as with the time lag a particular piece of information loses its effectiveness. However, the same can be retained by the use of these sources which guide the users to the exact information without the loss of time and wastage of energy.

QUESTIONS

Q-1 Define Recourses? Explain Documentary Sources of Information?

Q-2 What is information sources ? Describe NoN Documentary Sources of Information

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UNIT

7

INFORMATION COMMUNICATION PROCESS

STRUCTURE

The word communication is derived form the Latin word 'communist' which means common. In its application it means a common ground of understanding. It is a process of exchange of facts, ideas opinions, and feelings and as a means that individuals or organizations share meaning and understanding with another.

Communication is the vital aspect to change behavior of the receiver Communication is a tool of management to get the things done through people. Generally the process of communication demands the necessity of a transmitter, message, symbols, channel, decoding, receiver, action and feedback.

7.0 DEFINITIONS OF COMMUNICATION

George Lundberg considers communication as "a sub category of interaction, namely the form of interaction using symbols, gesture, picture, verbal or any other which would serve as stimuli to behavior"

According to Newman and summer" Communication is an exchange of facts, ideas, opinions or emotions by two or more persons"

Theo Haimann has discussed communications as "It is the process of passing information and understanding from one person to another. It is the process of imparting ideas and making one self- understood by other".

Features of Communication

Egar Dale mentions the following implications of communication:

1. It emphasises or need to build common understanding or consensus.
2. It suggests that, communication involves interaction the give-and-take process, that provides feedback to persons involved in exchanging ideas.
3. It assumes a democratic philosophy of life, the dignity and respect of all who enter into communication and the absence of manipulation of other persons.
4. It assumes freedom to learn and to criticize.
5. It makes central the idea of getting into the other fellow self (empathy) and having the courtesy and sometimes the courage to let him to yours.

Some of the general features of communication are:

1. It involves more than one person i.e., a communicator and a recipient at least.
2. It shares ideas, emotions, facts etc.
3. It may be expressed in any form i.e., speech, codes, writing etc.
4. It is a continuous process.
5. It usually requires a medium for transmission.
6. It is a process of transmission and reception

Along with these characteristics of communication, few rules may be formulated, supporting free and better communication, which are as follows:-

1. The message should be easy to understand.
2. The communicator should ensure that, the fact, information is well understood by the recipient.
3. The communicator should be well acquainted with the subject matter, so that, he is able to communicate properly and answer the questions.
4. The message communicated should be authentative.
5. The medium adopted for communication, should be in accordance with the changing trends.
6. These rules for better communication of information, if followed would facilitate effective means of communicating and utilizing data/information.

7.1 PROCESS OF COMMUNICATIONS

Communication is a process of exchange of ideas, facts, opinions and manner by which the receiver of the massage shares meaning and understanding with another.

It is organizational process. The whole process of a communication is graphically represented as,

7.1.1 Message

A piece of information, spoker on written to be passed from one person to another. It is the subject matter of communication. It may involve any fact, idia, oinion, figure, and attitude. It exists in the mind of the communicator.

7.1.2 Transmitter Encoding

The process of conversion of the subject matter into symbols is called encoding. The message or subject matter of any communication is always abstract. Encoding process translates ideas, word, facts, feelings, opinions into symbols, signs, actions, pictures and audio visuals etc.

7.1.3 Communication Channel

Communication channel means the medium or through message passes. The words, symbols, or signs selected should be transmitted to the receiver through certain channel pr medium. The media may be written media or oral media. Further there are various forms of written media like letters, reports, manuals, circulars, notes, questionnaires etc.The forms of oral media includes face to face conversation, dectaphone, telephone teleconferencing etc. The visual channel may be the slides, microfilms etc. television, documentary films, CD-ROMs etc. represent audio-visual channels.

7.1.4 Receiver

Receiver is the person to whom the message is meant for by the sender. A person who receives the message is called receiver. Responding or acting to the message done by the receiver only.

7.1.5 Decoding

Decoding is the process of translation of an encoded message into ordinary understandable language, receiver coverts the symbols, words or signs received from the sender to get the meaning of the message.

7.1.6 Acting

According to the understanding of the message, the receiver acts or implements the message.

7.1.7 Feedback

Feedback is though the last element an important one in the communication process. The sending back of the knowledge about the message to the transmitter is known as feedback. It ensures that the receiver has received the message and understood in the same sense as the sender meant.

7.2 COMMUNICATION THEORIES

There are many communication process models and theories to understand the

process involved in it as developed by different scientists. Some of these important theories are as follows

7.2.1 Mathematical theory

The mathematical theory of communication developed by the C.E. Shannon and Weaver, popularly called shahhnon-Weaver model, was developed in 1949 as a model in the electronics communication. It created in impact on such concept as measuring the units of the information transmitted over technical channel.

Shennon concerned with the technical problems of the transmitting signals from one point to another. He considered communication as a mechanistic system consisting of the following five basic elements such as,

(vii)	Information	Source
(viii)	Transmitter	To convert a message into transmittable signals
(ix)	Channel	Medium or agency
(x)	Receiver	Who reconstructs the message from the signals
(xi)	Destination	The person or machine to whom it is intended

Some of the components he introduced in the system are,

- The message,
- Transmitted signals,
- Received signals
- Noise source

Shennon and weaver model contains the essential elements for explaining the human communication processes.

Information source	Transmitter	Channel	Receiver	
	Noise Source			
Message	Sending Signals	Received	Message Signals	Destination

The identify the elements semantics, that meaning lies in people; the degree of difference in meaning between the sender and the receiver is accounted for the noice.

7.2.2 Information theory

In 1959, the information theory developed separately from the communication theory. The components of the information theory are the computer science, data processing cyber nets etc.Each of these areas have been contributing to communication theory.

7.3 COMPONENTS OF COMMUNICATION TECHNOLOGY

The whole communication technology is broadly classified into several divisions but they Are closely interrelated.

Mathematical Science		System Analysis
Psychology	Communication Theory	
Ecology		Linguistics Philogy Etymology Semanties

1. Telecommunication system
2. Optical communication system
3. Satellite communication system
4. Computer communication system

The above mentioned communication systems are thoroughly discussed in the coming chapters.

7.4 ADVANTAGES OF COMMUNICATION TECHNOLOGY

The impact of communication technology in information science has been increasing in importance, as interactive information retrieval systems have been developed, that allow users dispersed over wide region to obtain access to these systems on a real time basis. Computer based information retrieval system form one broad class of system that can be linked to users in their office, homes as well as to users in libraries and other centres.

7.4.1 Time Savings

Modern communication technologies avoid errors, duplication resulting in saving of time. They have mode speed with accuracy and can transmit quickly. The message lead which the machine can do is definitely more and resulting in saving of time of superiors and subordinates in the organization.

7.4.2 Saving Labour Cost

New Communication technologies are labour saving devices. They save labour as well as payroll cost. Less number of workers or staff are sufficient with the installation of modern communication devices. The staff thereby released can be utilized for alternative works.

7.4.3 Speed

A large quantity of information can be fed into the machines which in term transmit with considerable speed. In respect to certain matters, speed and quickness are necessary to take quick decision. The handling of transmission is assigned to

electrically or electronically or radio wave operated machine which are known for greater speed of despatch.

7.4.4 Reduce Monotony

Routine respective work may lead to fatigue or monotony mechanization of communication system reduces the fatigue of the staff and resulting in improving the efficiency and quality of the work. For instance use of visual and audio-visual aids will reduce fatigue, which improves the quality of work.

7.4.5 Equality

New technology can achieve equality in the provisions of communication reaching particularly with reference to geographical location.

7.4.6 Standardization

Standerdisatin of work can be archived through machines. The ensure consistency uniformity in the quality as well as quantity of work the principle of standardization is so important that no one can afford to ignore its advantages.

7.4.7 Accuracy and Efficiency

Correctness of message transmission is necessary tenable a receiver to understand in same spirit and to act accordingly. The systematic and automatic technology promote accuracy. The new technology in general increasing in efficiency.

7.5 LIMITATION OF COMMUNICATION TECHNOLOGY

There is no doubt that the use of communication technology ensures the speed, accuracy, efficiency and information load handling and potential. But it has its own limits, such as,

7.5.1 Expensive

The use of modern communication technologies involves both prohibitive installation cost as well as recurring maintenance cost. Besides these, the uses of office machine involve additional expenditure. Additional expenditure is towards special type of stationary, training. Etc. Hence small information systems may find with difficult to afford.

7.5.2 Less Flexible

Any system will become less flexible by the information of the machines. So to utilize the capacity of new technology, to the fullest extent , the whole system and the staff should be adjusted to suit the sophisticated machines.

7.5.3 Need of Expertise

Some of the machines require skill as well as expertise for the operation. The work will suffer machine will remain idle if the staff is not properly trained.

7.6 POTENTIAL THREATS AND PROBLEMS BY COMMUNICATION TECHNOLOGY

Information and communication technology can be used to enhance enterprise and personal productivity and creativity or to freeze existing structures and inhibit personal freedom. The main threats and problems of information and communication technology arise from,

- *Information pollution*
- Destabilisation potential
- Information insecurity
- Socio technical issues
- Potential lack of control over communication etc. information polution arises from dysfunctional provision of information. it is caused by,
  - (i) The amount of information available exceeding the capacity of recipient to examine, filter assimilate relevant information.
  - (ii) Provision of wrong information resulting in incorrect decisions and control that are not optimally effective, in the extreme case "garbage in garbage out" occurs, where computerized information systems are used to "Sanitize" the garbage that is treated as management information.
  - (iii) It is practically possible for communicate with anyone else, vertically or horizontally within and outside the enterprise, without disclosing the communication's identity. Misuse of electronic messaging is the important problem.

7.7 LIBRARY AS COMMUNICATION AGENCY

The objective of any library is to communicate the contents of the printed and non-printed materials to those to whom such contents are likely to be of some help. The library or information centre is the bridges between the stored information and the individual who needs such information. The times when we used to boast of our large collections, building, staff resources etc. are over. The day has dawned when the libraries are required to marshall different combinations of communication technology for the benefit and progress of our developing society. It is only them that the society could look forward with hope towards the librarians and information scientists and thereby enhances their status and prestige.

SUMMARY

The main aspects discussed are : Information as commodity/resource; information as data in the environment; information as representation of knowledge and information as part of Communication process.

In this regard, the idea and meaning of Communication, the definition of

communication is explained to you. The form and channels of communication and described and are represented diagrammatically to have a clear understanding. The essentials or ingredients of communication are dealt with briefly. The different function of communication along with its types are discussed in detail.

QUESTIONS

Q-1 Explain the basic elements of a communication process?

Q-2 Define communication theory and explain advantages of communication technology?

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UNIT

8

IMPLICATIONS OF INFORMATION SOCIETY

STRUCTURE

8.0 INTRODUCTION

Information and knowledge have always been resources for creating material welfare. Even the primitive man, to survive, has instinctively remained in groups. Endowed with the divine faculty of intellect, brain power and astute mind, humans continuously worked towards better living conditions and improvement in living standards, by understanding the environment.

This unit analyses these aspects in some detail with particular reference to certain sectors where in information and knowledge are important components, and also the general life of people.

8.1 INFORMATION /KNOWLEDGE AS SOCIAL WEALTH

Information and knowledge are always considered the root cause for the development of any society, primitive, agrarian, industrial or post – industrial society. Although

the creativity and intellectual faculty were confined to a few groups of people, the results of the created information and knowledge have always benefited the society. In this sense, information and knowledge can be deemed to be social wealth.

The individual and corporate knowledge and information have been accumulating throughout the course of human history. The knowledge reservoir created at different periods of time also includes the continuation, addition or modification of already existing knowledge. Therefore, the treasury of human knowledge is in many ways universal, continuous, cumulative, and ever growing. No final word can ever be said on any aspect of knowledge.

8.2 DYNAMICS OF CHANGES IN SOCIETIES

Change is the very essence of a growing society. Changes can be visible in life styles of people, their living environments, mode of production of goods and services, places of work, education and training, culture and in many others.

8.2.1 Societal Changes

In the pre – industrial agrarian society, most people were engaged in the activities of agriculture, fishing and mining. The social structure was fairly simple. Ownership of land provided the power base. Life for the people centered around cultivation of land for raising crops for food; culture and social life were confined to the environments in which they flourished. In the competition for scarce resources, the mighty took every thing or a major share of every thing.

The attributes of the post industrial society are:

- The centrality of theoretical knowledge as the source of innovation and polity formulation:
- Distinct change from a commodity producing to a service economy; and
- The pre-eminence of a managerial, professional, technocratic class and knowledge workers.

8.2.2 Rapidity of changes

The speed with which changes have taken place is vividly portrayed by Mc Garry in his book entitled The Changing Context of Information.

In order to appreciate the relative rapidity of these changes, he writes, by taking communication as an example "let us use a clock as a model to give ourselves an idea of the relative time span. We shall take an arbitrary date of 30,000 years ago, when man began the series of carvings and paintings that led to the cave are. Starting with approximately 30,000 years before the present, let us take 24 hour period starting from midnight and allowing 1200 years for each hour of the clock so that five minutes equal to one hundred years.

8.2.3 Changing Trends

The striking changes in the information Society (Post-industrial Society) are pictured dramatically by Alvin Toffler in his three books, each book appearing in three decades 1971, 1980 and 1991.

The Future shock (1971) portrays the process of change affecting people and organizations. It speaks about disorientation and stress brought about by trying to cope with too many changes in too short a time. The accelerated speed of history brings consequences of its own, independent of the actual direction of change.

Third wave of change- the start of the new, post-smokestack civilization. Among other things, it points at new industries to come, based on computers, electronics, information and biotechnology, terming these the "new commanding heights" of the economy.

It presents a new theory of social power, and explores the coming shifts in business, economy, politicks and global affairs.

While these works of Toffler may sound highly exaggerated bordering almost on science fiction, the importance of knowledge and information is forcefully highlighted. in fact, some of the ideas that Toffler has mentioned such as changes in supermarkets, hospitals, banks, business houses, television and telephones, are appearing to be vastly changing with the power of high technology.

8.3 IMPACT OF INFORMATION / KNOWLEDGE ON DIFFERENT SECTORS

We have so far considered the impact of information and knowledge on society in a general way, giving pointed attention to IT as the chief instruments of changes. In this section, we shall discuss the purposive influence of IT on the following few sectors which are deemed to have a strong information / knowledge component.

- Education and Training at all levels
- Research and Development
- Media
- Government in all its functions and activities
- Business and Industry
- Life of people

8.4 IMPACT OF IT ON LIBRARIES, INFORMATION SYSTEMS AND SERVICES AND THEIR SOCIETAL IMOLICATIONS

As libraries and information systems and services have been an outcome of the social milieu their existence and ability to adopt to the changes are vital for our profession to survive. Not only are they facing a challenge, a new type professional expertise is also emerging who are in the information field competing with us in professional work. In the following sections, we shall study the changes required in our professional systems and services and the challenges we have a face.

8.4.1 Libraries

Libraries and other information institution have been responding to the information needs of education, research and development, government, activities, business and industry and by the general public for a long time. With their collections, responsive

and anticipatory services, libraries were able to meet many of the requests for information for different clients.

The library and information profession will then have an indispensability and recognition in all developmental activities of a society.

8.4.2 Information products and services

Bibliographic activities, providing access to literature in almost all disciplines is a significant feature of information service in the 20th century. Learned societies like the American Chemical Society and publishing houses specializing in secondary services like Wilson and Co., have been pioneers in this type of services.

8.4.3 Information Industry and Business

Information industry is defined as a market place marked by the emergence of information content with hardware, software, and communication technologies to provide products and services, which enhance the capacity of people to solve their problems.

8.5 LARGER IMPLICATIONS OF THE IMPACT OF INFORMATION SOCIETY

The larger implications of the impact on all aspects of human life may have far reaching effects. Some of these, as seen by experts, are listed below:

- Information and knowledge become the principal generators of wealth in the form of educational institutions, research and development establishments, scientific and technological centers and other similar knowledge- oriented bodies ;
- Information and knowledge will grow in volume and variety. Criticism, dialogue and commentary will add value to them ;
- Changes in resource structure will obviously bring changes in the power structure. The natural corollary of this is the evolution of a new power elite, leading to anew power structure at the political level;
- An ever-increasing gap will grow between "information rich" and "information poor" among nations and within a nation;
- The actual decentralization of production and decision –making may provide the basis for a rich, articulate and participatory social system; or effect purely physical decentralization , combined with centralized decision-making an organization, giving rise to an increasingly rigid and monolithic society;
- Changes may lead to increasingly rewarding , qualified, creative and formative, by eliminating repetitive activities (both physical and mental);or develop highly standardized tailored work, offering only the advantage of lessening the burden of various activities, without any corresponding changes in the social structure;
- A better man – machine relationship by exploiting increased capacities for

interaction , dialogue , adaptations and intelligence on the part of machines; or a further alienation of the instrument of work, in terms of both ownership and ability to dominate them

- Increasingly centralized capitalism with a subordinate peripheral system, or horizontal diffusion of a rich and diversified form of capitalism with growing *labour participation, and at the outside, direct management by workers;* and
- Possibility of increasingly intense interaction between individuals and groups; or a dramatic deterioration in interpersonal relations.
- d information poor will widen.

8.6 IMPACT OF INFORMATION TECHNOLOGY

The impact of new technologies is seen in almost every human activity. The size and the rate of growth and change in the pattern of collection, storage and transmission of information are some of the major limitations in any library. The basic concept In the use of new technology is technology is to free the information scientist from the routine jobs connected with library operations, which can be entrusted to computer.

In this age of science, electronic computers provide information, which help to reduce the bulk of the printed materials. The computers also help to make the libraries and society paperless in future. The developing countries like India have reached a stage, where technology particularly the communication technology threatens the very existence of traditional of traditional libraries.

Lancaster predicted that we will soon be entering the era of paperless society, an era in which print on paper will be replaced by electronics. Thus "library will not be containing any printed material at all. It may become a room containing computer terminal only. But this prediction seems to have overlooked the fact that libraries are repositories of the recorded knowledge of many generations. The future of libraries is a mosaic that will make libraries more complex. In addition to took stacks and reading tables, there will be carrels and computer terminals"

The emerging communications technologies especially the interactive digital devices will drive the information future. The technology can handle the data overload but a human being cannot. It is the use of information technology that will give librarians as audience, an attitude, an amplification of self that will raise *their status in life.*

The convergence of electronics, computers and communications formed the basis for an advanced information society the main influence of information technology, that has a direct impact on information society, can be summed up as follows.

(a) Increased computer power leading to faster and cheaper computer processing which facilitated automation of even low budget libraries.

(b) Improved telecommunications, such as ISDN (Integrated Service Digital Network) with greatly increased capacity for data transmission, which facilitated introduction of new services such as Electronic Mail, Fax, teleconferencing etc.

(c) Cheaper data storage, such as optical storage media that increased the storage capacity of the libraries.

(d) Digitization of information – Text, Graphics, Photographic speech; sound etc. that provides quick transmission of any type of data.

(e) Better data transfer between different system and media, such as co-axial cables, optical fiber cables, satellite communications etc has promoted the resource sharing among the libraries.

(f) Increased reliability of hardware and software, which has increased the performance efficiency.

(g) User friendly systems that are developed to enhance the interface between technology and users of the library,

(h) Consequent to the developments on information technology, the libraries are being provided with the means by which they can improve their services. The integrated library management is possible today with the application of information technology.

The overall impact of information technology on library and information science, is broadly subdivided into 3 major divisions, such as,

1. Impact on the technical services
2. Impact of public services
3. Impact on library organization structure

8.6.1 Impact on Technical Services

The Technological developments, which seem to have had the widest impact to date on technical services in libraries, are the growth and development of bibliographic utilities and the more recent development of integrated automated local systems. Bibliographic utilities have prospered in large part because of the role they play in cataloguing. Automation, in the form of bibliographic utilities and MARC format, has revolutionized the practice of cataloguing. Today's librarians rely on MARC format to provide proper cataloguing services to their users.

OPACs (On-line Public Access Catalogue) can substantially reduce the cost of maintaining a catalogue. Many papers files can be eliminated and decentralization is possible because, staff can access the on–line files, wherever a terminal is located. If the OPAC is integrated with other technical service files in a full function automated system, work throughout the department can be streamlined and recognized. The impact on staff responsibilities and assignments can be significant.

Serials automation has proceeded more slowly than that of other technical services operations. The undertaking has been difficult, complex and frustrating. But after the quick proliferation of information technology, successful implementation of automated serials control, including check-in, claiming, binding control and routing of materials has become more feasible.

Collection development may be treated as part of public services or as part of technical services. It may be carried out within the acquisitions department of in a

separate unit. Regardless of the Organizational arrangements, libraries who select materials for the collection use a variety of bibliographic tools automation has made available many or these tools in machine readable format and offered new ways of monitoring collection development and management activities.

Co-operative collection development and management have become increasingly important in libraries due to tight budgets, rising prices and the information ecplosion; Bibliographic utilities facilitate these efforts through shared holdings, information and automated interlibrary loan subsystems to speed resource sharing.

8.6.2 Impact on Public Services

OPACs, which provided speedy on-line access to the entire library's holding by means of a computer terminal, are affecting library operations as powerfully as has the appearance of bibliographic utilities and automated regional networks. OPACs serving either a single institutions are now wide spread and continue to be Implemented in libraries across the country. Now optical technologies make possible and affordable the mounting of CD-ROM Public catalogues at standalone microcomputer stations an operational reality in virtually any library.

Advances in library automation also made possible the rapid development of union lists of serials, arranging holding information for a number of libraries, Library networks made available a central agency that could assemble, merge, and maintain the bibliographic and holding information of other libraries. The development of technology has provided significant improvements in 'resource sharing' especially in interlibrary loan operations.

As in technical services, public services operation have experienced movement of the more routine functions to lower level of staff, as a result of library automation. The verification of bibliographic citations has often become routine and is handled as ready 'reference' searching by support staff. The new emphasis on access to sophisticated information sources has placed new demands on the librarians. Therefore librarian often expected to train and advice patrons in their use.

SUMMARY

Information and knowledge are considered social wealth that should benefit all the sections of a society. Information Technology has enabled the wealth of information and knowledge to become much more easily accessible and available to all. In discussing these, the following aspects of the impact of information and knowledge on societal activities with reference to IT have been discussed in this Unit.

Of the three epochs- making revolutions in human society, the post-industrial society (information /knowledge society) seems to have been very significantly affected by information and knowledge. The rapidity with which changes are taking place figuratively minutes as compared to the time taken for changes in the agrarian or in the industrial society.

The agent of change is primarily IT. But it is only a means to change; the real change has to be in the sphere if socio-economic development.

Changes are very significant and far –reaching in many of the sectors such as Education, R&D, Media, Government, Business and Industry, in the life of a citizen of a country and many othern activities

The impact of IT on library and information systems and services and information industry will introduce totally new dimensions in every aspect of their functioning.

Very far-reaching and significant effects can be visualized in the way IT affords new capabilities to manage and serve information and knowledge.

Indian society is also changing fast but the changes are not with every section of the society. The poor see no changes in their life.

The rich and middle class is becoming a consumer society. To bring in better conditions to all sections of the society, a strategy towards 'sustainable development' is necessary.

Most importantly the power may change with the emergence of new power elite.

Centralization of information may lead to control of many kinds. The gap between information rich an

While all these effects are possible social hazards. IT will surely provide far more facilities to access information and knowledge as never before at every level of use.

QUESTIONS

Q-1 Describe the impact of information on different sector?

Q-2 What is the total implication of information on the society?

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NOTES

UNIT

9

KNOWLEDGE MANAGEMENT CONCEPT AND TOOLS

STRUCTURE

9.0 INTRODUCTION

Many definitions of information, knowledge, and data have been suggested throughout the history of information science.

Knowledge is defined as information given meaning and integrated with other contents of understanding.

A problem with defining knowledge is known as the "Gettier problem." The Gettier problem arises when we give certain kinds of counterexamples to the JTB (justified true belief) definition. A counterexample is a case where the definition applies, but the word defined doesn't; or a case where the word defined applies, but the definition doesn't. Gettier counterexamples are examples where the definition, justified, true belief applies; but one nevertheless still doesn't have knowledge, so the word "knowledge" doesn't apply in that case.

9.1 KNOWLEDGE MANAGEMENT

Knowledge management seeks to understand the way in which knowledge is used and traded within organizations. Treats knowledge as self-referential and

recursive. This recursion means that the definition of knowledge is in a state of flux. Knowledge management treats knowledge as a form of information which is impregnated with context based on experience. Information is data which cause a difference to an observer because of its observer-specific relevance. Data is can be observed, but does not need to be.

9.1.1 Sociology of knowledge

Aspects of knowledge ehibit a social character. For instance, knowledge is a form of social capital. Sociology of knowledge examines the way in which Society and knowledge examines the way in which Society and Knowledge interact.

9.1.2 Adoption of knowledge

Through experience, observation, and inference, individuals and cultures gain knowledge. The spread of this knowledge is examined by diffusion. Diffusion of innovations theory explores the factors that lead people to become aware, try, and adopt new ideas and practices – this can help to explain development of knowledge.

9.2 KNOWLEDGE FORMATION

Knowledge can be divided in both tacit knowledge, which involves senses, skills and intuition, and explicit knowledge, which is formulated and /or captured.

The knowledge creation process involves 5 steps:

1. Sharing tacit knowledge
2. Creating concepts
3. Justifying concepts
4. Building a prototype
5. Cross-leveling knowledge.

9.3 KNOWLEDGE MANAGEMENT

Today, both are on the management agenda. The interest in knowledge as a strategic lever in business is not new, in the 1970s and 1980s there were great expectations that knowledge based computer systems (expert systems) could harness knowledge to solve many business problems. That promise was only partially fulfilled and certainly not to the extent that workers in the field had hoped. In retrospect the problem was that developers focused too much on what has been described as "falling into the trap of trying to develop 'thinking machines' rather than using machines to augment human thinking."

Subjective insights, insights, intuitions and hunches fall into this category of knowledge. The four conversion processes they describe are:

Tacit- to tacit (socialization) – where individuals acquire new knowledge directly from others;

Tacit-to explicit (externalization) –the articulation of knowledge into tangible from through dialogue;

Explicit –to –explicit (combination) – combining different forms of explicit knowledge, such as that in documents or on databases;

Explicit-to tacit (internalization) – such as learning by doing, where individuals internalize knowledge from documents into their own body of experience.

9.4 KNOWLEDGE TO BUSINESS SUCCESS

Knowledge adds value to a business through its products, processes and people. The product contribution of knowledge is described by Davis and Botkin. They describe six feature of knowledge- based business;

1. The more you use knowledge- based offerings, the smarter they get.
2. The more you use knowledge-based offerings, the smarter you get.
3. Knowledge-based products and services adjust to changing circumstances.
4. Knowledge- based business can customize their offerings.
5. Knowledge –based business enable customers to act in real.

Recent examples of the growing intensity of knowledge in products are the intelligent oil drill, which 'knows' the shape of the reservoir it is drilling, and the intelligent car, whose engine management systems can monitor performance of vital parts and 'knows' when they need servicing. These are examples of where knowledge can enhance the value of a product in the eyes if the customer.

9.5 KNOWLEDGE PRACTICE

The following were common activities that were taking place in knowledge management initiatives:

- Creation of knowledge terms –people from all disciplines to develop the methods of knowledge management.
- Sharing if best practices- from one part of the organization to another, through databases, but also through personal interaction and sharing events.
- Development of knowledge databases- best practices, expert directories, market intelligence etc.
- Creation of Knowledge Centres- focal points for the development of knowledge skills, managing and enhancing knowledge databases and facilitating knowledge flow
- Collaborative Technologies- the use of Intranets (internal Internet) or groupware for rapid information access
- Intellectual Capital teams– to identify and audit intangible assets such as knowledge.

9.6 KNOWLEDGE MANAGEMENT SYSTEMS

Knowledge Management System (KMS) has a knowledge base as a major component of computer-based information systems. A KMS uses its knowledge base about a specific, complex application area to act as an expert/ consultant to end-users. Such a system can be used either for management or for operational applications. Thus a KMS can be classified conceptually as either a operation or management system, depending on whether it is used for expert advice to control operational processes or for assisting in managerial decision making.

9.6.1 Characteristics

KM, as already mentioned above, attempts at the holistic application of the complexities of human intellectual processes, including tacit knowledge, learning and innovating processes, communication cultures, values and intangible assets to assist decision making and control processes. It also recognizes the subjective, interpretive and dynamic nature of knowledge. At the same time KM draws from the developments in ICTs for effective and efficient organizational management and development.

In developing a KMS it is necessary to take into account the following factors:

1. KM does not come cheap.
2. Effective KM requires hybrid solutions using people and technology
3. KM is highly political, has socio-cultural and human implications.
4. KM requires development of knowledge managers.
5. KM benefits more from maps than models, more from markets than from hierarchies.
6. Sharing of knowledge may be perceived as an 'unnatural act'
7. KM entails improving knowledge-based work processes and providing knowledge –based products and services.
8. Accessing knowledge is only the beginning.
9. KM is a never-ending continuous process.
10. KM requires a knowledge contract.

SUMMARY

Following consideration of what is knowledge management (KM), discussed the changing socio-economic environment in a knowledge society and the impact of information and communication technologies especially on enterprises.

After presenting the characteristics of knowledge management systems. Discusses practical approaches and strategies of KM

Following discussion on the need and characteristics of knowledge based product; outlines the architecture of knowledge products.

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Concludes with a discussion on data mining, text analysis and text mining –their usefulness and limitations in developing knowledge products.

QUESTIONS

Q-1 Describe knowledge management ?.state its characteristics?

Q-2 Discuss the advantages of knowledge management in an organization?

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UNIT

10

INFORMATION NETWORKING

STRUCTURE

10.0 INTRODUCTION

Networking is a common concept, which concerns itself with mutual co-operation and co- ordination between systems of information for exchange of resources, services, facilities, etc. This exchange is termed as a network when these activities are performed in a systematic pre-planned manner. A network can be defined "as group of individuals or organizations that are interconnected. The linking must include a communication mechanism, and many networks exist for express purpose of facilitating certain types of communication among their members. In the library world, institutions from networks primarily to achieve better sharing of resources consisting of bibliographic information and of collections-and better service to patrons"

Alphonse F. Trezza has defined, networks as "a formal organization among libraries for co-operation and sharing of resources, in which the group as a whole is organized into subgroups, with the exception that most of the needs of a library will be satisfied within the subgroups of which it is a member"

10.1 NEED AND PURPOSE

Some of the factors that are essential for the formation of networks are :

1. It makes possible timely access to reliable and precise information which is crucial for the developmental activities of the nation.
2. It makes possible the selection, processing, organization and dissemination of world literature easier. Moreover relevant information can be scanned regularly for use by researchers and personnel engaged in R&D activities.
3. The number of users served may be infinite.
4. It ensures access to information sources without any financial limitation on individual libraries and the difficulties caused by rising price of reading material.
5. A number of libraries working in coordination can eliminate some purchasing and processing costs, as well as, avoid unnecessary duplication of documents.
6. Network enable global access to international databases and information centres, with the help if computer application and communication technologies.
7. The new techniques developed world work in information handling and library services can be better utilized as compared to that of a particular library.
8. Network acts as a bridge in reducing the gap between the available information and the users of information.

10.2 OBJECTIVES

The objectives of an information network may be stated as follows;

1. Promotion of resource sharing among the libraries through computerized networking, for maximum use of resources.
2. To assist member libraries in cataloguing of books, serials, non-book material and catalogue production.
3. To facilitate and promote delivery of documents manually or mechanically.
4. To coordinate efforts for suitable collection development and reduce unnecessary duplication.
5. To establish referral centres, to monitor or facilities catalogue search and maintain a central on-line union catalogue of books, serials and non-book material of all the participating libraries.
6. To develop a specialist bibliographic database of books, serials and non book material for search and access.
7. To create a database of projects, specialists and institutions for providing on line information service.
8. To promote computerized operations and electronic services in the libraries for fast communication of information.

9. To co-ordinate with other regional, national and international networks for exchange of information and documents for the use of libraries and users.
10. Optimum utilization of existing library and information systems, their resources and services and evolution of new standards and uniform guidelines in techniques, methods, procedures, hardwares and softwares; services and so on, and promote adoption and actual practice by all libraries.
11. Provision of precise and exhaustive information accessible with minimum delay. Presented in a manner convenient to the respective users, at a reasonable cost.
12. Development of facilities for education and training in library and information science.
13. To assist transmission of graphic material.
14. To facilitate book selection and promote better and relevant reading material among the users.
15. To assist locating out-of-print material and facilitate fact retrieval in special areas.
16. Promotion of research development and innovation in information technology.

10.3 FUNCTIONS

The network performs a number of functions to achieve its objectives:

1. To co-ordinate and communicate the resources and services within the network.
2. To facilitate efficient and economic interlending of information resources.
3. To provide reprographic and translation facilities
4. To make available adequate computer facilities for fast information access and retrieval.
5. To establish centralized data banks for quick information service.
6. To formulate standards for information techniques, procedures, processes and services for use of the libraries forming part of the network.
7. To establish coordination with other regional, national and international centres, engaged in information handling.

10.4 SCOPE

A network, beinga Klink between a group of orgninsations and libraries. Would facilitate:

1. Monitoring of important socio-economic projects
2. Maximum utilization of costly computer resources
3. On-line retrieval and updating of information
4. Dissemination of information

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5. Sharing newly developed software
6. Exchange of messages
7. Act as an emergency communication system

10.5 TYPES

A number of networks may be recognized. One of the ways to characterize networks is to distinguish them as:

1. Organizational network.
2. Specialized network
3. Functional network

10.5.1 Organizational Network

The public library system of a state may be recognized as an organizational network.

10.5.2 Specialized Network

The sectoral information systems planned under the NISSAT scheme are specialized networks, as they deal with a specific subject area.

10.5.3 Functional Network

The National Information Center's plan of having a large computer configuration with a direct access, secondary memory and connected to a number of institutions through communication channel and having a terminal is a functional network.

10.6 Other Types of Network

Other types of network besides the above are:-

(a) Library Networks

(b) Information Retrieval Networks

Library Networks

The library networks have the following features:

1. Similar type of data (bibliographic data)
2. Committed user base (librarians/public/researchers)
3. High professional needs (telecommunication network/private network/hard wired network)
4. Low end –users needs (librarians/public/researchers)

Information Retrieval Network

Information retrieval networks include more bibliographic records. but as textual or numeric information based databases are increasing, retrieval is based largely on Boolean searching. Thus, information retrieval consists of varying types of data, unstable user base and a mix of professional/non-professional needs.

The important characteristics of information networks are:

(v) Data : Bibliographic records (textual/numeric)

(vi) Retrieval : Subject based (Boolean/Key)

(vii) Access: Telecommunication networks/private networks/hard wired networks).

(viii) Users : Intermediaries (End-users)

Networks may further be of the following types:-

1. LAN (Local Area Network)
2. MAN (Metropolitan Area Network)
3. WAN (Wide Area Network)

LAN

Local Area Network is a facility data communication, video or voice, within a single building or over a small area of space. It constitutes the following features:

1. A diameter of not more than a few kilometers
2. A total data-rate of at least several MBPs
3. A single organization has complete ownership

This is called LAN, as all the terminals and peripherals are located within a building or complex. Input of data and access to data is possible through any of the terminals or computers linked with the central computer's processor; this system is most suited for offices. Libraries, factories, departmental shops, educational institutions etc.

MAN

Metropolitan Area Network covers the entire city, using LAN technology.

WAN

Wide Area Network constitutes a number of autonomous computers distributed over a large geographical area including city, state, region, nation or the world. Transmission facility is generally through satellites.

10.7 LEVELS OF NETWORK

Networks have the following levels:

(i) National Network

(ii) Regional Network

(iii) Local Network

National Network

The following constitute the important national networks:-

1. INFLIBNET

2. NICNET
3. INDONET
4. ERNET
5. INFOTEL

10.8 INFLIBNET (INFORMATION AND LIBRARY NETWORK)

INFLIBNET is a network programme, aiming at achieving maximum utility of the existing resources by co-operative network, linking remote areas and with the other information centres, research centres, university libraries so as to make possible the access to information quicker and thus inter-connect the entire nation into an information centre which will contribute towards pooling sharing and optimization of resources, facilities and services of libraries and information centres in the university system and R & D complexes.

The INFLIBNET programme was launched by UGC under the chairmanship of Prof Yash Pal in April 1988. The participants of this programme would include institutions of higher learning covering all disciplines, R &D institutions and national organizations like CSIR,ICAR,ICCR,DRDO,ICMR,ICSSR,ICHR,DOT,DOE, Indira Gandhi National Centre for Arts etc.

Objectives

INFLIBNET would fulfill the following objectives:-

1. To function as a pool of information and thus help in sharing the resources, facilities and services available to the maximum.
2. To reduce financial constraints by lowering the cost factor of acquiring reading material by each library and also the time and labour involved in providing the various services.
3. To increase the efficiency of information access and services provided by introducing new technologies i.e. computer and communication technologies.
4. To encourage co-operation among libraries and information centres within the country and promote co-ordination among research institutions.
5. To create efficient manpower for the management of INFLIBNET.
6. To create data based for providing on-line services.
7. To evolve standards and uniform guidelines in techniques, methods, services for effective use of available resources.

Structure

The proposed programme of INFLIBNET operates at different levels-national, regional, sectoral and local.

National Centre

The National centre for managing and coordinating the affairs of INFLIBNET is located at Ahemdabad. INFLIBNET has established as computer laboratory at the

national center and started training programme of four weeks duration to train the staff members in the use of computers in universities and colleges. The training programme includes teaching of CDS/ISIS package, sanjay package as well as allowing the candidates to practice on personal computers along with knowledge of hardware and software concepts.

Regional Centers

The programme consist of four regional centres north, south, east and west, covering the four regions of the Indian Union which will maintain union catalogue of holdings of libraries in the regions and databases of projects, institutions, specialists, etc.

Sectoral Centres

INFLIBNET also includes a number of sectoral centres, which include institutions with large collections on specific subjects, to cater to the needs of subject specialists. These centres would be discipline wise such as Science & Technology, Humanities, and Social Sciences as well as by specific subjects such as Sanskrit, Geography, Economics, Law, Education, Mathematics, etc.

Local Centres

In this programme the networks of institutions universities colleges and R &D organizations would function as local level agencies for serving the users. About 170 university & 500 college libraries and 200 R & D institutions are included in the programme for providing information services at local level. Nearly, 40 nodes for this purpose has been planned to be set up, throughout the country.

Services

INFLIBNET, through its network programme, would provide a number of services:

1. Catalogue-based services
   - (a) Shared cataloguing of monographs, serials and non-book material.
   - (b) On-line catalogue access for shared cataloguing and location identification.
2. Database services
   - (a) Bibliographic database services
   - (b) Retrospective search, SDI, current awareness services
3. Document supply services
   - (c) Inter-library loan service
   - (d) Document delivery (fax/non-fax)
4. Collection development
   - (a) Acquisition and assistance in selection and procurement
5. Communication-based services
   - (a) Electronic mail

(b) Transfer/receiver messages

(c) Bulletin board-view /update bulletin board.

Future

The implementation of INFLIBNET as a computer communication network of libraries would transform the library scenario within the country.

Earlier, it was planed to implement this project within a period of five, years i.e. during the Eight Five Year Plan period, under the assumption that the Planning Commission, Govt.-of-India would make the require funds of Rs. 150 crores available to this project. However due to delay in launching of the Eighth plan and overall budget crunch. it is planned to implement the project upto the end of the Ninth Five Year Plan in a phased manner. It was anticipated that during the Eighth Plan Period, the national and one regional centre would be established, 50 university libraries. 20 sectoral information centres and document resource centres would be activated and a massive training programme for developing the man power needed for this project would be started.

With the initiation of the UGC, such a massive network programme has been started but as a large amount of funds is involved in accelerating such a programme, the government should take an active step forward and support such education based programmes, so that our people may also be able to get at par with the other parts of the world.

10.9 NICNET (National Informatics Centre Network)

It is a national information retrieval network; National Informatics Centre established NICNET in 1977 and was commissioned in 1987. It is a satellite based computerized information system to provide data communication between the districts, states, regional centres and ministries/departments at central level and the central headquarters.

Objectives

NICNET was established to fulfill the following objectives:

1. To design, develop and implement advance computer based methodology.
2. To promote adoption of computer based management techniques
3. To generate specialized manpower in the field of information
4. To set up a computer network for connecting the various government departments/ministries
5. To establish information centres at state capitals and district information centres at all districts in India with linkage to NIC at four centres.

CONCLUSION

The incoming technologies and the pace at which these new developments are coming up have compelled us to be more selective. India being a developing country should first make sure that which ever mode it accepts for the expeditious dissemination of its information should definitely be cost-effective and within the reach of the masses. Too expensive a technology, if adopted may leave us half way, instead of carrying us across, as by them our budget, our resources; everything would be exhausted, without any proper gain.

Today, we find a number of networks mushrooming in different areas and are successfully operating also. But when it comes to libraries, some how the statement does not hold true. The information policy for libraries and information centres has not yet been implemented. Similarly INFLIBNET has not progressed the way it was proposed to, it still needs to be paid much attention.

The major problem today, is that we are running after technology, with our eyes closed. We ought to open our eyes and study our country's entire setup. There are a number of

Problems that are coming up as obstacles, in the proper transmission of information. As far as research institutions are concerned they are in a better position, due to the homogeneity among the group of users. The problem arises outside these centres, where the universities are concerned. On surveying our universities sincerely, it will be a surprise to find that there are very few libraries that are computer operated. I think universities; either belonging to metropolitan cities or other areas have equal importance. They should be equally developed. If we turn our mid towards our subject area i.e. library & information Science, we are lagging far behind as regards the budget, trained manpower, equipment, we even lack proper libraries. With all these existing problems if we are unable to select the right system, most suited to our country, at the right time, we will surely end up in a mess.

QUESTIONS

Q-1 What is networking? Explain its function and scope?

Q-2 Explain national library networking? Give suitable example?

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NOTES

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UNIT

11

ON- LINE ACCESS TO INFORMATION: COMPUTERIZATION

STRUCTURE

11.0 INTRODUCTION

There has been a radical change in the concept of modern library service during the later half of the twentieth century, because of the exponential growth of literature in all fields of human knowledge and the ever-increasing number of documents in each subject area. Such growth has been creating problems of selection, acquisition, organization and service in libraries.

Today, we have lived through the transition period from industrial age to the information age. We communicate across continents without knowing whether or not voice and pictures are bounced off satellites, carried over air voices, over wires or through glass filaments. Not only are our lives immersed in information, but also of those who are engaged in important activities of information dissemination in this information age.

11.1 NEED FOR INFORMATION

Information is of vital concern; we need to consider the impact of new technologies on library resources, management and co- operation. Libraries and documentation

centres have traditionally been reservoirs of information, and we must undertake such steps so as to ensure maximum possible Contribution to the society. As the bulk of information increases, it becomes harder for researcher to identify and obtain the precise information that he requires.

Computers play an important role in the organization and functioning of library and information services. The use of computer-based systems in libraries and information units is now comparatively common place and is no longer a controversial issue. In modern times, the library is a complex system of information distribution. It acts as a system where individuals perform specific, inter-related tasks, designed to provide the most effective service to the users.

Computers are used to assist a variety of library functions such as maintaining and providing access to the catalogue of items in the collection, managing the issue and return of items from the collection, the acquisition of new items for collection, controlling the serial publications and allowing the retrieval of information from local files and searching

External on line information sources are references to the general literature, numeric data or for the full text of the documents.

Computers have facilitated the house keeping operations in libraries as well as retrieval and dissemination of information. Thus, the online communication provides a bridge across geographical barriers.

11.2 CHARACTERSTICS OF AUTOMATED SYSTEM

1: The operations/processes are carried out automatically.
2. It avoids or reduces human action and thus saves labour, and
3. It increases efficiency and speed in operation.

Thus, the functions offered by computers, that are important in library operations are :

- Capacity to store large volumes of data
- Communicating large volumes of information
- Arranging, sequencing and publishing large volumes of information.
- Constructing indexes, of many forms, for stored information
- Retrieving stored information by many facts and access points
- Performing 'dialogues' with users to offer rapid response and progressive improved search criteria.

11.3 INFORMATION CHAOS AND COMPUTER

The enormous amount of information produced due to increase in research work, setting up of a number of documentation and information centers, assisting further research and training and the number of academic and research institutions coming up day by day, present before us the problem of information organization, storage,

retrieval and dissemination of the right information, at the right time to the right reader, without loss of time.

It is not possible to handle this enormous literature manual as the large amount of information cannot be accurately organized and disseminated expeditiously. Computers with its large storing capacity, good memory and easy retrieval process, are in a position to assist the users in handling the chaos created by the incoming non-stop information.

Time Factor

Today, time plays an important role as the distance between an invention and its application has reduced to a great extent. As soon as a new invention or a new concept is generated. it is ready for use. When information is being brought our at such speed it should also reach the users in time, only then will it be useful.

Speed Factor

Along with the time factor is associated the speed factor in order to provide the required material to the user in time, it will have to be provided speedily, By speed, we mean without loss of time, as early as possible i. e .when that information is most required as the utility of that data s maximum when it is needed. For this, we will have to adopt a system which can ensure speedy access to the material. Computers have the quality to organize the enormous material in such a way as to be used when required.

Accuracy

One of the important factors in organizing and disseminating information is its accuracy. We have tremendous amount of information from various sources. To scan the entire material and provide it to a particular user, may end ip in some or the other type of error. A human brain is prone to err, but if computers are brought into use, accuracy in the provision of information can be ensured. Since a computer is a stupid servant, it cannot add or delete any information fed into it. Once the data is input, we can get the output as and when required with full accuracy.

11.4 Resource Sharing

In the present situation with such a large volume of literature being generated in every discipline and in every part of the world, it is very essential for every citizen, moreover, a research scholar to know all about the developments are published in the recent journals and other sources.

Staff

With the increase in documents and the number of users, using these documents, the number of staff should also be increased for providing the services. Along with the number of increased staff number of other expenses would also add up.

But if computers are used, only by training the already available staff, we will be in a position to serve better.

Effective Services

Computers can help us to organize the information, as well as to disseminate the information with the help of a number of services. As these services would be provided with the help of computers, they would be more efficient and accurate.

Information Storehouse

The computers have access to a number of libraries via its telecommunication networks; it acts as a large storehouse of information, where information either retrospective or anticipatory may be retrieved.

Lack of Space

With the increase in growth of recorded material the space available at the disposal of each library is limited. It is not possible for a library to increase its space every year. Computer application can solver this problem, a s magnetic tapes, CD-ROMs etc. which occupy less space and store large quantities of data.

11.5 COMPUTERS IN LIBRARIES: DEVELOPMENT

Use of computers in libraries for information storage, dissemination and retrieval, is a big revolution. R.G. Woods provided an excellent review of library automation in UK, upto 1982 whilst Kilgour provides a history of developments in US upto 1975.

During 1960's several libraries both in North America and UK began to experiment with computers. In US much of this work was carried out in special and university libraries. In 1966, the United States Government had more than 2000 computers in operation and by 1970, it was estimated that at least 1,00,000 (1 Lakh) computers were working computers have accelerated the production of bibliographies and indexes; improved the efficiency of record keeping particularly serial record control and circulation; and has increased the ease of locating certain types of information.

In 1961, H.P. Luhn of IBM developed programs for producing keyword indexes to titles of articles appearing in Chemical Abstracts and the Douglas Aircraft Corporation started to produce catalogue cards by computers. In UK, public libraries have always been as involved as academic and special libraries, in developing computer-based systems. These first cataloguing systems were based on 80 column punched cards, with the resulting catalogue being printed by the computer's line printer. Several university libraries received funding from the British Research and Development Department.

In the mid 1960's the library of Congress (LC) in US, started to experiment with the production of MARC records. In Britain , the British National Bibliography (BNB) co-operated in the development MARC record structure and now, many countries all over the world use the MARC format in the production of their national bibliographies.

During 1970's various cataloguing standards such as the General International Standard Bibliographical Description ISBD(G) and the second edition of the Anglo

American Cataloguing Rules (AACR-2) were formulated and have been incorporated into the MARC format. In 1970, libraries, cataloguing, agencies and the book trade began to adopt the International Standard Book Number (ISBN).

During the early 1970's many libraries began to use their parent body's computer system and develop local systems. The 1970's saw a growth in co-operative services and resource sharing amongst libraries in UK, the two major co-operative systems which emerged are :

1. BLCMP (Library Services) Ltd. (formerly the Birmingham Libraries Co-operative Mechanization Project)
2. SWALCAP (South –Western Academic Libraries Co-operative Automation Project)

Co-operative systems also developed in North America, OCLC (formerly the ohio college Library Centre and now the online Computer Library Centre), which was incorporated in 1967 to develop and operate a computer system to support libraries in Ohio, rapidly expanded its services to libraries outside the State and the Europe.

OCLC is the large library co-operative service in the world, serving almost 3000 libraries. The other major North American co-operative are RLIN-the Research Libraries Information Network-developed at Stanford University Library ; WLN-the Washington library Network –developed from work at the Washington state Library, and UTLAS-the University of Toronto Library Automation Systems –which developed from the cataloguing system at Toranto University Library.

By the Mid 1970's several organization such as the US National Library of Medicine, the Lockheed Missiles Corporation and the Systems Development Corporation (SDC) had started to offer online searching.

In the late 1970's several libraries started to supplement the computing facilities available from their parent authority by having a mini –computer installed in the library. This mini computer can be used for a variety of functions with a popular one being the provision of on –line access to some of the files in a computer based circulation system.

The trend for libraries to acquire their own computing facilities has accelerated in the 1980's, with the availability of microcomputer systems. Microcomputers may be used as 'intelligent' terminals to remote computer system or may be used in small libraries to control a variety of functions, such as the creation and maintenance of local databases, serial control, acquisitions and so on. During 1980's , the provision of 'packaged' hardware and software systems has come into practice and also gained popularity for information storage and retrieval processes and reference network of the libraries and bibliographical information centres.

In India efforts towards automation of libraries began in 1960s. INSDOC was the first information centre to start making use of IBM -1620 Model-I Computer in 1964. The first attempt was to produce a national union catalogue followed by the various directories and information handling systems. In 1976, TIFR, Bombay, conducted an experiment known as 'RECON on line demonstration projefct linking to world sources of information' in which INTELSAT communication satellite

was used for linking Bombay and the computer centre at FRESCATI, Rome. This experiment was organized by INSDOC and DST, to access a large amount of information available at ESRIN, Rome to be searched form the terminals located at Rome via INTELSAT. The same experiment was repeated by DST and computer society of India in Feb. 1981.

Similarly, further wirk in creation of data- bases in Electrical Engineering was carried out by DRTC in collaboration with BHEL, Hyderabad. BARC, TIFR, ICAR etc. are creating databases in collaboration with international organizations, in their respective fields.

About 37 libraries and information centres in India, are using computers for in house library operations. Since 1975, INSDOC has been providing computerized SDI services to scientists throughout the country.

The National Informatics Centre has also been established at Delhi which is working towards developing ASIANET, with the help of Indian Communication Satellite. Besides, BARC and ICAR are also working as national input centres for INIS and AGRIS respectively, both of which are computer based international information systems.

Further, India has also developed on –line retrieval system facilities, with the help of INSAT-IB under the NISSAT plan. The daily newspaper 'Hindu' brought out from Madras (Chennai) is now being produced and disseminated electronically using facsimile transmission system. India has made remarkable progress in this area, but the main aspect remains that unless, computer literacy is made compulsory and gap between the citizens of different parts viz. urban and rural is reduced to the maximum the expected results can not be attained.

11.6 COMPUTERS IN HOUSE KEEPING ACTIVITIES

House keeping activities in a library, refers to those functions which are done in the background so that the library may perform its goal, of service to the user community. The jobs like selecting, ordering and receiving books, are repetitive in nature; these jobs if mechanized would be a great relief for the staff, who may utilize their time for providing other services. The house keeping operations that have been automated successfully are:-

1. Acquisition of books
2. Cataloguing
3. Circulation

Acquisition System

In a manual acquisition system, one finds that the library has to maintain several paper files and records. Examples of files and records necessary in acquisition are records (usually on cards) of books on order, files of purchase orders, correspondence with vendors, records pertaining to advance payments and follow-up pertaining to non-supplied items, etc. in addition acquisition involves a number of activities like checking for duplication. Generation of purchase orders, filing of in –order records,

monitoring of expenditures and preparation of budgets, receiving of books ordered, passing of invoices for books received, accessioning, etc.

Some of the tasks involved in the administration and management of the acquisition function are of a routine or clerical nature, e.g. Filing of cards, typing of purchase orders, passing of bills. Etc. further , the same data is re-keyboarded several times, e.g., when placing a purchase order the bibliographical details (author, title, etc.) are required to be typed on the purchase order, again the same information is required to be typed in a follow-up reminder to the vendor.

These routine works can be easily conducted by the help of computers relieving the professional staff for qualitatively better work, e.g. better book selection, better budgeting, more interaction with users for better selection of books.

Cataloguing

The most important holding of a library is its catalogue. A good catalogue enables both the users and the library staff to utilize the library collection effectively.

The cataloguing functions require the professional as well as clerical skills on the part of the cataloguer such as typing of headings. Sorting of cards and alphabetization, filing etc.

The computer has been used in a variety of ways in cataloguing. The most elementary use of computers for cataloguing is to minimize data-entry of keyboard effort. After all data elements for cataloguing of a given publication are entered, it is possible to use the data to produce a full set of catalogue cards for it. Once the entered data is verified. All cards produced are error-free. It can also help in producing book cards and spine labels.

Computers are also useful in producing book catalogues i.e. catalogue records arranged in the form of a list of entries and bound as books. Further, Microfiche (COM) catalogues using magnetic tape, to produce microform images of stored data e.g. Catalogue records, are also being prepared. Computers can, also be utilized for centrasized cataloguing e.g. MARC project of the Library of Congress.

Serial Control

By serials we mean publication issued at regular intervals and intended to be continued indefinitely. Serials include journals, newspapers, annual reports, advances or progress series, proceedings of learned bodies, mono graphic series, etc.

Serial control means the formation of policies, procedures and operations for the management of the acquisition functions and generally for building collection.

Serials, unlike books present several problems in their acquisition. Automation of serial acquisition undoubtedly ensures better control over the functions especially when the number of serials to be acquired is high. Automation enables better control over receipts and follow-up and timely action, in renewal.

Circulation Control

The main aim of circulation control is to ensure that the holdings of a library are available, to those who need it for a reasonable period of time and that users are

provided an equal opportunity, in the use of library materials. Activities involved in circulation control are not technically complicated but are highly labour intensive and time consuming. Further transactions involving circulation are not evenly distributed throughout a working day. There are peak hours in which there is a very heavy load of transactions (issues, returns, etc.) Manual circulation systems involve simple but repetitive activities and considerable amount of record keeping, eg. Records of issues, borrowers, due-dates, overdues, etc. Manual systems however, are error prone especially at times of peak transactions.

The computer in circulation control is being made use of in the west. It is quite successful as the operations and procedures involved in circulation are simple and repetitive, which are easily handled by computers, Besides, automated circulation systems also provide valuable management information.

Now –a-days automated systems are bar-code based. i.e. books and borrowers are identified by unique bar-codes. The spine labels of books have bar-code labels and the users are also provided identity-cards which have bar codes. A bar-code reader is used to read the labels and identity cards and record the information of transactions on magnetic media (disks, tapes). Such data is then available interactively in an on-line circulation system and can be searched to answer queries concerning items under circulation.

11.7 OTHER SERVICES

Besides the above discussed services, other major computerized information services are Current Awareness Services, Selective Dissemination of Information, and Retrospective Searches.

Current Awareness Services

Current Awareness Service helps the user to keep himself up to date with the progress within a subject area. It involves a process of reviewing the publications immediately on receipt, selecting information pertinent to the programmed of the organization served, as well as recording individual items to be brought to the attention of those persons, to whose work they are related. CAS has the characteristic feature of bringing the new information continuously to the notice of the scientists. The techniques used for providing CAS are as follows:

1. telephone calls
2. periodical routing
3. maintaining card files of references of information by manual or machine methods
4. Recording individual references and forwarding them to the concerned persons.

5. issuing of CAS bulletin from the library
6. circulation of contents pages of periodicals

Selective Dissemination of Information (SDI)

"SDI service is personalized CAS service which is provided within an organization that concerns itself with the channeling of new items of information from whatever source to those points within an organization where the probability of its usefulness is high." SDI service was developed mainly to provide the research scholars and scientists individually at regular intervals, a list of carefully selected publications, in his area of interest. This service can be provided manually as well as in a mechanized from.

With the help of computers, a number of large abstracting and indexing services have produced machine readable files, of large volumes of document records. These files are usually in the form of magnetic tapes which are commercially available and can from very convenient data bases for large-scale SDI services. Some of the well known databases are the CAS (Chemical Abstract Service), ISI (Institute for Scientific Information), MEDLARS (Medical literature Analysis Retrieval System), COOMENDEX (Engineering Index), etc. The development of the CAN/SDI service offered by the National Science Library of Canada is another effective move in this direction.

Present Situation

Today, ready made software packages for different library operations are available commercially. There are several software houses and vendors specializing in library and information software development in the country. Considering the number of libraries, there is a vast scope for library and information software market in the country. Important library packages have been developed by various agencies namely Indo-informatics ASLIS). VIPRO (WILISYS), VILIMAX (House-Keeping) WILITRAXIRX), Minifax (ARCHIVES), Info-Tech (LIBSYS) with data operating systems and system software utilized.

CONCLUSION

The above discussion may be concluded that, as the objectives and recommendations are made in the policy for library and information systems are tailor made according to today's requirements, which would serve to be fruitful for the present community. It ensures maximum use of the existing resources through network which would facilitate easy access of the sources. But, the essential part is building up the environment for its implementation. We should mould our education procedure to cope with the changing trends.

Once we get started , there is every possibility that this policy would take our country to greater heights with intellectually powerful scholars and citizens, ready to meet any challenge in this ever competitive world.

QUESTIONS

Q-1 Describe the house keeping activities of online library?

Q-2 Explain the process of computerization of library and describe its need and characteristics?

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UNIT

12

AUTOMATION AND RELATED FACETS

STRUCTURE

12.0 CONCEPT OF AUTOMATION

There has been a spurt of automated activities in many libraries and information centres using computers for a variety of house-keeping operations. Each library is developing in its own way in trying to change its mode of operation from manual to mechanized methods to keep pace with the time.

According to Merriam-Webster's Dictionary, the concept, automation' means automatically controlled operation of an apparatus, process, or system by mechanical or electronic devices that take the place of human organs of observation, effort and decision

In the words of D.S.Harder who introduced the term. 'Automation' for the first time in 1936, the term, 'autoamation'denotes'the automatic handling of parts between progressive production processes' in relation to engineering industries.

Historically, however, library automation has stressed the need of

computerization of bibliographic tools, such as catalogues, indexes, and other finding aids-rather than storage and retrieval of books, periodicals and other documents contained in library collections, thereby, computer-based management of the collections is the next logical step in library automation.

Some of the important developments in the sphere of library automation during 1960s were:

(i) The pioneering work on serial control by th3e Southern Illinois University of California at San Diego.

(ii) The development of circulation system by the Southern Illinois University at Carbondale.

(iii) Ontario New University Library project of the University of Toronto in 1963 (the project was aimed at producing computerized book catalogues for five new University libraries in Ontario.

12.1 AIMS AND OBJECTIVES IF LIBRARY AUTOMATION

Aims of Library Automation

The aim of library automation is to make a significant difference in the services of traditional libraries. Michael Gorman, while contrasting the fantasies of the 'paperless society' and the 'electronic library' with the realities of the 'virtual library service' proposed five laws of Librarianship on which progress can be based These are :

(i) Libraries serve humanity;

(ii) Respect all forms by which knowledge is communicated;

(iii) ***Use technology*** intelligently to enhance service;

(iv) Protect free access of knowledge; and

(v) Honour the past and create the future.

Objectives of Library Automation

The expectations of the users are far higher than the capabilities of traditional libraries. The publication deluge and knowledge explosion has made the automation of libraries a necessity. The size and complexity of the work may be different but the goal was essentially the same as that of traditional system. Between 1963 and 1966, when the first viable system became operational, the basic principles, to a large extent, became standardized. Slowly and gradually, these limited objectives started changing. The human librarian thus, has a tool by use of which he can make changes to the operation of his library system, based on quantitative data, and to bring real improvements in the services of his library.

According to Kimber, the stage has been reached when the technology and perhaps also the economic incentives exist for a radical long-term appraisal of the nature of the library and information services that should be an integral part of a highly organized and scientifically and industrially advanced society. In computer based library and information systems, we have both the reasons for making such and appraisal and means for achieving the goals that may emerge from it.

Behera feels that the goals of automation of today's libraries seem to have evolved through the following three basic phases:

(i) Efficiency of internal operations (improving internal work flow and sharing cataloguing data);

(ii) Access to local library resources (library automation market place, on-line catalogue, retrospective conversion); and

(iii) Access to resources outside the parent library system (document delivery development, online data exchange, integrating on-line resources).

The foregoing functions are usually dictated by the objectives of the library described by prof. Ranganathan in 1931 when he presented his five laws of library science. The fourth law propounded by Dr. Ranganathan, "Save the time of the Readers" aptly recognized an object relating to the internal efficiency of the library. In a corollary to this law, he further argued that while a library has the basic objectives to maximize user's satisfaction and to minimize the time loss to the user, the library management has an objective to save the time of librarians. This can perhaps be achieved by increasing the internal efficiency of the library. It is in this context of the fourth law that automating some of the functions of a library becomes most relevant and desirable.

According to Borgman the objectives of Automation related to managing libraries can be grouped into four categories:

(i) Supporting the mission of the institution;

(ii) Reducing costs and achieving efficiencies;

(iii) Improving the system of acquisition, retrieval and dissemination;and

(iv) Educating and training both staff and clientele for the automated environment.

Thus, the main purpose of library automation is to achieve the preordained goal of the institution by providing efficient but less expensive services and by educating the staff and the users for the changed new environment.

12.2 SCOPE AND AREAS OF LIBRARY AUTOMATION

The scope and areas of library automation are unlimited, as the subject of automation of each library is not only unique but also independent of the other. At present, the

movement towards electronic information society is pushing libraries to automation, CD-ROM networking, and a digital based environment.

Before starting the computerization process in any library, it is not only essential but also desirable to understand the existing system, its scope, capabilities, limitations, and the changes that might need to be incorporated in the newly proposed system. The areas where use of computers can be made are to be ascertained on a priority basis.

Literature explosion is the result of multidisciplinary and interdisciplinary research and consequent growth of knowledge. This has created the need for relevant information as an essential input form research in general and social science research in particular. Further, in rapidly changing economic situation librarians face the crucial problem of providing relevant information to researchers both in 'anticipation and on demand in least possible time. Hence, the demand for a well-developed and well- organized library with IT based services has become a necessity more particularly for a university library.

This can only be done if the library is able to handle the vast ocean of data and disseminate information effectively. This depends to a large on how efficiently and rapidly the university libraries are able to integrate new information technology methods and devices into the mainstream of their library and information systems and services with that of others.

The use of automated services is becoming increasingly widespread among academics, and has already led to changes in the method of teaching, research, and acquiring knowledge. Thus, the most talked subject among the librarians today is the need for application of IT in libraries to meet the diverse information requirements of the present changing society. Libraries and Librarianship are undergoing rapid changes to cope with the demands of fast changing information requirements of their users. Unless one tries to cope with the situations, librarianship will soon become obsolete. To begin with, the librarian, however, should carefully judge the particular area or activity that require automation on priority so as to bring immediate benefit to the users.

The myriad areas of automation, however, can be classified under *three*, broad categories, namely, (i) technical services (cataloguing, acquisition, serials, circulation); (ii) public services (online catalogues, CD-ROM's, other databases); and (iii) computer networks (electronic mail, creation and use of networked information resources, etc.).

The growing awareness of the value and feasibility of the application of information Technology for harnessing the information transfer and for better organization of collection of documents and effective utilization of accumulated knowledg3e are some of the factors that are responsible for giving scope for implementation of automation.

Traditionally, libraries have been labour intensive but shortage of funds in many countries have reduced staffing levels. Therefore, resorting to the use of IT and computers in IR-related activities to cope with the growing needs of the users seemed to be the only solution. A variety of library activities and services that deserve to be automated ar3e dealt in the succeeding sections along with their associate attributes:

Automation in Acquisition Control

While doing almost all the housekeeping jobs and operations, the library staff work with some common bibliographical details, such as author , title , call number, accession number, imprint , etc. of books. These are to be entered for each publication received in, or selected for, the library. The relevant bibliographical details are again used, may be in different order and form, for other hobs and services also, such as in catalogue cards, circulation records, bibliographies list of additions, etc.

Automation in Cataloguing

Since much of cataloguing is rule-based, it is an area that can benefit greatly from an expert system. Both consistency and quality in cataloguing can be improved by using computers.

Automation in Serial Control

For serial control, data to be entered are title, frequency, address of the publisher, address of the vendor, year, volume number, expected date of arrival, date of receipt , etc. once the data for all the titles are entered, the database is ready. Hereafter, as the issues of periodicals are received, data relating to that is continuously entered. At fixed intervals, the non-receipt of the issues is checked and reminders are sent.

Automation in Circulation Control

In the design of a computer-based circulation system, it is necessary to define the objectives, which the circulation system is supposed to achieve. Adeyami while outlining the objectives for the university of Lagos library define as:

(i) to facilitate speedy, efficient and effective circulation transaction;

(ii) to optimize the utilization of the collections in the libraries composing the university's library system;

(iii). to provide on the spot information about the state of materials in any of the component libraries

(iv) to increase the traffic of cooperation among libraries in the system;

(v) to provide an effective inventory system; and

(vi) to provide a basis for management and operations research information on circulation activities in the libraries making up the system

Generally, circulation system manages issue, return, reservation, renewal and overdue control. Automation makes these jobs easier, speedier and efficient. An automated circulation system can perform a variety of other associated functions such as, notification to defaulters, calculation of overdue fines-notices and receipts of fines, recall notices, document status information, circulation statistics, etc. besides creating a database of library users.

Users Services

University library which is considered as a power-house of information/knowledge often acts as a transformer of knowledge and transmits this power to the students, scholars, and teachers. It thus, paves the way for their academic and research distinction. The intrinsic value of library lies in achieving user satisfaction. This can be achieved only by the speedy procurement of documents, their timely processing and dissemination of information to the potential users.

A reader may have a limited knowledge as far as search is concerned . in that case, it becomes all the more important and necessary for the library personnel to guide the user for rapid access to the required information and how to access the internal and external resources. If a user does not know how to use a computer or automated services/online search, the library staff can help the user by making search and providing the required information to the user. Example of some expert systems in reference work include:

(i) Online Referenc3e Assistance (ORA) is a reference expert system developed by james Parrott at the university of Waterloo Library which was designed to suggest sources to help answer factual questions and provide assistance with bibliographic instruction activities.

(ii) PLEXUS is a system that is actually a prototype of a library system for referral . it was developed by Helen Brooks and Alina Vickery at the University of London. PLEXUS is a well defined universe focusing only on gardening.

(iii) ANSWERMAN, developed by Sam Waters at the National Agraicultural Library, is designed to help users in finding answ4ers to ready reference questions.

(iv) POINTER, developed by Karen Smith at SUNY/Buffalo, is a system that 'points' users in the direction of government publications.

Despite all these facilities, many of the university libraries are still not benefited from the human endeavours, and, therefore, they are not playing satisfactory role in offering various information services. Reference services are vanishing from the present day university libraries.

Automation in Online Public Access System (OPAS)

Traditionally, one of the keys to retrieve information has been the catalogue which started in the book form did not remain stable. It went on growing in its character and complexities over the years both in physical and inner forms. The developments in information technology has forced the librarians-particularly the special and large university libraries, in the direction of adopting new physical forms of catalogue, one such being On-Line public Access Catalogue (OPAC).

OPAC is an access tool and resource guide to the collection of a library or libraries which provide (s) bibliographic data in machine readable form and can be searched interactively on a computer terminal by users. Now –a-days, the emphasis in libraries is shifting from collection to access. The card catalogue has been replaced by OPAC (on-line Public Access Catalogue). Such OPACs may be searched from a terminal within the originating library or at a terminal elsewhere in the organization or remotely via national or international telecommunication networks. Libraries are automating their in house-keeping jobs, so it has become easier to know whether a book is in the collection of a particular library and also whether it is available on the shelf or on loan or on order, including its location.

Generally, OPACs allow searches through the access points as author, title, subject, class, keyword, combination, etc. OPACs in some modern software provide options as place of publication, year of publication, publisher, and etc.as well. An additional provision of truncation of terms is also available in the OPAC system. This option makes the system most flexible. There are four options in truncation-right truncation, left truncation, simultaneous (left and right) truncation, and infix (middle) truncation. If the searcher wants to search for documents on politician, he can truncate the term as:

Politic?

The question mark is the arbitrary symbol. The computer will select all the documents with the term 'politic' as root such as:

- Politic
- Political
- Politician
- Politics, and so on.

This option opens a wide range of possibilities to the users when the exact spelling of a term is not known.

In a library where the database of books has been created by using library software is just a catalogue of the concerned library and can be accessed within the library only. But if it is connected on-line, than it can be accessed from anywhere

in the world which make the access possible to the collection of that library as well as access to resources not owned by that library.

OPACs- searching depends upon the databases of a library. The more exhaustive the database is, the more exhaustive the search will be. Moreover, the user should have the knowledge about the search options. OPACs can be grouped broadly under four generations, namely:

First Generation: e.g. Library Control System (LCS) at Ohio University to sometimes inferior to traditional catalogue;

Second Generation: e.g. DIALOG, BRS, etc. similar to IR System and referred to keyword or post-coordinate OPACs;

Third Generation: e.g.MELVYL (University of California) LCS/WN University of Illinois) NLM, CITE OPAC etc.-offer command language;

Fourth Generation: e.g. Sophisticated Web OPAC

Librarians in the near future to capture the user enthusiasm in the university libraries should use OPAC as power base to provide improved access to information retrieval systems. This will certainly be an exciting but complex experience for the users and the librarians, while looking mostly for Web-OPACs (with both single and multiple menu searches) in the 21st century. Some of the Indian OPACs are enumerated.

However, some of the major problems that prevent the popularity of OPAC in the Indian university libraries include (i) absence of proper efforts and multilingual problems in creation of databases; (ii) paucity of funds; (iii) trained manpower; (iv) personality clash in record-generation; (v) and lack of proper infrastructure.

Automation in Other Activities and Services

In addition to the foregoing activities and services, automation can also be resorted to a variety of other associated activities/services directly or indirectly related with the improved and qualitative services of a functional library.

Automation in Vocabulary Control

Computers can be used in various activities of vocabulary control for example:

(a) The terms to be included in the controlled language can be selected from the machine readable database and frequency based ranked list can be produced;

(b) Terms can be simply sorted and counted, and co-occurance table can be produced sorting the terms according to final words and roots mau aid to identify faces or hierarchies on many occasions;

(c) Various type of display-partial, hierarchical, permuted word display, categorized display, and alphabetical display, can easily be generated. A computer program is able to produce these displays with cross-references;

(d) A machine readable thesaurus, input to a photo composition device, can also produce high quality print out;

(e) Computers can effectively be used in updating as well as maintenance , and more particularly addition and deletion of various terms easily;

(f) Just as computers can be used in creating controlled vocabulary, in the operation of a retrieval system using controlled vocabulary, computers can be effectively used;

(g) It helps to check the consistency and acceptability of terns used by indexer of searcher;

(h) It can also undertake certain automatic mapping activities; and

(i) It can maintain statistics of terms used in indexing and searching, which is extremely useful in updating the thesaurus.

Automation in Generation of Accession List

The data entered for cataloguing of books cam also be used for generation of accession list. Usually, accession lists are generated at fixed intervals. Each record entered in a computer has date of entry as one of the data elements. Hence, records created during a particular interval can easily be found. Author, title, and subject indexes can also be generated for each issue without any difficulty. Various other functions like, compilation of directories, bibliographies and union catalogues can also be computerized.

Automation in Classification

Computers can also be used in Classification. As a matter of fact, the DRTC, Bangalore experimented the use of the colon classification. The other Classification schemes, namely, Dewey decimal classification. Library of Congress Classification, etc. are also in operation as retrieval languages in OCLC Website, the DDC gets updated online which any university library having access to OCLC Website can download.

Automation in Stock Verification

Stock Verification of any department is a necessary evil and particularly it is unavoidable when it is a library. In central M.S. Randahwa Library of Punjab Agriculture University (PAU), Ludhiana, the library staffs are not aware of the exact number of books that have been lost since the library came into being. For complete stock verification, the library would have to be closed for a couple of

weeks. This would adversely affect the research work of students and teachers. The library suffered maximum loss in 1996 when the non-teaching employees of the university were on strike for 63 days . Dr.S.C.Uppal , librarian of the University library feels that the incident of theft of books can be checked by installing close circuit TV cameras.

Stock verification in an automated system with bar-coding facilities not only becomes easier but also becomes fool proof. By reading/clicking the 'Bar Code' reader, the accession numbers of library books are stored into the computer memory. The accession numbers read by the bar code readers are compared with the book database which are left without matching, are identified as 'missing. A missing list can initially be printed out to do the job of tracing.

Automation in Administration

Technological interdependence has made the world a smaller place and barriers have started shrinking. The idea of a virtual paperless office began its base in day today office administration. Companies like, Accord Communications, Copper Connections, Infinity Systems, and Time Technologies have come out with their technological products to support administration and managerial skill to a considerable degree. Thus office routines , circulars, reminders, inquiries, pay bills; etc. can be handled with unprecedented efficiency. Some of the software packages which are useful in managing administrative routines are word star.

Automation in Library Statistics

Statistics play a key role not only in measuring the service but also in justifying the very existence of any service organization or institution. Hence, statistics of all library activities like, total holdings, circulation details, membership details, overdue, furniture and equipment details, staff data, etc. can be generated and maintained through computer easily. Most of the official records, various forms like, approval form, overdue notice, reminders to the delinquent borrowers, purchase slips, reservation slips, etc. being routine/repetitive in nature, could be programmed and produced through automation.

Automation in Information Retrieval

In words of Marlene S Heroux, Director, Atlantic Comm for Olympic Games Library," the real craft of the profession is not in having the largest collection, but in networking and knowing how and where to find information"

Information like new accession, keywords, author, title, call numbers, series, subjects, publishers, year of publication, accessions of a specified period, library holdings with status, missing/lost items, can easily be retraced and recorded using computer.

Automation in Storage Media

Traditional ledger/register/record systems are replaced by storage media such as hard disks with backup facilities, mini floppies, tapes, CD-ROMs microfiche/films, micro cards, etc. which help to save time, space, and maintenance expenses.

12.3 TREND IN UNIVERSITY LIBRARY AUTOMATION

The trend is the transition from manual to electronic system. Dut to invincible qualities, viz. the splendid speed to act in nani-second (ns) and pico seconds (ps), superb capabilities of modern technologies to the unmanageable tasks, the unlimited capacity to store information on to tiny storage mediums, immense capability to perform repetitive jobs without any fatigue; the radical power to sort, arrange, retrieve and disseminate information almost instantaneously etc. are some of the forces that make the moern computers as indispensable tools for the society . its use in the libraries is the need of the day and its application will certainly increase the use and utility of libraries to a great extent.

Libraries and the world of information are changing rapidly as technologies change and governments emphasize the role of libraries in supporting education, social inclusion and economic growth as well as the more traditional cultural role. Digitization going ahead on a large scale in some countries are increasingly undertaken by the libraries.

For implementing software in a library, a suitable hardware is needed according to operating system (OS) of the soctware

Library Computer hardware consists mainly of mainframe, mini, and micro computers. In most cases , the supply of hardware depends on the nature of activities and services of the parent University's Library system in consonance with its aims and objectives. In some cases, university libraries have their own servers but the performance and speed do not meet the needs of the growing number of users and the service becomes uncertain and slow.

Following tasks need to be considered for selecting hardware for automation of university libraries:

(a) need for local databases storage capacity, partial storage of remote databases and storage of primary electronic texts should be met;
   - (i) servers for continuous automated work should be bought for libraries;
   - (ii) the requirements for safe operation, data protection should be fulfilled;
   - (iii) hardware for CD-ROM, multimedia services;
   - (iv) supplementary hardware (e.g.scanner, barcode reader, etc.) are necessary;

(v) terminals should be made available for users in sufficient quality and quantity;

(vi) Maintenance of hardware should be organized.

The hardware configurations of CALIBNET, DELNET, and INFLIBNET were conceived in the late 1980s. A good library should, therefore, have the following provisions

(i) minimum hardware redundancy;

(ii) scope for up gradation;

(iii) provision for additional terminals;

(iv) high computing facilities;

(v) capacity to get along with the best available software on library networking, and

(vi) Compatibility with mini and micro-computers to suit all types of libraries.

Infact, the selection of hardware and software for a library is very much important. The hardware options should be latest and should consist of CD-ROM Drive, Multimedia Kit, Scanner, Modem, a telephone connection, a bar-code reader, and a dot-matrix printer to print the catalogue cards along with the scope for up gradation.

As far as software is concerned every library has its own limitations as regards to funds and professional manpower. But before buying or developing software, the future requirements should be kept in mind. Thus, the detailed considerations of the software are dealt in the next section.

12.5 SOFTWARE CONSIDERATION FOR UNIVERSITY LIBRARY AUTOMATION

Borgman sys that access includes two dimensions: (i) access to the collection of the library and (ii) access to resources not owned by the library. The co-operation goal includes sharing of resources by multiple libraries. In order to access to resources of other libraries it is necessary to use a library software designed as per international standards. She further says that the slogan *"think globally, act locally"* applies to the Global information infrastructure (GII) as it does to the environment.

To automate a library, selection of hardware and software is of prime importance as the same is highly complex and risky. The Task Force on Library Automation (TFLA) created in Saudi Arabia in March 1979 to prepare an automation plan for Automating library operations had suggested that the features of a library system should have the following.

12.6 CRITERIONS FOR EVALUATION OF LIBRARY AUTOMATION

To evaluate the performance of a library is well recognized as and important issue since a library is considered as a service and non-profit institution. The performance and output measures are defined by the experts like, Goodall, Shapiro, and Van House who clarified that, performance is a broader term that may actually be used with measures of input, process, output, and outcomes, Knightly distinguishes clearly and simply among library inputs, process, outputs, and effect (impact) as the components of a system and the four types of evaluation that may result such as:

(i) effort evaluation (inputs)

(ii) process evaluation (appropriateness and efficiency of activities);

(iii) effectiveness (outputs and the accomplishment of objectives); and

(iv) Impact (on the parent or broader community).

Knightly, further enumerates the following seven types of measurement criteria:

(i) assessment based on user opinion;

(ii) expert opinion;

(iii) standards;

(iv) peer comparison;

(v) quantifiable outputs;

(vi) quantifiable process; and

(vii) Based on unit costs in combination with other criteria(s).

King and Griffiths, on the other hand, outline four broad categories of generic measures *(ibid)* which include

(i) input cost measures (staff, equipment, facilities, collections, the allocation among those, and their attributes);

(ii) Output measures (quality of service, timliness, availability, accessibility);

(iii) Effectiveness measures (amount of use, user satisfaction , user expressed importance of service , consequences of use of services);

(iv) Service domain measures (total population size and attributes, user population size and attributes).

They further identified for major derived indicators. These are i) Operational performance, (ii) effectiveness, (iii) cost-effectiveness, and, (iv) impact (ibid).

CONCLUSION

It is believed that through automation, libraries will be able to deliver more efficient and effective service. In 1964, Jesse Shera while predicting the future libraries has succinctly

It is observed that the application of computers in most of university library activities is still in an embryonic state. However, several experimental projects are underway, and some projects are currently being used by librarians and patrons. There is much optimism on the part of expert system enthusiasts that computers can be applied in most areas of the library. More particularly the libraries attached to large universities

But the question remains to be debated is that as to why the university libraries are still lagging behind in automation of their respective library services? What problems are being faced by the library managers? The answers to these and other such questions have been analyzed in *Third Chapter* that discusses the myriad problems of automation which the university libraries are confronted with.

QUESTIONS

Q-1 what is library automation? Explain its aims and scope?

Q-2 Describes the process of automation in university library?

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