



**MASTER OF LIBRARY AND
INFORMATION SCIENCE**

**MLIS 201
INFORMATION,
COMMUNICATION
AND SOCIETY**

UNIT NO. 2

**Department of Distance Education
Punjabi University, Patiala**

(All Copyrights are Reserved)

Lesson No. :

- 2.1 : Information Science : Definition, Scope and Status
- 2.2 : Information Life-Cycle : Generation, Acquisition, Processing, Storage, Dissemination and Use
- 2.3 : Universe Subjects : Formation, Structure and Development
- 2.4 : Information Policy : Need, Purpose and Developments
- 2.5 : Intellectual Property Rights
- 2.6 : Library and Information Infrastructure

INFORMATION SCIENCE : DEFINITION, SCOPE AND STATUS

STRUCTURE :

- 2.1.0 OBJECTIVE
- 2.1.1. INTRODUCTION
- 2.1.2. EMERGENCE OF INFORMATION SCIENCE
- 2.1.3. DEFINITIONS OF INFORMATION SCIENCE
 - 2.1.3.1 INFORMATICS
- 2.1.4. NATURE OF INFORMATION SCIENCE
- 2.1.5. SCOPE OF INFORMATION SCIENCE
- 2.1.6. INFORMATION SCIENCE AS A DISCIPLINE
- 2.1.7. SUM-UP
- 2.1.8. SELF CHECK EXERCISES
- 2.1.9. REFERENCES
- 2.1.10. ANSWERS TO SELF-CHECK EXERCISES

2.1.0 OBJECTIVE

After reading this lesson students will be able to understand :

- (i) Nature and scope of Information Science;
- (ii) Difference between Information Science and Informatics ; and,
- (iii) Information Science as a Discipline.

2.1.1. INTRODUCTION

Library as an agency of communications has been fulfilling its major social role of providing information primarily based on book collection. The spread of education increased the use of books. Gradually, research activity also increased as a result of social pressure. This sudden spurt in research activity brought in many changes in recording, communication, organization and dissemination of scientific information. And a new breed of libraries called special libraries, came to be established with major research institutions, where library service started growing more and more highly specialized.

As a result, in addition to books more and more scientific periodicals occupied library shelves. This gave birth to new techniques of handling these documents including indexing, abstracting, translation, reprographic services and the like. These techniques came to be known as documentation, defined by S.C. Bradford as "the art of collecting, classifying and making readily accessible the records of all kinds of intellectual activity."

2.1.2. EMERGENCE OF INFORMATION SCIENCE

With the emergence of computers, interest was shifted towards mechanized handling

of information. Their utilization in information management paved the way for some term other than documentation that would be more co-extensive with the recent developments. As a result, the term 'information' came into existence and its use spread all over. As the acceptance of the vital importance of information was growing in the post-industrial society, new services with new techniques also emerged on the scene. The emergence of information science as a discipline was mainly out of concern for handling science information. The exponential growth of scientific information on the one hand, and the increasing information requirements of scientists and technologists on the other, made the processing of information a complete affair. The specificity of information required by the users complicated the matter further. In order to process the information more efficiently, technological tools had to be put in use.

Along with these developments, a new group of scientists, committed to provide information to their colleagues, devised ways and means for the purpose. Based on the techniques employed by them, a new discipline began to be shaped and this came to be called "Information Science". This fact has prompted Vickery and Vickery to state that the term Information Science first appeared in the guise of information scientist.

Information Science has emerged as a new intellectual discipline of high significance cutting across all conventional disciplines of humanities, social sciences, science and technology by becoming inter-disciplinary in character.

Although, its origin can also be attributed to the needs of information transfer during post-war period, yet its origin is of recent coinage. It made its first appearance as 'science information' in the early 1960s.

2.1.3. DEFINITIONS OF INFORMATION SCIENCE

Information Science has been variously defined by scholars. Some of its definitions are as given below.

According to Herman Weisman, "information science is concerned with how information is generated or is gathered, processed, stored and retrieved; how it is expressed and communicated; and how it is used by individuals and by human and non-machine systems."

Pauline Atherton defined information science "as a complex multidisciplinary subject ranging from computer and tele-communication through cybernetics to psychology, logic and techniques of classification and indexing, and as such the information work and information science may be defined briefly as professional disciplines concerned with the accumulation, storage and transfer of recorded knowledge."

Slamecka has defined information science as "an inter-disciplinary field of study of the nature, properties, control and use of information." In this definition, the underlying object to study information is a content bearing statement in the process of communication, problem solving, decision-making and learning."

Wilson defined information science as "that set of practices and related disciplinary

studies which is concerned with the generation, transmission, organisation, storage, retrieval and use of information together with studies of the user of information.”

Mikhailov has defined information science “as a scientific discipline studying the structure and the general properties of scientific information as well as the regularities of all processes of scientific communication.”

Some definitions give equal emphasis to information and its communication.

Vickery and Vickery treat information science “as the study of the communication of information in society.”

As given in *Harrod's Librarians' Glossary and Reference Book* information science “is the study of the use of information, its sources and development, usually taken to refer to the role of scientific, industrial and specialised library and information units in the handling and dissemination of information.”

Griffin considers information science “as a subject concerned with the generation, collection, organisation, interpretation, storage, retrieval, dissemination, transformation and use of information with particular emphasis on the application of modern technologies in these areas.”

But one school of thought believes that information science has been an extension of activities involved in librarianship.

Foskett has defined information science as “the discipline that is emerging from cross-fertilization of ideas involving the ancient art of librarianship, new art of computing, art of new media of communication.... transfer of organized thought.”

Artandi observed : “In information science we are often concerned with problems that are qualitatively the same as library problems at the same level, except that we are considering those with more sophistication.” This view has been further supported by Gluliano, when he observes that “Information science comprises that set of research and development undertaking, necessary to support the profession of librarianship.”

The most acceptable definition of information science from the point of view of librarians is that of Harold Borho. He sees in information science a true discipline “that investigates the properties and behaviour of information, the forces governing the flow of information, and the means for processing information for optimal accessibility and usability. It is concerned with that body of knowledge relating to the origination, collection, organization, storage, retrieval, interpretation, transmission, transformation and utilization of information. This includes the investigation of information representation in both natural and artificial systems, the use of codes for efficient message transmission, and the study of information processing devices and techniques, such as computers and their programming systems.”

Harmon believes that information science evolved not only as an expansion, or metamorphosis, of documentation and information retrieval, but also directly or indirectly incorporated or paralleled “several prevailing objectives and concepts of the communication and behavioural sciences and other contributory disciplines.”

The American Society for Information Science defined information science as “concerned with the generation, collection, organization, interpretation, storage, retrieval, dissemination, transfer and use of information with particular emphasis on the application of modern technologies in these areas.....”

2.1.3.1 Informatics

The Russian scholars, meanwhile, coined the term Informatics. On the other hand, they made information science subordinate to social science. They said, “Information science is a discipline belonging to social science, which studies the structure and general characteristics of scientific information, and also general laws governing all scientific communication processes.”

The new term 'informatics' was defined by Mikhailou, Chernyl and Gilliarevski as "the processes, methods and laws related to the recording, analytico-synthetical processing, storage, retrieval and dissemination of scientific information.”

It can, however be stated that informatics has to do with meaningful information but not with qualitative appraisal of that information. It is believed that such appraisal can be carried out only by specialists in the particular scholarly discipline.

The term 'informatics' became quite popular in Russia, East Germany and several East European countries, whereas the term 'information science' has been in vogue in USA, Canada, UK and other countries of the world. In India, the term 'informatics' is used, but information science remains more popular.

2.1.4. NATURE OF INFORMATION SCIENCE

Information Science is an interdisciplinary domain of knowledge taking shape in the form of a new paradigmatic science. It means that it is a distinct science recognisable from its theoretical formations, broad agreement as to its purpose, and the methods and approaches it employs. Information science is still considered in its infancy and often reluctant to work out a formal theory embracing the applications of research and the results of its observations, is emerging as a remarkably fertile theoretically and practical field of knowledge.

Information science is concerned with the principles and techniques governing the transfer or communication of organized knowledge from one human mind to another and ultimately to society. As a discipline information science is concerned with the following :

- (i) Generation and growth of information in different environment;
- (ii) Collection, storage, organization and processing of information to facilitate access and use;
- (iii) Dissemination, diffusion and transfer of information in different user environment.
- (iv) Design, development and management of information systems and services-manual and machine; and

(v) Education and research is information; and so on.

2.1.5. SCOPE OF INFORMATION SCIENCE

In professional literature, the term 'information science' was used without determining its scope and coverage. Many information specialists have been trying to arrive at some consensus but to no avail.

Before looking at a conceptual approach to information science, it is necessary to decide whether there is any need to determine its scope and coverage. Shera once said in this respect that “the first responsibility of a profession is to know itself, which means first knowing what a profession is, second knowing what kind of profession it is, and third knowing what differentiates it from other professions.”

One school of thought believes that information science has grown up as an independent subject, whereas another school believes that it is simply an extension of activities involved in librarianship. This was amply clear if we look at the various definitions given above.

Information science has emerged as a new intelligent discipline of high significance cutting across all conventional disciplines.

Information science emphasizes heavily on applying modern technology and scientific methods to the handling of information. Therefore, most curricula of information science includes topics relating to library automation, computer processing, system analysis, system design, computer programming and other related topics.

In recent times, information theory, system theory, psychological and sociological aspects of information and philosophical concerns, networks, mathematics, engineering and linguistics have gained wider acceptance in the information science. Many scholars also consider communication as an important aspect of information science.

Various disciplines have their impact on information science in the following ways :

- 1. Philosophy and Logic :** They are tool disciplines for the generation and development of information. Philosophy is concerned with the principles which lie behind different branches of human activity, while logic plays important role in classification and indexing.
- 2. Semiology and Linguistics :** They deal with problems related to documentary languages, indexing, machine translation, automatic indexing and artificial intelligence.
- 3. Computer Science :** It alongwith operations research or with cybernetics help in the study and development of information processing.
- 4. Psychology and the Behavioural Sciences :** These disciplines show light on the human process involved in knowledge transfer such as the communication process, the learning process, analysis of user needs and man-machine interactions.
- 5. Management Science :** It helps to perfect the system design and system management through system analysis.

6. **Mathematics and Statistics** : These subjects help in programming as well as in the study of economics of information, to estimate costs, to evaluate performance etc.
7. **Education Sciences** : These work out programmes of education and training for the profession itself and for the users at large.
8. **Legal Sciences** : These attempt to examine the legal aspects of information processing, storage transfer and use.
9. **Sociology** : It helps to look at the social aspects of information, in understanding the needs of the users and integrating with the information sources so as to meet their aspirations.

It can be stated from the above that information science has been characterised from the outset as being purpose-minded although its name has been changed through documentation from library science to information science. In the US, information science is regarded as an extension of documentation, hence they replaced the term 'documentation' by 'information science'. Consequently, the 'American Documentation Institute' was renamed as 'The American Society for Information Science'.

Information science has broadened its scope over the years to information facilitating contexts other than libraries.

Taylor, while commenting on the scope of information science observed that it “is concerned with the phenomena of message generation, storage organization, structures, filters and transfer..... its objective is to explicate, to state, and to test hypotheses relevant to information systems and communication environment.”

Thus, the scope of information science has broadened significantly.

2.1.6. INFORMATION SCIENCE AS A DISCIPLINE

In view of what has been discussed in the preceding paragraph, it can be stated that information science is a subject of interdisciplinary nature. It is concerned with the way in which individuals process information, form concepts and use and structure language, but from a new stand point.

Despite the fact that there are two divergent schools of thought regarding the status of information science as a discipline, most of them believe that it has strong relationship with library science. Sivanson has declared that, “the field of information science, information technology, information retrieval and documentation will not be treated as separate topics but rather as an integral part of information science.... Thus, we shall not be concerned with whether information science is part of library science or vice-versa.”

Reynolds and Daniel are of the opinion that librarianship and information science arise from the same need to provide client with information.

Taylor has emphatically said that information science interfaces with the library primarily through technology.... There are fine areas where information science and technology interacts with librarianship and library education : systems analysis;

environmental context; information channels; the classification process; and the main system interfaces.

Regarding the status of information science, it can be added that information science is concerned with organizing information for use and librarianship and information science arise from the same need, the only difference is the character of the client and the degree of urgency of information need.

2.1.7. SUM-UP

Explains the factors that have been responsible for the evolution of information sciences as a new discipline, more particularly with the advent of computers. Provides various definitions of information science putting across different opinions regarding its emergence from library science or independent of it, while the scholars in Russia chose to coin a new term of 'informatics' for the entire series of processes. Describe also the nature of information science linked to the transfer of information. Discusses the scope of information science with reference to the impact the other disciplines have on information science thereby broadening its scope.

2.1.8. SELF CHECK EXERCISES

1. Describe information science as a discipline.
2. Write an essay on the scope of information science.
3. Define information science and discuss its nature.
4. Mention the various subjects related to information science.

2.1.9. REFERENCES

1. Curas, Emilia, *Towards a Theory of Information Science*, New Delhi : BRPC, 2002.
2. Fosbett, D.J., "Information Science as an Emerging Discipline", *Journal of Documentation*, 34 (1) 1978 : 55-85.
3. Vickery, Brian and Vickery, Alnia, *Information Science in Theory and Practice*, London : Butterworths, 1987.
4. Viswanathan, C.G., *Elements of Information Science*, New Delhi : Today & Tomorrow, 1976.
5. Prasher, R.G. : *Information and Its Communication*. Ed2. 2003

2.1.10. ANSWERS TO SELF-CHECK EXERCISES

1. See Section 7.6
2. See Section 7.5
3. See Section 7.3 & 7.4
4. See Section 7.5

**INFORMATION LIFE-CYCLE : GENERATION, ACQUISITION,
PROCESSING, STORAGE, DISSEMINATION AND USE****Structure**

- 8.0. Objective
- 8.1. Introduction
- 8.2. Generation of Information
 - 8.2.1. Authors
 - 8.2.2. Editors
 - 8.2.3. Publishers
 - 8.2.4. Database Producers
 - 8.2.5. Libraries
 - 8.2.6. Information Analysis Centre
 - 8.2.7. Information Networks
- 8.3. Acquisition and Processing of Information
 - 8.3.1. Classification
 - 8.3.2. Indexing
- 8.4. Information Storage
- 8.5. Information Transfer
 - 8.5.1. Retrieval and Dissemination
- 8.6. Use of Information
- 8.7. Summary
- 8.8. Self-Check Exercises
- 8.9. References
- 8.10. Solution to Self-check exercises

8.0. Objective

After studying the lesson, you will be able to know :

1. How information is generated, acquired and processed; and
2. How it is stored and transferred, thereby completing the life-cycle and beginning of the new life-cycle.

8.1. Introduction

In modern times information is considered an economic resource, and as such power and key to development. No country can any longer afford to remain in isolation and ignore rapid developments in the field of information and communication technology. Today people require information on a subject in different forms with different emphasis and different depths of explanations.

Information is considered as "An assemblage of data in a comprehensive form capable of communication," according to *Harrod's Librarians' Glossary and*

Reference Book. 7th ed. (1990) Hardan Cleveland said that, "Information is the core, the sum total of all the facts and ideas accessible or not, that are available to be known by somebody at a given moment." According to Shera, information in the generic sense, "is that which is transmitted by the act or process of communication, it may be a message, a signal, a stimulus."

Since information is all pervasive, a basic resource, power, etc. we must look at how it is generated, stored, and disseminated.

8.2. Generation of Information

The information that is generated through research, governmental activities and so on, is contained in various primary, secondary and tertiary sources. These sources are made available by libraries and information centres for use by researchers and scientists.

John Feather has listed some inventions that have affected human life over the years :

(i) Printing

When the written word was improved and made available through printing, it became an even more integral part of life than before. Its impact was very powerful. For instance, scholars could read the works by other scholars whom they would never meet.

(ii) Mass Media

- (a) **Newspaper** : It is circulated in large scale among millions to keep people abreast of the latest developments.
- (b) **Photography** : It allowed people to see things that they had never seen before.
- (c) **Electric Telegraph** : This was the first system to provide instant communication over distance beyond the limits of human vision.
- (d) **Telephone** : This goes further than the telegraph as it allows direct spoken communication.
- (e) **Radio** : It is faster than the newspaper and reaches a large number of people. It can be used for education, entertainment and information.
- (f) **Television** : It scores over the other media. It was powerful visual images, emotive music and evocation of a lifestyle for beyond the reach of the vast majority of its audience. With the spread of satellite and cable systems, the possibilities are even much more higher.

(iii) Computer

It is in almost every office, on most desks, and in many homes. It is involved in almost everything we do—from buying our groceries to getting education. Millionaires have emerged from the computer business, particularly the Internet, E-mailing, e-publishing, e-shopping, e-commerce, e-conversation, e-marriage, e-diagnosing and treating are just few of things we can do with computer.

Some information workers and generators can be listed below.

8.2.1. Authors

Author is the creator of information, intellectual, artistic and scientific work. The author is the person(s) who have created the document and the document bears his name. The author may be an individual, an organization, or an unidentified author. Author wants his work to be visible to the other authors, researchers as soon as possible. Author wishes that the work must carry credibility within instructions, their colleagues, research granting bodies, etc., and hence bearing it in the form of article.

8.2.2. Editors

An editor is a person responsible for a publication that groups together the contributions of several authors. The resulting publication is called as collective works (e.g., conference proceedings), and bears his name as 'editor', or 'compiler', etc.

8.2.3. Publishers

They bring authors' works into a form that is usable, and distribute among the users. Recent changes in telecommunication technology have resulted in the repackaging of information.

8.2.4. Database Procedures

Some publishers have shifted from the conventional printed products, such as abstracts, indexes, etc. to the online mode and full-text documents. Some publishers of primary documents supply their publications to database producers, who in turn supply their products and/or services to users. The database producers also supply their databases to online hosts who make them available direct or via intermediaries, to users.

8.2.5. Libraries

Libraries are considered as treasure house of knowledge and its dissemination. To achieve their objectives, libraries collect, organise and preserve documents and make them available to users. They also make extensive and intensive efforts to inform the users about information available in different documents through its various bibliographical and information services, such as current awareness services, selective dissemination of information, etc.

8.2.6. Information Analysis Centres

Established with research organizations there are advanced form of information centres. They evaluate current knowledge on specific subjects and provide directly usable information. Their primary purpose is to prepare authoritative, timely and specialized reports of the evaluative and analytic, monographic or state-of-the-art type.

8.2.7. Information Networks

These generally comprise of organizations that exchange information in

various forms on a regular basis. Their objectives include the need for knowledge, less burden, share tasks, pool resources with common procedures and techniques. Information networks are based on a given geographical area, limited to a city, region, or country. For example DELNET, CALIBNET, INFLIBNET. There are others which are limited to some subject and creation of shared database. For example, AGRIS, INIS, MEDLARS, etc.

8.3. Acquisition and Processing of Information

Information thus generated in a variety of forms such as tools, periodicals, monographs, reports, standards, patents, and so on are required in the libraries and information centres. These are acquired according to the needs of the library users.

8.3.1. Classification : These and other documents on different subjects are then processed by various classification systems to organize them according to subjects. Classification is an analytical technique by which documents and information are fitted into a pre-established organizational scheme. Mostly, libraries and information centres make use of hierarchical schemes of classification, such as DDC, UDC, etc.

Hierarchical schemes, as Meadow has noted, are based on the assumption that topics or subjects can each be divided into more specific subjects ; the process is separated as often as necessary until a structure or hierarchy is created to cover the domain of subjects within the systems.

Such classification schemes are valuable in searching the documents from the file with the help of descriptors and their generalization. Their structured notation show the structure relationships and subordination of the various elements.

Hierarchical classification schemes are also useful for showing and filing of documents. Documents are thus classified to provide for a shelf location and for a convenient browsing. The homogeneity or heterogeneity, the types and number of documents, as well as the breadth and depth of their information should determine the classification scheme most appropriate for a particular system.

8.3.2. Indexing

An index is a locator device which directs a user to the place in the file or collection where a specific document or group of documents may be found. The term indexing, according to Weisman, represents "the analytical processing of identifying, selecting, and assigning identifiers, labels or descriptors to a document's subject contents to help in retrieving specific documents, specific chunks of information, or discrete data points." Some other scholars, however, look at index as a filter between the transmission of information and the receiver, is user.

The total information storage and retrieval system is actually index system

for locating documents and thus provide the user no more than the document's identification or location. This process helps in efficient storage and retrieval. In the indexing process prior to storage, each document is assigned labels or keywords identifying its character and content. In addition, this analytical process of indexing may include classifying the document into one or more subjects categories.

According to Lancaster : "Efficient subject indexing is not necessarily achieved by labelling a document on the basis of its intrinsic subject matter. Rather, it is achieved by labeling a document according to the types of users who may be expected to derive most benefit from it and the types of requests for which the document is likely to be regarded as responsive. In other words, subject indexing must closely reflect the characteristic and requirements of the users of the document collection."

The index for the user serves not only as a locator of wanted documents and information but also as filter to withhold irrelevant materials.

Subject heading systems alongwith classification systems are the major methods of indexing. Subject heading systems use traditional approach of arranging their items of information alphabetically. Most libraries also depend upon author and subject indexing in addition to classification as a principal means of vetrieval.

8.4. Information Storage

Once the subject analysis is done the arrangement of the document collection may be based on it. If a classification system has been used to indicate the subject content, the appropriate classification number is marked on each document and filed within the logic of the scheme. Williams has identified several types and approaches to storage :

1. Fixed Storage : Here, documents or information cannot be readily reproduced, though new documents can be added and items within the collection used or circulated. For example, collections of out-of-print books or historical documents of fragile nature.

2. Flexible Storage : It requires manual handling often with the help of mechanical or electronic equipments.

3. Variable Storage, Format Changeable : This type of storage provides for replacement or revision of documents, or portions of them. For example, punched card, magnetic tape, etc.

4. Variable Format, Fixed Storage : The form or format of the document is fixed, but the data within it can be changed. Forms and tables are examples of manually variable format, fixed storage.

5. Manual Storage : It covers all methods which require a human being to place documents or information in or out of storage.

6. **Semi-Automatic Storage** : Here the human being gets machine help in selecting, printing or erasing information. For example, punched edge notched cards.

7. **Automatic Storage** : In it there is no human intermediary in writing or erasing information on the media. Example are disc files, core memories, etc.

8. **Master Image Storage** : It refers to microform prints, and electronic storage which are capable of displaying the called for information on the computer screen.

9. **Random Access Storage** : It means storing and selecting documents or information in and out of files which have no particular scheme of arrangement. This is generally done by computerized means.

8.5. Information Transfer

In the present complex world it is rare that one researcher interacts directly with another researcher. Team efforts are usually involved in this process. Information must pass barriers of distance, discipline, repeated handling, patent rights, language and political barriers. Though direct communication between producer and user is desirable and effective, direct channels usually are not practical. Communication between producer and user is multi-channelled from books and journals through reports, indexes and abstracts to computer printouts.

Meanwhile, increased volume of information and increased number of potential users add complexity to the process. Channels of communication often become clogged with information. The scientists cannot find time to read the many papers and journals related to his interests; and he also faces the problems of volumes of literature as well as language barrier of foreign papers, and problem of their inaccessibility. Scientists and technologists are, therefore, depending more and more on intermediary resources—repositories, services and analysis centres to provide them with usable information.

8.5.1. Retrieval and Dissemination

Retrieval and dissemination of the information contained in the document/s generated by researches and scientists may originate in response to query by a user.

On the other hand retrieval and dissemination of information may be built into the system as a routine. It is done through Selective Dissemination of Information (SDI) procedure. In SDI system subscribers with pertinent interest profiles receive extracts on abstracts of the information.

Current awareness bulletins carrying an abstract extract of the documents are distributed to users of such a system. Documents are also made available in hard copy, reproduction in microfilm or only data from within it.

Translation services from or into another language may be part of the system. The information analysis centre intellectually filters the information in the

document, i.e., it evaluates it, synthesizes it, analyses it, condenses it, and repackages it within a state-of-the-art report, a critical review, a critical compilation of data, so as to make it more usable by the users.

8.6. Use of Information

In the information flow from the generation to publication process, the use of information is the final step. The end user is the focal point of all information systems. The end user is the beneficiary of the information or document, or any of its data. He is both consumer as well as producer of information. For instance, a scientist is a producer of information through articles, reports and other documents and a user of referral and bibliographic search services when seeking documents to help his research articles.

The use of information through varies from one segment to another segment of society, but the scientist researcher uses it at the different stages of his scientific work. Vickery and Vickery while quoting another study by Garney and his colleagues, have identified these stages as follows :

1. **To add in perception or definition of problem** : This is required at the preliminary planning stage of scientific work.
2. **To formulate a scientific or technical solution** : For theoretical and conceptual planning the use of information is required.
3. **Preparation of written research proposal** : Information is used to place work in proper context with similar work already completed.
4. **Preliminary experimentation** : In order to relate work to ongoing work in area, information is put to use.
5. **Presenting** : For selecting a design or strategy for data collection.
6. **Design and Development of equipment** : For designing equipment or apparatus for scientific works, scientists make use of information.
7. **Formulation of experimentation/study design.**
8. **Collection of Data** : Information is used to select a data-gathering technique.
9. **Analysis of data** : To use a data analysis technique, information is put to use.
10. **Interpretation of results** : Information is needed to enable full interpretation of collected data.
11. **Preparation of report of work** : To integrate findings into current state of knowledge in the area information is put to use.

Thus, information is constantly needed and used throughout all stages of scientific and technical work. In the initial and final stages the use of information quantitatively seems to be greater.

8.7. Summary

The various component sub-system of the basic life cycle of information are

discussed. These comprise of generation of facts and ideas; the encoding-processing of information; various analytical activities as classification, indexing, evaluation; storage and retrieval of information through various media; and the use of information for the benefit of the user and the society at large.

8.8. Self-Check Exercises

1. Discuss the role of persons who are involved in information generation.
2. Write a note on acquisition and processing of information.
3. Describe various approaches to storage of information.
4. Discuss how information is transferred.
5. Write a brief note on the use of information.

8.9. References

1. Gufia, B., *Documentation and Information*, 2nd ed., Calcutta : World Press, 1999.
2. Vickery, B.C. and Vickery, Alina, *Information Science in Theory and Practice*, London : Butterworths, 1987.
3. Weisman, Herman M : *Information Systems, Services and Centres*, New York : Becker and Hayes, 1972.

8.10 Solutions to self check exercises

1. See section 8.2
2. See section 8.3
3. See section 8.4
4. See section 8.5
5. See section 8.6

**UNIVERSE OF SUBJECTS : FORMATION, STRUCTURE AND
DEVELOPMENT**

STRUCTURE :

- 2.3.0. OBJECTIVE
- 2.3.1 INTRODUCTION
- 2.3.2. SCOPE OF KNOWLEDGE
 - 2.3.2.1 TYPES OF KNOWLEDGE
- 2.3.3. NATURE OF KNOWLEDGE
- 2.3.4. FORMATION OF SUBJECTS
 - 2.3.4.1. DISSECTION
 - 2.3.4.2. LAMINATION
 - 2.3.4.3. DENUDATION
 - 2.3.4.4. LOOSE ASSEMBLAGE
 - 2.3.4.4.1. LOOSE ASSEMBLAGE-1
 - 2.3.4.4.2. LOOSE ASSEMBLAGE-2
 - 2.3.4.4.3. LOOSE ASSEMBLAGE-3
 - 2.3.4.5. SUPERIMPOSITION
 - 2.3.4.6. FISSION
 - 2.3.4.7. DISTILLATION OF KIND-1
 - 2.3.4.8. DISTILLATION OF KIND-2
 - 2.3.4.9. FUSION
 - 2.3.4.10. CLUSTERS
 - 2.3.4.11. AGGLOMERATION OF KIND-1
 - 2.3.4.12. AGGLOMERATION OF KIND-2
- 2.3.5. STRUCTURE OF SUBJECTS
 - 2.3.5.1. DICOTOMY
 - 2.3.5.1.1. TREE OF PORPHYRY
 - 2.3.5.2. DECACHOTOMY
 - 2.3.5.2.1. ARBITRARINESS OF DECACHOTOMY
 - 2.3.5.3. POLYCHOTOMY
 - 2.3.5.4. PROLIFERATION
- 2.3.6. MAPPING THE STRUCTURE OF SUBJECTS
 - 2.3.6.1. LINEAR DISPLAY
 - 2.3.6.2. GRAPHIC DISPLAY
- 2.3.7. DEVELOPMENT OF UNIVERSE OF SUBJECTS
 - 2.3.7.1. ANCIENT LIVES

- 2.3.7.2. CASUAL DEVELOPMENT OF PAST
- 2.3.7.3. RESEARCH IN PARALLEL
- 2.3.7.4. TIME-LAG
- 2.3.7.5. ORGANIZED DEVELOPMENT OF THE PRESENT
 - 2.3.7.5.1. TEAM RESEARCH
- 2.3.7.6. RELAY RESEARCH
- 2.3.7.7. EXCHANGE OF INFORMATION
- 2.3.7.8. TIME-LAG REDUCED
- 2.3.7.9. SPIRAL DEVELOPMENT OF NEW SUBJECTS
- 2.3.7.10. DYNAMIC CONTINUM
- 2.3.8. SUMMARY
- 2.3.9. SELF CHECK EXERCISES
- 2.3.10. REFERENCES
- 2.3.11. SOLUTIONS TO SELF-CHECK EXERCISES

2.3.0 OBJECTIVE

Study of this lesson will help to learn about :

- (a) Scope and nature of knowledge;
- (b) Formation and structure of subjects; and
- (c) Development of universe of subjects in historical perspective.

2.3.1. INTRODUCTION

Knowledge has been growing ever since the evolution of man, but for many countries, it was developed and extended at a very low rate. However, a distinctly higher rate of growth of knowledge may be said to have begun about the 18th century. Ever since, knowledge has had a multidimensional dynamic growth, especially during the second half of the 20th century. It is continuing to grow at a fast pace in the wake of unprecedented growth of literary warrant in various developing fields.

It is necessary for library and information professionals to understand the general trends and special features of the growth of knowledge reflecting the development of the universe of subjects. The measure of incidence of the growing number of subjects can be estimated from the fact that the number of basic subjects in colon classification scheme alone has increased from a mere two dozen in the first edition (1933) to 779 in the seventh edition (1987). Even this figure does not reflect the real picture as many subjects are not completely enumerated.

Some efforts have been made to study the growth of knowledge, in terms of the ways in which subjects get formed. Ranganathan has formulated a set of modes of formation of subjects. He has also provided a structure to organize knowledge embodied in print and non-print documents, collected in libraries and information centres.

2.3.2. SCOPE OF KNOWLEDGE

It is a well known fact that knowledge is organized and structured set of ideas and

concepts. It is also known that knowledge is infinity, a dynamic continuum and ever growing. The universe of modern knowledge is very vast and complex, and its structure is very difficult to be mapped comprehensively. The growth and development of all fields and sub-fields are also difficult to be measured, particularly in fields like computers and communications, science and technology. Subjects are also developing in multi-disciplinary and multi-dimensional ways. Since library and information professionals are concerned with knowledge embodied in published literature, they must develop familiarity with the ways of growth of subjects and knowledge.

2.3.2.1. Types of Knowledge

Broadly, knowledge can be divided into two types :

2.3.2.1.1. Private Knowledge : It is the knowledge of an individual available to him, and through him to others. In this way, it contributes to public knowledge.

2.3.2.1.2. Public Knowledge : It is the knowledge possessed collectively by the society. It is freely and equally available to all the members of the society, and as such is an essential source of private knowledge. Libraries and information centres deal with public knowledge only.

2.3.3. NATURE OF KNOWLEDGE

The nature of knowledge is infinitely expandable, and includes, according to Alvin Toffler, data, information, images, attributes, values and other symbolic products of society in its scope. Knowledge being power, all the countries of the world intend to exercise control on this greatest source of power. Today, all the human activities are dependent on information and knowledge, and it why there has been information revolution. The society is moving towards the stage of knowledge society, where the knowledge base will be much more than restricted to the traditional sectors only.

2.3.4. FORMATION OF SUBJECTS

The universe of subjects is a correlate of Universe of Knowledge. The philosophers have been attempting to divide the universe of knowledge into bits and to arrange the bits into some acceptable sequence. But, library and information professionals are concerned with dividing the universe of subjects into bits and arranging them in a helpful linear sequence so as to provide subject approach to documents. They also have developed a variety of tools and techniques to provide various services and disseminate information. Ranganathan has developed a strong theoretical base to design these tools and techniques. In this process he also studied the formation of subjects and identified some modes of formation of subjects. Ranganathan has recognised five preliminary modes of formation of subjects and their arrangement. Based on the same methodology, Neelamegham worked out more modes of formation of subjects taking the number to twelve. These are discussed as follows :

2.3.4.1. Dissection

Ranganathan has defined dissection as "cutting a universe of entities into parts of

coordinate status, even as we cut a slice of bread into strips." He further states that when these parts are ranked, they form an array. Each part is called a "Lamina". For example, subjects Botany, Agriculture, Zoology represent a few consecutive members of the dissected universe of subjects.

2.3.4.1.1. Continuation of Dissection : Each one of the basic subjects resulting from dissection may be taken to be a universe by itself. It can be dissected further into its own parts. This can be continued as often as necessary and possible.

2.3.4.1.2. One Method of Formation : Dissection, according to Ranganathan, is one of the methods of formation of basic subjects in a facted classification. But in an enumerative classification it is one of the methods of formation of subjects.

2.3.4.2. Lamination

It has been defined as "construction by overlaying facet on facet, even as we made sandwich by laying a vegetable layer over a layer of bread. When the basic layer is a basic subject and the other layers are isolate ideas, a compound subject is formed." It is of two kind :

2.3.2.1. Lamination of Kind-1

It involves laminating one or more isolate facets over a basic facet to produce a compound subject.

2.3.2.2 Lamination of Kind-2

According to Neelameghan, consists of the attachment of a speciator or qualifier to a main subject.

For example, in the subject of "Agriculture of Corns", the two layers 'Agriculture' and 'Corn' lie on both the ends of the basic subject 'Agriculture' and isolate idea 'Corn'.

In Lamination of Kind-2, special basic subjects are formed when core entity of study in a main subject is qualified by the help of a speciator. For instance, in medicine, it may be qualified by 'age' or 'by sex'.

2.3.4.2.3. Continuation of Lamination : Compound subjects with two, three, four etc. facets are formed by lamination of one, two, three etc. isolate ideas on any basic subject as the basic lamina.

2.3.4.2.4. Enumerative Classification : In an enumerative classification, lamination does not take place.

2.3.4.3. Denudation

Denudation "is the progressive decrease of the extension and the increase of the intension (or the depth) of a basic subject or an isolate idea, even as we scoop out of the flesh of a soft fruit from deeper and deeper layers or as we excavate a well." In the words of J.H. Shera, denudation is "the exposure of a new area of knowledge by erosion or divestment through research or enquiry."

For example : Philosophy – Logic – Deductive Logic

2.3.4.3.1. Enumerative Classification : In an enumerative classification, the term

'denudation' applies not only to basic subjects but also to compound and complex subjects.

2.3.4.4. Loose Assemblage

It is the assembling together of two or more of : (i) subjects (basic or compound), (ii) isolate ideas (in one and the same facet, or the same array)."

It is of three kinds :

2.3.4.4.1. Loose Assemblage-1 : In this mode, two or more subjects - be it simple or compound - are studied in their mutual relation. The relation may be a general one, or one of bias, or of comparison, or of difference, or of influence; or one subject may be used as the tool for studying the other subject. This is called "Inter Subject Phase Relation". This results in a complex subject.

For example, A text book of Political Science and Economics.

2.3.4.4.2. Loose Assemblage-2 : In this mode, two or more isolates taken from one and the same schedule are brought into mutual relation. The relation may be any one of the kinds mentioned with reference to Loose Assemblage 1. This is called 'Intra Facet Phase Relation.' This results in a complex isolate.

For example : Comparative study of Jainism and Buddhism.

2.3.4.4.3. Loose Assemblage-3 : In this mode, two or more isolates taken from one and the same array of order higher than 1 in one and the same schedule are brought into mutual relation. The relation may be of any one of the kinds mentioned with reference to Loose Assemblage 1. This is called 'Intra Array Phase Relation'. This results in a complex array isolate.

For example : Relation between DDC and UDC.

2.3.4.5. Superimposition

Ranganathan has defined Superimposition as "connecting together two or more isolate ideas belonging to the same universe of isolate ideas. Need for this will arise when an entity is eligible to be an isolate idea on the basis of two or more quasi-isolate ideas." The isolate idea resulting from superimposition is called a 'Superimposed Isolate Idea', or 'Compound Isolate Idea'.

For example : Sociology of rural poor.

Ranganathan, later enumerated four more modes of formation of subjects in his *Colon Classification, Ed.7 (1971) : A Preview*. However, still later (in 1975), Gopinath and Setharama in a joint paper redesignated 'Partial Comprehension' as 'Agglomeration' and 'Subject Bundle' as 'Cluster'. These new modes are discussed as follows :

2.3.4.6. Fission

In this mode, an isolate or a Basic Subject - be it main or non-main - gets fissioned or split into sub-divisions. This process has, until recently, been denoted by the term 'Dissection'. However, 'Dissection' usually implies the splitting, breaking up, etc. of an entity into parts by an outside agency. On the other hand 'Fission' is an internal process of

division without the involvement of an outside agency.

Example : The first order of main subjects designated as the traditional main subjects in CC-7 are supposed to have formed by fission.

2.3.4.7. Distillation of Kind 1

A distilled subject is one which gets formed on the basis of same or similar or common observations, experiments and experiences in several subjects.

For example : Research is conducted in various subjects, and on the basis of experiments and experience in different fields, new subject of Research Methodology has developed. Similarly, several such subjects have developed in the past few decades, and are included in CC-7th Ed. These are Management Science, Information Science, Conference Techniques and so on.

2.3.4.8. Distillation of Kind 2

For some sociological or academic reasons, from time to time, a particular idea (or sometimes several ideas) hitherto occupying in a particular basic subject becomes the focus of study. This may lead to a considerable literary warrant for the ideas generated, and ultimately develops into a new subject.

For example : Statistical Calculus developing from Maths. Microbiology developing from Biology and Botany.

2.3.4.9. Fusion

As a result of interdisciplinary research, subjects associated with two different main subjects combine together in such a way that a new subject of inter-disciplinary nature is developed. This process is known as Fusion.

For example : Biology + Chemistry = Biochemistry. Similarly are the result of Fusion
Astrophysics, Psycholinguistics

2.3.4.10. Clusters

A new trend of research has, in recent years, come into being in which an idea becomes the focus of study from the stand point of scholars in different subject fields.

For example : The idea 'West Asia' may be studied by Political Scientists, Geographers, Sociologists, Economists etc.

2.3.4.11. Agglomeration of Kind 1

Partial comprehensions are now called 'Agglomerates' and are formed as a result of Agglomeration.

Agglomeration of kind 1 consists of subjects treated integrally or distinctively in one and the same document.

For example : Natural Science, Humanitics

2.3.4.12. Agglomeration of Kind 2

It constitutes subjects comprehending other subjects with respect to the schedules of

a particular scheme of classification.

For example : Psychology and Sociology as in UDC.

The above mentioned modes of formation of subjects are not only useful in designing classification schemes, but also for intellectual organization of knowledge and information for such other purposes as collection development, information storage and retrieval etc.

2.3.5 STRUCTURE

The structure of subjects is affected by their modes of formation. The various kinds of structure have been discussed as follows :

2.3.5.1. Dichotomy

Dichotomy means division into two. It is also referred to as 'Binary Classification'.

2.3.5.1.1. Tree of Porphyry : It is a schematic representation of dichotomy. Here, two divisions are formed in the first stage. In the second stage, two sub-divisions of each of these divisions are formed. In this manner, the process of division may be continued.

2.3.5.2. Decachotomy

Decachotomy means division into ten. Decimal Classification of Melvil Dewey replaced 'Dichotomy' by 'Decachotomy'. He divided universe of knowledge into ten divisions called main classes, and each of ten into further ten divisions, and then sub-divisions, and so on. This process continues till it secures as many sub-sections as may be needed in any topic.

2.3.5.2.1. Arbitrariness of Decachotomy : Ranganathan said this structure is also as arbitrary as the process of 'Dichotomy'. He believes that the Universe of Subjects transcends its capacity.

2.3.5.3. Polychotomy

It means division into many. As has been proved, the process of division of Universe of Subjects into ten divisions, at each stage has been unhelpful. It implies that the number of divisions should at no stage be pre-determined.

On the other hand, whatever be the number of divisions, shown forth by the Universe of Subjects at any stage, that should be recognised and enumerated in the library classification schemes. Thus 'Polychotomy' can be made really unrestricted.

2.3.5.4. Proliferation

There are various ways in which the Universe of Subjects gets proliferated. As knowledge is dynamic and continuous, there is tremendous and unlimited proliferation of subjects taking place all the time.

Also, increased pace of research and development taking place in different subjects throughout the world has also increasingly contributed to the development of subjects and their changing structure.

2.3.6. MAPPING THE STRUCTURE OF SUBJECTS

In this section, we shall discuss the mapping of the subjects.

2.3.6.1. Linear Display

The modern classification systems display the concept relationship in subjects in a linear way. This is generally indicated by various types of indentions and other methods of display. The concepts thus displayed through are multidimensional in their relationship, yet restrictions are imposed by the linear method.

2.3.6.2. Graphic Display

Generally, this problem of display is overcome by graphic display. This method helps in mapping hierarchical and associate relationships. This method also makes the presentation of multidimensional concepts, that makes the job of indexer and searcher easier.

2.3.7. DEVELOPMENT OF UNIVERSE OF SUBJECTS**2.3.7.1. Ancient Times**

Ever since man started living with an intelligent understanding of the environment, knowledge has been growing. Meanwhile, man developed alphabets, numbers etc. to express ideas and concepts. With the passage of time, more sophisticated methods of recording events, activities, communication were developed. These efforts reached a high level of knowledge development in many countries including India. Then came the contribution of Renaissance and Reformation to knowledge development. Later in time, many scholars and scientists including Newton, Darwin, Locke, Marx, Einstein made seminal contribution to the development of universe of subjects.

2.3.7.2. Casual Development of Past

Due to low population pressure and social pressure, there was no incentive for organised development of subjects. It was mostly the inner urge to create, that subjects were being developed, but it was a casual affair.

2.3.7.3. Research in Parallel

The men of genius were scattered in different countries of the world and there was seldom cooperation among them. There was much of the secrecy and no sharing of the research work among themselves. As a result, the research potential was often wasted by duplication and research in parallel. Pressure of society was too small to correct the tendency to work in parallel. The result was slowness in the development of universe of subjects.

2.3.7.4. Time Lag

Low social pressure was not able to create the incentive for the speedy exploitation, for social use, of new developments in the fundamental subjects. For example, there was a time-lag of more than a century between the discovery of the electrical form of energy and its extensive exploitation. Thus, the development of the applied subjects was also a slow and casual affair.

2.3.7.5. Organized Development of the Present

In the present times, population pressure and social pressure have increased; the essential needs have shot upto a high level. These have necessitated improvement in technology, and led to an organized, government-planned research and development in fundamental and applied subjects.

2.3.7.5.1. Team Research : In the changing circumstances the inner creativity of individual genius is supplemented by a team research drawn from various intellectual strata. The present awareness of the need to get the best out of every worker in the intellectual scale is the established norm. It leads to continuous research efforts on a very large scale leading to the production of new books, periodicals, research reports, theses, monographs etc.

2.3.7.6. Relay Research

Further, relay research is being organized at various levels allowing the research grid pertaining to any subject, except defence science, to extend over the whole world. Prompt communication of new thought and myriads of more rapid tools of technology and indexing services have eliminated the need to repeat any investigation. The more radical results are even flashed around the globe through computer networks.

2.3.7.7. Exchange of Information

In the present times much of the research is government funded. But exchange of information about research results is selective and limited to personal association. In view of the importance of scientific and technological information in the post-industrial society, it is imperative that information is speedily communicated. Some efforts in this regard like inter-institutional agreements; inter-governmental agreements; joint research projects; support from international organizations; etc. are being made and are playing important role in the transfer of information.

2.3.7.8. Time-Lag Reduced

In the modern society, the time lag between the invention and its application to beneficial social use has been reduced considerably. For instance, if photography took 112 years from discovery to application, telephone took only 53 years; atomic power only 13 years; while transistor took 8 years, but laser took just 2 years. It is therefore necessary to have some agencies at national and international levels that could carry forward from fundamental research to the stage of production of service or commodity. The result of such an organization of relay research will be a considerable increase in the formation of new subjects.

2.3.7.9. Spiral Development of New Subjects

The relay research organized on a national and international level is leading to a spiral movement in the development of new subjects. Some of the major stages in the spiral movement are :

(i) Fundamental Research (ii) Applied Research (iii) Pilot Project (iv) Design and Production of New Machinery (v) New Material (vi) New Product (vii) Using the New Product (viii) New Problems created by the New Product and (ix) Fundamental Research Again.

2.3.7.10. Dynamic Continuum

It is clear from the above that no subject can be developed without its calling for some development in every other subject. Thus, the universe of subjects is never ending; it is a dynamic continuum. At present, organized relay research is producing a continuous cascade of new micro-subjects, each stimulating another in succession in every area of subjects. This cascade makes the universe of subjects a growing continuum.

2.3.8. SUMMARY

This lesson highlights the growing nature of knowledge, and its types. Describes the various modes of formation of subjects and intellectual organization of knowledge. Explains the structure of subjects through dichotomy, decachotomy etc. Mapping of the structure of subjects through linear and graphic display. Development of subjects is the work of scholars of great vision and understanding, and continuous additions to existing knowledge. The patterns of knowledge development is explained to understand the implications.

2.3.9. SELF CHECK EXERCISES

1. Distinguish between private and public knowledge.
2. Discuss the structure of subjects and their proliferation.
3. State the importance of mapping of the structure of subjects.
4. State the organized development of subjects of the present.
5. Distinguish between team research and relay research.
6. Outline the major stages of spiral development of new subjects.

2.3.10. REFERENCES

1. Kemp, D.A., *The Nature of Knowledge : An Introduction for Librarians*, London : Clive Bingley, 1976.
2. Neelameghan, A., Basic Subjects, *Lib. Science with Slant to Documentation*, 10(2), 1973 : 149-157.
3. Neelameghan, A; Non-Primary Basic Subjects, *Lib. Sci. with Slant to Documentation*, 10(2), 1973 : 189-201.
4. Ranganathan, S.R., *Colon Classification, Ed. 7 (1971) : A Preview*, Bangalore : Sarada Ranganathan Endowment for Library Science, 1971.
5. Ranganathan, S.R., *Prolegomena to Library Classification*, 3rd Ed., Bombay : Asia, 1967.

2.3.11. SOLUTION TO SELF CHECK EXERCISES :

1. See Section 9.2.1
2. See Section 9.5
3. See Section 9.6
4. See Section 9.7.5
5. See Section 9.7.5.189.7.6.
6. See Section 9.7.9

**INFORMATION POLICY : NEED, PURPOSE AND
DEVELOPMENTS**

STRUCTURE :

- 2.4.0. OBJECTIVE
- 2.4.1. INTRODUCTION
- 2.4.2. SCOPE OF POLICY
 - 2.4.2.1. MEANING OF INFORMATION
 - 2.4.2.2. MEANING OF POLICY
 - 2.4.2.3. DEFINITION OF NATIONAL INFORMATION POLICY
- 2.4.3. NEED FOR A NATIONAL INFORMATION POLICY
 - 2.4.3.1. INFORMATION AS WEALTH
 - 2.4.3.2. DIVERSE PARTICIPANTS IN INFORMATION TRANSFER
 - 2.4.3.3. USE OF INFORMATION
 - 2.4.3.4. ORGANIZATIONAL INFRASTRUCTURE
- 2.4.4. NATIONAL INFORMATION POLICY ISSUES
 - 2.4.4.1. INFORMATION NEEDS OF USERS
 - 2.4.4.2. DOCUMENTARY AND NON-DOCUMENTARY RESOURCES
 - 2.4.4.2.1. PRIMARY SOURCES OF INFORMATION
 - 2.4.4.2.2. SECONDARY SOURCES OF INFORMATION
 - 2.4.4.2.3. TERTIARY SOURCES OF INFORMATION
 - 2.4.4.2.4. INDIVIDUALS AS SOURCES
 - 2.4.4.2.5. INSTITUTIONS AS SOURCES
 - 2.4.4.3. TECHNOLOGY ADOPTION
 - 2.4.4.4. FINANCIAL RESOURCES
 - 2.4.4.5. ORGANIZATION AND STRUCTURE
 - 2.4.4.6. PRODUCTS AND SERVICES
 - 2.4.4.7. STANDARDIZATION
 - 2.4.4.8. REGIONAL AND INTERNATIONAL COOPERATION
 - 2.4.4.9. EDUCATION AND TRAINING
- 2.4.5. NATIONAL INFORMATION POLICY : INDIA
 - 2.4.5.1. EFFORTS FOR INFRASTRUCTURE
 - 2.4.5.2. EFFORTS TOWARDS NATIONAL LI POLICY
 - 2.4.5.3. NAPLIS
 - 2.4.5.4. SALIENT FEATURES OF NAPLIS
 - 2.4.5.5. EMPOWERED COMMITTEE
 - 2.4.5.6. WORKING GROUP

2.4.6. INFORMATION POLICY : INTERNATIONAL ISSUES

2.4.6.1. ISSUES IN DEVELOPING COUNTRIES

2.4.6.2. ROLE OF INTERNATIONAL AGENCIES

2.4.7. UAP

2.4.7.1. UAP PROGRAMME

2.4.7.2. OBJECTIVES

2.4.7.3. STEPS TAKEN

2.4.7.4. IMPLEMENTATION

2.4.7.5. CONTINUED EFFORTS

2.4.8. SUMMARY

2.4.9. SELF-CHECK EXERCISES

2.4.10. REFERENCES

2.4.11 SOLUTIONS TO SELF-CHECK EXERCISES

2.4.0. OBJECTIVE

Study of this lesson will help you to understand :

- (a) Meaning and need of Information Policy;
- (b) Issues pertaining to National Information Policy; and,
- (c) International issues pertaining to Information Policy.

2.4.1. INTRODUCTION

In recent years the impact of information on society has been far reaching. Information is not only a part of the social wealth but also has assumed the significance of economic resource. Its dimensions are further expanding as it is meaningful to various groups of persons involved in information activities in the society.

The perception of information is also changing in the context of library and information systems and services. It is therefore essential to have an Information Policy so as to understand the value of information and its judicious use by a variety of users.

2.4.2. INFORMATION POLICY

The term Information Policy suggests different meanings to different groups of persons because of their different perceptions regarding its meaning and scope:

- For library and information professionals, Information Policy deals with the documents and their contents regarding their collection, storage, processing, making them available.
- For researchers and scientists, Information Policy is related with generation, dissemination and communication of data and information.
- For computer professionals, Information Policy deals with data processing, hardware and software development etc.
- For people in mass media, it covers gathering, analysis and dissemination of news, views and other information of general interest to the public at large.

— And, for a common person, it is anything that makes him powerful to decide and act.

2.4.2.1. Meaning of Information

We have already discussed about the meaning of information in detail in earlier lessons. These definitions provide the basic understanding and initial thinking about the formulation of an Information Policy. However, information is also understood in a much wider sense in today's changing context. It includes the whole range of activities that covers discovery, creation and collection of information; storage, retrieval, processing and dissemination of information; distribution of information through mass media channels; information market etc.

2.4.2.2. Meaning of Policy

Policy means an instrument seeking to concretise or legalise a system design or plan. Fundamentally, a policy may be stated to be a statement of guidelines for a course of action. A course of action is formulated with different levels of generality and specificity which may include a hierarchy of steps as outlined below.

2.4.2.2.1. Goal : It is the ultimate destination. It is an enduring statement of purpose towards actions over a period of time.

2.4.2.2.2. Policy : It is a statement of commitment to a generic cause of action necessary to achieve the goal.

2.4.2.2.3. Strategy : It is a predetermined course of action selected from many alternatives. It is generally formulated through a process of planning.

2.4.2.2.4. Programme : It is a scheduled set of activities taken to implement a strategy. It is therefore a set of tactical actions of a goal-seeking process, requiring specific planning.

2.4.2.3. Definition of National Information Policy

An international definition of National Information Policy put forward by UNISIST-II is given as follows :

"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 or instruments such as financial, personnel, institutional, for concrete implementation."

In view of the changing context of information the definition of National Information Policy should be restricted to information systems and services. Such a policy is likely to meet the needs of library and information professionals.

2.4.3. NEED FOR A NATIONAL INFORMATION POLICY

The ultimate purpose of information is to put it to use for providing higher quality of life to people. The role of information in national development is imperative. Therefore, the primary aim of National Information Policy is to realise the gradual upliftment of socio-economic development of the nation by making information

available to it.

The need for a national information policy can be explained as given below.

2.4.3.1. Information as Wealth

In the present era of post-industrial society, the advanced countries of the west would prefer to invest in information generation activities including human resource planning. Such research and development activities would help create new information and knowledge as information is the real wealth for them. For providing a necessary information support system to the development process, an appropriate national information policy is required.

2.4.3.2. Diverse Participants in Information Transfer

As discussed elsewhere, the generation, dissemination, transfer, communication, distribution of information takes place through various channels and media. In the present information communication environment, such groups of people as researchers, academicians, entrepreneurs, technicians, farmers, traders, workers, administrators etc. take part as communication in not only between individuals, but also from individual to groups, and from group to group.

They transfer information not only through verbal and paper print media, but also use the AVs, micro and electronic forms of communication.

As a result of the impact of the information revolution, the life-style of people has undergone a change. In such an environment, the entire range of information field is beyond the comprehension of an individual, one group of people, or institutions. It is here that for developing a total information system, a national information policy is needed.

2.4.3.3. Use of Information

There are many user groups of information and knowledge to fulfil their respective needs. But information systems could not be developed for all these fields except for education, research and a few others. To provide access to information and make it available for diverse needs, information support systems are required. This can be provided with the help of a national information policy.

2.4.3.4. Organizational Infrastructure

In view of the growing information needs of the society, a variety of institutions, though unorganized, have come upto help in the information transfer process. This has led to a haphazard growth of these institutions without proper linkages. For a systematic and harmonious development of information providing institutions, a national information policy is needed to link these institutions through networks.

2.4.4. NATIONAL INFORMATION POLICY ISSUES

Some efforts have been made at the international level to identify the policy issues. UNESCO has been quite active in this regard and had set up a couple of committees. On the recommendation of these committees the following policy issues could draw the attention of the library and information professionals.

2.4.4.1. Information Needs of Users

There are different categories of users who make use of information according to their functions and responsibilities. As has already been mentioned these user groups include policy makers, planners, legislators, judges, industrial workers, business executives, researchers, scientists, technologists, teachers, students, general public and so on.

The information needs of all these diverse kinds of users must be studied through user studies/user surveys. These should be matched with the appropriate sources of information. It is found in literature that user studies so far have been largely restricted to the assessment of information needs of users in the sectors of education and research and development.

The national information policy guidelines must include all these and other related issues regarding the information system and programme.

2.4.4.2. Documentary and Non-Documentary Resources

All the information sources are not available in view of the various information needs of large groups of users. These have to be collected carefully in relation to user needs by different information systems established in different subjects. These sources could be published or unpublished; textual, numeric or graphic; or in any other format. These are broadly divided into three major categories as given below.

2.4.4.2.1. Primary Sources of Information : There should be provision in the national information policy that all the sources of primary information should be collected. These include journals, reports, theses and dissertations, conference proceedings, monographs etc. which should be collected. As there is no provision of their legal deposit, these sources could not be collected systematically. There should be legal provision in the policy document for their collection in some selected institutions in the country.

Many government departments also generate primary information. The internally generated information by the public and private undertakings, research organizations etc. should be collected under the legal provisions.

But despite this all the primary information is not adequately available in the country and large volume of information has to be imported from other countries for use in the host country.

2.4.4.2.2. Secondary Sources of Information : These provide access to primary information, hence are also called as access material. Various bibliographies, indexes, abstracts, current awareness lists and so on comprise the secondary sources. In our country, there is no adequate bibliographic control mechanism as of now. On the other hand, foreign published secondary sources are not only available in print form but are also available in computer readable form, both offline and online. Such bibliographic databases should be acquired at least by some select institutions and information contained there in should be made accessible through resource sharing and networking.

2.4.4.2.3. Tertiary Sources of Information : Such sources as bibliography of bibliographies, guides, referral directories of on-going research are among the various sources of tertiary information.

In addition to the above mentioned three traditionally recognized sources of information, the following two more categories can be added to them.

2.4.4.2.4. Individuals as Sources of Information : Individuals as members of the society are very useful sources of information. These individuals may include suppliers, consultants, advisers, guides, specialists, scientists, technologists, editors, rural artisans, farmers and such other individuals may be invaluable sources of information for the rest of the people. These human resources must be trained well for developing quality manpower which could help in achieving the targets.

2.4.4.2.5. Institutions as Sources of Information : Various institutions and organizations, from time to time, organize formal meetings, seminars, symposia etc. which constitute important sources of information.

Many institutions in the public and private sectors go on generating such information as may not be available through other media of communication. For instance, information analysis centres, data centres, publishing houses, various information systems and networks, and so on.

It is therefore obvious from the above that all these types of sources must be included in the national information policy, because taken together there would help in building up national information resources, so direly needed for adequate and appropriate man power.

2.4.4.3. Technology Adoption

In order to modernise information services and overall development of the country, Information Technology (IT) holds the key. Though some developing countries often view access to IT as the magic solution to the problems of under-development, yet the experiences of other countries suggest several necessary conditions. These conditions include : strong domestic competition, human resource development and active government policies to promote diffusion and dissemination of information about new technologies. The government can play its role in expanding the scope of technological opportunities.

From the stand-point of library and information professionals, IT applications can help interlinking databases using online facilities through telecommunication networks. It further helps in obtaining document delivery services from the global networks. With the confluence of technologies, more fundamental changes in knowledge and information exchange systems are expected through research in Artificial Intelligence, Cognitive Sciences etc.

It is therefore necessary to keep pace with the new development and make these a part of the national information policy.

2.4.4.4. Financial Resources

In order to build, develop and operate information systems at all levels, adequate financial allocation is required. The proportion of investment made in the information sector should be commensurate with the investments in other sectors of national development programmes such as R&D, higher education, etc. To enable the information sector to become efficient enough to provide the expected inputs to national development, a matching scale of investment is necessary. This is also important since the information products, imported from the western countries, are very costly. For quality of information in all sectors a heavy price has to be paid.

2.4.4.5. Organization and Structure

There has been unplanned growth of the information institution without any regard to building a national information system. It is therefore necessary to interlink some of these institutions so as to develop a total information network with some policy making bodies at the top which would evolve standards and guidelines for evaluating the quality of the system. It will further have a number of sectoral centres oriented to a discipline, and a number of local information units for meeting the immediate needs of the researchers and other users.

A national information policy would, however, take care of the organization and structure of a national information system.

2.4.4.6. Products and Services

It is the time of successful innovation both in products and services in the modern organizations, industrial, technological, information centre, or any other. In the changing context of information, these products and services can be conveniently generated with the help of IT, from the national and international databases. Such products and services can be developed according to the needs of the various user groups. A national information policy can look into these possibilities as these are going to be necessary and useful for the users of the information system.

2.4.4.7. Standardization

Standardization of techniques, method, procedures, hardware, software is an essential pre-requisite for achieving compatibility. For a successful plan of co-ordination, system management, networking etc. Certain degree of uniformity in organization and operation of the system is considered necessary. By effectively implementing the national and international standards exchange of information and other facilities and resources can be feasible. Further, to achieve economy in cost, time and effort, standardization is considered essential.

Many organizations such as ISO are working for standards in library and information systems and services at the international level. Similarly, Bureau of Indian Standards has produced some national standards but more needs to be done in the field of library and information services.

It is here that a national information policy can take care of the standardization in this field.

2.4.4.8. Regional and International Cooperation

In the present times, information is viewed as an international resources to be freely used by one and all. It is also considered as economic and social resource, it should be allowed a fair exchange. But unfortunately in many areas such as trade and commerce, industry etc. the free flow of information is not allowed for various reasons.

Cooperation at regional and international levels will not only allow free exchange of information but would also permit the exchange of professional expertise. A national information policy can identify various other areas of cooperation among countries for a better tomorrow.

2.4.4.9. Education and Training

Adequate development of manpower working in different sectors of economy require proper education and training. Well trained workforce would raise the rate of return of investing in IT and diffusion of technological change. Companies and industries have to give more emphasis on management training and higher education in computer science. On the other hand, developing countries also need education and training in information science to organize, disseminate and provide information resources in support of all development activities. A broader technical and scientific education is also required to prepare the scientific workforce that could unhesitatingly participate in the present age of information and knowledge society.

All these and other issues need to be incorporated in the national information policy.

2.4.5. NATIONAL INFORMATION POLICY : INDIA

Much before the thinking about the national information policy in India, the Govt. of India had already cleared the Scientific Policy Resolution. However, let us have a look at the various efforts and background of the national information policy.

2.4.5.1. Efforts for Infrastructure for National Information Institutions

In the post-independent India, not only the scientists and researchers but also the Govt. of India recognized the importance of new scientific knowledge and information. The need for the development of information infrastructure was realised so that new knowledge and information could be generated and used by the researchers.

- Research institutions in the field of Natural Sciences, Social Sciences were set up in the country.
- These were followed by the establishment of the National Informatics Centre, and the National Information System for Science and Technology.
- A working group for the Modernisation of Library Services and Informatics

- was set up by the Planning Commission, in the Seventh Five Year Plan. It has been functioning since and set up for every Five Year Plan period to make certain useful suggestions.
- The University Grants Commission has set up the Information and Library Network (INFLIBNET) to link up the resources of libraries of the Universities and Research and Development institutions in the country. It is considered as a milestone in the progress and development of library and information services in the country.
 - Many more library and information networks like the Developing Library Network (DELNET), Calcutta Library Network (CALIBNET), Madras Library Network (MALIBNET), PUNENET, MYLIBNET, ADINET, etc. have been set up to coordinate and integrate the library and information resources and services of some major libraries in the country.
 - These are encouraging developments and should be a part of the national information policy for their future development.

2.4.5.2. Efforts Towards National Library and Information Policy

From time to time various professional associations in India more particularly the Indian Library Association (ILA), the Indian Association of Special Libraries and Information Centres (IASLIC) have been making their efforts to impress upon the government for formulating a national information policy.

- The ILA submitted a draft policy statement to the Govt. of India.
- Meanwhile, the Raja Rammohan Roy Library Foundation also submitted to the Govt. a draft document on National Policy in 1984.
- This rolled the ball and the matter was discussed by the Planning Commission Working Group for the Library Services for the Seventh Five Year Plan.
- Subsequently, the Deptt. of Culture, Govt. of India set up a Committee in October 1985 with Prof. D.P. Chattopadhyay for the formulation of a National Policy on Library and Information Systems (NAPLIS) which submitted its report, after considerable efforts in May, 1986.
- In the meanwhile, Osmania University Library, Hyderabad organized a seminar on "National Policy on University Libraries" on September 29-30, 1986, and made some useful recommendations.
- Also, the Association of Indian Universities took the initiative and formulated a National Policy on University Libraries which was published in 1987.

2.4.5.3. National Policy on Library and Information Systems (NAPLIS)

The final report submitted as the Draft Policy on Library and Information Systems contains ten chapters as mentioned below :

1. Preamble

2. Objectives
3. Public Library System
4. Academic Library System
5. Special Libraries and Information Systems
6. National Library System and the Bibliographical Services
7. Manpower Development and Professional Status
8. Modernisation of Library and Information System
9. General Professional Issues and Implementing Agencies
10. Financial Support

In each chapter of this document specific recommendations have been made with reference to upgrading and coordinating the existing library and information systems and services.

2.4.5.4. Salient Features of NAPLIS Report

Some of these are briefly given below :

1. To establish, maintain and strengthen the free public libraries in the country.
2. A village or village cluster with an adequate population should have a community library which will also serve as an information centre.
3. To establish an important link between the community library of the village and the village primary school.
4. The community library should also cater to adult education and make adequate audio-visual aids available to attract the villagers.
5. The district library should serve as an apex-library for each district with public libraries at city, town and village levels.
6. To build libraries for special groups in tribal areas or minority communities to develop their distinctive cultures.
7. Each public library should have a section for children and in addition separate libraries for children with attractive books.
8. The district library will take the leadership in establishing linkages between all other public libraries of the district and work towards resource sharing within the district.
9. All the libraries within a state should form part of a network extending from the community library through the district level to the State Central Library.
10. The state central library has to perform as the coordinating agency for public libraries in the state.
11. Each state should enact its own library legislation and libraries funded by the state.
12. The central government should assist the state in the development of public libraries. The Raja Rammohan Roy Library Foundation as

the national agency for co-ordinating the development of public libraries be suitably strengthened for the purpose.

2.4.5.5. Empowered Committee

The Department of Culture, Govt. of India, appointed an Empowered Committee in November, 1986 once again under the chairmanship of Prof. D.P. Chattopadhyay to play down the programme of action for the implementation of the recommendation made in the policy document. This committee submitted its report in April, 1988.

2.4.5.6. Working Group

In order to look into the programme of action as recommended by the Empowered Committee, the Department of Culture, Govt. of India, constituted a working group to go through carefully each decision of the Empowered Committee, and indicate how best to implement them. The Working Group submitted its suggestions in December 1992. These have since been accepted by the Govt. for implementation, but nothing concrete has happened thereafter.

2.4.6. INFORMATION POLICY : INTERNATIONAL ISSUES

2.4.6.1. Issues in Developing Countries

Most of the countries of the world today have developed some form of national information systems. These could either be the result of the national information policy, or on the basis of some other considerations. Need to respond to advance in IT which are helpful for developing information networks, and the political and economic changes as a result of IT, perhaps are the major contributory factors to the development of these policies. They must take into account the international issues arising from the global transfer of information and information technology which have helped to increase the need for international cooperation.

Some of the issues that need attention include : exchange of resources, security, data ownership, legal problems involved in trans-border flows in information and intellectual property rights, information markets, commercial concerns and such other issues.

The problem of transborder data flow can be resolved by formulating policies at the international level. The library and information professionals can take the following steps

- (i) In the process of transborder flow of information, the barriers and their effects can be communicated to the appropriate agencies.
- (ii) They must sufficiently understand the issues related to transborder data flow.
- (iii) Adequate communication should be established among the components of public and private sectors libraries and information centres.
- (iv) A better understanding of the economic issues related to online

databases should be developed.

2.4.6.2. Role of International Agencies

To facilitate international cooperation, various international agencies help the developing countries in particular. Efforts in respect made by such agencies as UNESCO, IFLA, FID, ICSU and other agencies are positive and helpful to the Third World Countries.

The SAARC is a good example of regional cooperation among developing countries of South Asia. It is clearly indicative of the fact that awareness about international cooperation in the field of transborder data flow is essential. It can further lead to a global perspective in information handling and can help in tackling the issues while framing the information policies.

2.4.7. UNIVERSAL AVAILABILITY OF PUBLICATION (UAP)

2.4.7.1. UAP Programme

UAP programme is a step at the international level towards bibliographical control of publications developed by IFLA.

2.4.7.2. Objectives

The principal objectives of the programme are as given below :

- (i) To ensure access and availability of publications to users.
- (ii) To improve acquisition policies and practices at the national level.
- (iii) To improve repository policies and planning.
- (iv) To promote national and international lending policies and practices.

2.4.7.3. Steps Taken

IFLA had undertaken investigations on the global availability and supply of publications, and considerations given to UAP in different countries. A joint UNESCO/IFLA International Conference on UAP was held in Paris in 1982. A training seminar was organized in Boston Spa in 1983. Again, a regional meeting on UAP was held in Nairobi in 1984.

Studies have been conducted (i) on the commercial supply of book materials to libraries; (ii) in national acquisition policies; (iii) on national repository planning; and (iv) in national interlending systems.

On the basis of these studies, a possible model of national systems that integrate acquisition, retention and inter lending has been proposed. Further, it has also issued guidelines for national planning.

2.4.7.4. Implementation

UAP provides wide publicity for the principles and practical implementation of UAP for libraries and library materials of all types through publications (including the UAP Newsletter). It also makes efforts for implementation through worldwide regional meetings and conferences.

2.4.7.5. Continued Efforts

A continuing programme of research is maintained, feasibility studies are undertaken on many projects. These include the design of national availability systems for individual countries, national repository plans and programmes, all meant to promote the objectives of UAP.

2.4.8. SUMMARY

Discusses about information policy while giving the meaning of information and policy particularly limiting it to the needs of the library and information professionals. Explains the need for a National Information Policy on account of the importance of knowledge and information transformed into powerful wealth. Points out the needs of the diverse user groups whose needs can be known by user studies. Various policy issues on user needs, documentary and non-documentary resources, technology adoption, organization and structure, products and services, standardization etc. are to be included in the policy document. States the efforts to draw the govt. attention for formulating a National Information Policy in India. Points out the salient features of NAPLIS. Discusses also the international issues for the information policy, and the efforts made by the international agencies in this respect are praise-worthy.

2.4.9. SELF-CHECK EXERCISES

1. Define National Information Policy.
2. Describe the need for a National Information Policy.
3. What resources constitute issues for formulating a National Information Policy.
4. While framing a National Information Policy mention the issues that need to be incorporated in it.
5. Discuss the various issues relevant to the formulation of information policy at international level.
6. Give a brief account of the information policy initiatives in India.

2.4.10. REFERENCES

1. Association of Indian Universities, New Delhi; *National Policy on University Libraries : Report*, New Delhi : AIU, 1987.
2. India, Ministry of Human Resource Development, Deptt. of Culture, *National Policy on Library and Information System : A Presentation*, New Delhi : The Author, 1986.
3. Neelamghan, A., Need for Information Policy, *Journal of Library and Information Science*, 1(2) 1976 : B-18.
4. Raja Rammohan Roy Library Foundation and Indian Library

Association, *Documents of National Policy on Library and Information System*, Calcutta : RRRLF, 1985.

5. Sewa Singh, National Policy on University Libraries in India : A Hard Look, In J. L. Sardana (Ed) : *Libraries and Information Services in the Electronic Information Era*, New Delhi : ILA, 1999, pp.541-547.

2.4.11. SOLUTIONS TO SELF-CHECK EXERCISES

1. See section 10.2.3
2. See section 10.3
3. See section 10.4
4. See section 10.5
5. See section 10.6
6. See section 10.5

INTELLECTUAL PROPERTY RIGHTS

STRUCTURE :

- 2.5.0. OBJECTIVE
- 2.5.1. INTRODUCTION
- 2.5.2. MEANING OF IPR
 - 2.5.2.1. TYPES OF IP
 - 2.5.2.1.1. INDUSTRIAL PROPERTY
 - 2.5.2.1.2. LITERARY PROPERTY
 - 2.5.2.1.3. NEW PROPERTY FORMS
- 2.5.3. NEED FOR PROTECTION OF IP
- 2.5.4. DEFINITION OF IPR
- 2.5.5. TYPES OF IPR
- 2.5.6. WIPO
 - 2.5.6.1. ESTABLISHMENT
 - 2.5.6.2. OBJECTIVES
 - 2.5.6.3. MEMBERSHIP
 - 2.5.6.4. STAFF
 - 2.5.6.5. TASKS AND ACTIVITIES
- 2.5.7. WIPONET
 - 2.5.7.1. ESTABLISHMENT
 - 2.5.7.2. OBJECTIVES
 - 2.5.7.3. MEMBERSHIP
 - 2.5.7.4. SERVICES
- 2.5.8. COPYRIGHT
 - 2.5.8.1. BACKGROUND
 - 2.5.8.2. SOCIAL AWARENESS
 - 2.5.8.3. WHAT IS COPYRIGHT?
 - 2.5.8.4. COPYRIGHT PROTECTION PRINCIPLES
 - 2.5.8.5. DURATION OF PROTECTION
 - 2.5.8.6. COPYRIGHT AND DIGITAL DATA
 - 2.5.8.6.1. REASONS FOR PROBLEMS
- 2.5.9. DATA SECURITY
 - 2.5.9.1 ETHICAL ASPECTS
- 2.5.10. FAIR USE
 - 2.5.10.1. EXAMPLES
 - 2.5.10.2. PROVISIONS FOR TEACHERS, ETC.

- 2.5.10.3. FACTORS
- 2.5.10.4. HIGHER EDUCATION AND FAIR USE
- 2.5.11. RIGHT TO INFORMATION
 - 2.5.11.1. ROLE OF THE GOVT.
 - 2.5.11.2. FREEDOM OF ACCESS TO INFORMATION
 - 2.5.11.3. FREEDOM OF INFORMATION
 - 2.5.11.4. IMPACT OF NEW TECHNOLOGY
 - 2.5.11.5. RIGHT TO INFORMATION ACT (INDIA)
- 2.5.12. CENSORSHIP
 - 2.5.12.1. MEANING
 - 2.5.12.2. DEVELOPMENT
 - 2.5.12.3. CENSORSHIP AND LAW
 - 2.5.12.4. CENSORSHIP AND NEW TECHNOLOGY
 - 2.5.12.5. TOLERANCE AND INTELLECTUAL FREEDOM
 - 2.5.12.6. LIBRARIES AND INTELLECTUAL FREEDOM
- 2.5.13. FAIFE
 - 2.5.13.1. ORIGIN
 - 2.5.13.2. OFFICE
 - 2.5.13.3. FUNDING
 - 2.5.13.4. MISSION AND ACTIONS
- 2.5.14. SUMMARY
- 2.5.15. SELF-CHECK EXERCISES
- 2.5.16. REFERENCES

2.5.0. OBJECTIVE

After studying this lesson you will be able to know :

- (a) Meaning, need and types of Intellectual Property Rights (IPR);
- (b) Establishment and functions etc. of WIPO & WIPONET; and,
- (c) Concepts like Copyright, Data Security, Right-to Information, Censorship and FAIFE.

2.5.1. INTRODUCTION

In the present Information Society, new ideas and inventions keep on averaging in every field of science and technology. These are the outcome of manipulation of human mental faculty. The resulting outcome of human intelligence is known as "Intellectual Property". This subject has been a topic of discussion at various conferences and seminars even in India.

In order to make optimum utilization and obtain benefits from it there is need for conversion of knowledge into wealth. Mashelkar, Director General, CSIR observed that "Twenty first century will be the century of knowledge, indeed the century of mind. Innovation is the key for the production as well as processing of knowledge. A nation's ability to convert knowledge into wealth and social good through the

process of innovation, will determine its future. In this context, issues like generation, valuation, protection and exploitation of Intellectual Property (IP) are going to become critically important."

2.5.2. MEANING OF INTELLECTUAL PROPERTY (IP)

Human property is both tangible and intangible, and intellectual property is the part of the latter. Intellectual property therefore is that property which is created by human intelligence or mental labour and it is mostly in intangible form even though it can be reproduced in tangible form.

2.5.2.1. Types of IP

There are two major categories of IP. These are :

2.5.2.1.1. Industrial Property : In this category fall such products as the patents, trademarks, industrial designs, layout designs etc.

2.5.2.1.2. Literary Property : This category of IP includes primarily copyright and neighbouring rights including the performer's rights.

2.5.2.1.3. New Property Forms : These have come into existence in recent years. They include plant varieties, plant breeders rights, digital copyright and domain names, etc. These can be said to be related to Information Technology, Chemical Technology, Biotechnology. Some in the area of traditional knowledge have also come up.

2.5.3. NEED FOR PROTECTION OF IP

In view of the above, it is necessary to protect such IP so that nobody else can enjoy the fruits of other's efforts. Moreover, "everyone has the right to the protection of the moral and material interest resulting from any scientific, literary or artistic production of which he is the author."

There are many ways for protection of IP.

New inventions can be protected by patenting them.

New designs, new logos, new labels can be protected by registering them with the authority.

Similarly, a piece of art, literature, film, musical record, computer programmes can be registered for their legal protection under copyright law.

It may, however, be pointed out that IP like any other property, is not absolute. No private person can therefore enjoy an exclusive right in respect of IP without the control and regulation by the government. The Govt. can impose restrictions on the ground of public health and morality while issuing licences for IP.

2.5.4. DEFINITION OF IPR

Intellectual Property Rights (IPR) can be defined as the rights given to persons over the creations of their minds. They usually give the creator an exclusive legal right over the use of his/her creation for a certain period of time and thus protect the owner against copying or imitation.

2.5.5. TYPES OF IPR

2.5.5.1. The Trade Related Intellectual Property Rights (TRIP) has identified the following types of IPR :

- (i) Patents
- (ii) Copyright and Related Rights
- (iii) Geographical Indications
- (iv) Industrial Designs
- (v) Trademarks
- (vi) Layout Designs of Integrated Circuits; and
- (vii) Trade Secrets

2.5.5.2. Recent developments in IPR are beneficial to the Indian science and technology community as these would provide them the long-awaited support.

2.5.6. WORLD INTELLECTUAL PROPERTY ORGANIZATION WIPO

2.5.6.1. Establishment

Though the roots of WIPO can be traced back to the nineteenth century yet it was renamed as WIPO in 1970, and in 1974 became a specialized agency of the UNO. As an international organization WIPO ensures that the rights of creators and owners of intellectual property are protected worldwide. It further ensures that the authors and inventors are recognized and recorded for their work.

2.5.6.2. Objectives

WIPO was set up with the following objectives :

- (i) To harmonize national intellectual property legislation and procedures;
- (ii) To provide services for intellectual applications for industrial property rights;
- (iii) To exchange intellectual property information;
- (iv) To provide legal and technical assistance to developing and other countries;
- (v) To facilitate the resolution of private intellectual property disputes; and
- (vi) To marshal information technology as a tool for storing, accessing and using valuable intellectual property information.

2.5.6.3. Membership

About 90 percent countries of the world, i.e. about 180, are members of WIPO. This number speaks volumes of, about the crucial importance and relevance attached to the work being done by this international organization.

2.5.6.4. Staff

Drawn from around the world, the strength of its staff stands at about 817 at present.

2.5.6.5. Tasks and Activities

WIPO carries out many tasks related to the protection of intellectual property rights. These include :

- (i) Administering international treaties;
- (ii) assisting governments, organizations and private sector;
- (iii) monitoring developments in the field of IPR;
- (iv) harmonizing and simplifying relevant rules and practices; and
- (v) development and applications of international norms and standards.

2.5.7. WORLD INTELLECTUAL PROPERTY RIGHTS ORGANIZATION NETWORK (WIPONET)

2.5.7.1. Establishment

For economic development of nations IP is becoming a key issue. Organizations which are engaged in the protection of IPR must be interlinked with the help of a worldwide network. Therefore, WIPO decided to create a global network in January, 1998 in order to help in the process of generation, valuation, protection and exploitation of IP.

2.5.7.2. Objectives/Goals

It was set up with the following objectives :

- (i) To provide the necessary network infrastructure and services for improved information exchange among the global intellectual property community.
- (ii) To derive practical benefits of the information technology (IT) so as to address the problems being faced in IPR administration by the member states and the IP community.
- (iii) To narrow the information access gap that exists between the developed and developing countries.
- (iv) To improve the flow of information concerning IPR and WIPO member states, regional Intellectual Property Officers and Intellectual Bureau.
- (v) To improve access to and exchange of intellectual property information in terms of costs and access time in accordance with the agreed upon principles.
- (vi) To improve intellectual property information dissemination.
- (vii) To consider information needs and filling requirements of applicants and to develop electronic services, keeping in mind the need to provide benefits to applicants and IP offices and to other interested circles.
- (viii) To help guide IP to cope up with information technologies.
- (ix) To improve the retrieval of intellectual property information through further development of international classification of patents, trade marks and industrial designs as efficient search tools.

2.5.7.3. Membership

The WIPONET will connect 332 intellectual property offices in 171 countries to begin with. It being a global information network, it will certainly enhance communication between the WIPO and the Intellectual Property community.

2.5.7.4. Services

WIPONET is providing the following services to its members :

- (i) E-mail Services
- (ii) List Services
- (iii) Web Hosting
- (iv) File Transfer Services
- (v) Discussion Groups on IP related topics.
- (vi) Virus Scanning
- (vii) Provision of Updated Signatures

2.5.8. Copyright

2.5.8.1. Background

The concept of copyright is old enough. But the issue of developing a system of copyright protection became a current one after the advent and use of printing. However, when the technique of multiplying copies of a printed work became more popular in the western countries, the need for reciprocal protection was felt in the 19th century.

It was in 1886 at the Berne Convention that a tangible form was given to international copyright protection. However, many countries of the world, including the USA and the then USSR (now Russia), were not signatories to the Berne Convention.

In 1952, the Universal Copyright Convention was convened and many more countries became its members including the USA and India.

Thus, these two today are recognized as important multilateral conventions the world over for protecting the creativity.

2.5.8.2. Social Awareness

Enactment of a copyright law in any country is not the end but only a beginning. Its implementation by creating social awareness is the real difficult task.

Because of lack of social awareness about the uses of a book, a musical composition, or painting, or architecture, their creators still tend to suffer.

However, with the spread of literacy, democratic ideas, expansion of education in institutions of higher learning, people started reading and the level of awareness about these creative works started rising. All the works of art became gradually more popular with increasing cultural activities.

On the other hand, in developing countries the pace of creativity increased after they attained independence. The new governments started spending money on the spread of literacy and the encouragement of art, music etc. Thus, the need for protection of copyright became more urgent in these countries.

2.5.8.3. What is Copyright?

We have already pointed out that intellectual property comprises two main branches. One is industrial property, chiefly comprising the inventions, trademarks, industrial designs, appellations of origin. The other is copyright, chiefly comprising in literary, musical, artistic, photographic and audio-visual works.

A copyright is the set of exclusive legal rights authors have over their works for a limited period of time. These rights include copying the works (including parts of works), making derivative works, distributing the works, and performing the works (this means showing a movie or playing an audio recording, as well as performing a dramatic work).

Copyright law governs such works as the traditional works of authorship as books, photographs, music, drama, video and sculpture, and also software, multimedia, and databases. Copyrighted works are protected regardless of the medium in which they are created or reproduced. Thus, copyright extends to digital works and works transformed into a digital format.

Encyclopedia Americana defines copyright as “the exclusive right that protects an author, composer or artist from having his work recorded, performed, displayed, translated, distributed, or reproduced by way of copies, phonorecord, or other versions (derivative works) except with his permission, subject to specified limitations. This intangible property right comes into existence automatically on creation of an original music or dramatic work; a novel, poem, or work of non-fiction; a printing; or a map-to name but a few intellectual productions that qualify for such legal protection.”

Again, copyright works are not limited to those that bear a copyright notice, indicated by © (letter 'c' encircled).

As a result of changes in copyright law, works published since March 1, 1989 need not bear a copyright notice to be protected under the statute. This is an encouraging development in this area.

2.5.8.4. Copyright Protection Principles

The following are certain key principles concerning copyright protection :

(i) Copyright protects the manner of expression of information, not the idea of information itself.

(ii) The work need not to be of very high quality for protection under the copyright. It only needs to be original.

(iii) In principle, it is the skill of labour, and judgement of the author that is protected under the copyright laws irrespective of the form in which the product appears.

(iv) The copyright in literary, dramatic, musical and artistic works belongs to the author of the work.

- (v) The author has to be a person and not a corporation.
- (vi) In case a work is produced with the aid of or is generated by computer, the person who undertakes the arrangements necessary for the creation of the work is considered as the author.
- (vii) In case a work is produced by someone in the course of his employment, then the normal rule is that the copyright is owned by employers. Copyright will belong to the employer only if it is part of the employer duties to produce the work.
- (viii) No formalities such as registration or request to protect a work under copyright. The copyright notice needs to appear on any work.
- (ix) The copyright owner can give a licence to the work by others. Any assignment of copyright is to be in writing.
- (x) Copying or making adaptations, of a work verbatim reproduction of a substantial part, if done without the permission of copyright owner, is breach of copyright.
- (xi) Use of copyright works for the purpose of research and private study is generally permissible.

2.5.8.5. Duration of Protection

The minimum standards of protection provided for in the Berne Convention also relate to duration of protection, which term shall be the life of the author and 50 years after his death.

2.5.8.6. Copyright and Digital Data

The purpose of copyright is to promote science and useful arts as well as to protect an author against piracy of his work. Copyright has survived previous new technologies such as photography, sound recordings, and broadcasting. These technologies have posed some challenge for copyright law; but have not threatened the viability of the core concepts of copyright law. But, the digital and networked environment has posed several problems to the copyright law.

2.5.8.6.1. Reasons for Problems

Pamela has identified the reasons of the problems to copyright law as follows:

- (i) In the digital medium, works are more equivalent : In digital form, all copyrighted works-pictures, sounds, texts, music or movies - consist of strings of bits. Therefore, all fit in the definition of 'literary work'.
- (ii) The plasticity of works in digital form : Works in digital form are easily transformed from one form to another. They are also easy to alter, even without a change in the character of the work. With the right tools, it is easy to digitally edit photographs, texts, or anything else - and to do so in a manner, which can not easily be detected.
- (iii) Automatic generation of works in digital form : The digital medium also permits new works to be created for which no human author can readily be

designated.

(iv) Technological and contractual means for overcoming digital replicability : A well-recognized problem digital technologies pose for copyright arises from the ease and low cost with which multiple copies can be made and distributed in digital form, especially in a networked environment.

2.5.9. DATA SECURITY AND FAIR USE

With the increasing use of new technology for digital conversion of data, librarians and educators are in a dilemic situation that whether seanning and digitizing materials for preservation, sharing etc. is legal under the copyright law.

Many legal experts point out that in most instances it is not legal. The Association of American Publishers issued a report in 1994 stating that digitizing of copyright materials was not permissible without permission.

In the context of the growing volume of digitized data in databases and transacted over networks, which can be more easily manipulated and misused, stated Neelameghan, special provisions are necessary to ensure that sensitive data are protected from unlawful intrusion or “that personal and commercial data supplied to the authorities for legitimate purposes are not subsequently divulged or misused.”

The users of data must exercise judgement based on understanding of the copyright law. A library, however, can “make photocopies of manuscripts by microfilm or electrostatic process, but not reproduce the work in machine readable language for storage in an information system.”

2.5.9.1. Ethical Aspects

Most of the library and information professional associations have developed their ethical codes. The professionals can apply these codes to the question of standard of case. Mostly, members of the associations are expected to :

- (i) give clients the most current and accurate information possible;
- (ii) help a client understand the sources of information used, and the degree of reliability which can be expected of them.

At the same time the guidelines for ethical behaviour must be kept in mind by online searchers so as to maintain data security.

2.5.10. FAIR USE

The term 'Fair Use' is used in the USA, while it is 'Fairdealing' in the UK.

Fair use provisions of the copyright law allow for limited copying or distribution of published works without the author's permission in some cases.

2.5.10.1. Examples of Fair Use

These include of copyrighted material as follows :

- quotation of exerpts in a review or critique;
- copying of a small part of a work by a teacher or student to illustrate a lesson.
- new issues about fair use have arisen with the increased use of

Internet, and now it is being considered whether fair use provisions will be extended to appropriate users/uses of copyrighted Internet material.

2.5.10.2. Provisions for Teachers, Researchers, Librarians

In the US context two provisions of copyright statute are of particular importance to teachers, researchers and librarians. These are :

- (i) A provision that codifies the doctrine of 'fair use', under which limited copying of copyrighted works without the permission of the owner is allowed for certain teaching and research purposes.
- (ii) A provision that establishes special limitations and exemptions for the reproduction of copyrighted works by libraries and archives.

2.5.10.3. Factors

The following four factors need to be evaluated in determining whether a particular use of a copyrighted material is a permitted 'fair use', or an infringement of the copyright.

(i) Purpose of Use : The purpose and character of use, including whether such use is of a commercial nature or is for non-profit educational purposes. The Copyright Acts have tried to distinguish between the two options.

(ii) Nature : The nature of the copyrighted work has to be taken care of. For instance, it may be a book (a ch); a short book, report, standard, pamphlet (upto ten percent); short story, poems etc.

(iii) Amount of Use : The 'amount' and substantiality of the portion used in relation to the copyrighted work as a whole; and

(iv) Effect of Use : The effect of the use upon the potential market or upon value of the copyrighted work.

2.5.10.4. Higher Education and Fair Use

It is urgent, timely and in the best interests of higher education that the educational institutions and libraries and information centres raise a coordinated voice to address the 'Fair Use' of copyrighted works.

- (i) Higher education is legitimate right to use copyrighted works must be protected.
- (ii) Freedom of access to information, regardless of its format, is essential for the creative and learning processes.
- (iii) Higher education's right of fair use in the electronic era must continue unencumbered by terms of licences or transaction fees.
- (iv) Higher education has an obligation to educate its constituencies about intellectual properties and about the lawful uses of copyrighted material.

2.5.11. RIGHT TO INFORMATION

2.5.11.1. Role of the Government

Promotion of democracy should also ensure equality of opportunity to access information. In a democratic set up it is considered the responsibility of the government to provide freedom of access to information to every citizen. Today, access to information has assumed more significance as information/knowledge is considered as power.

2.5.11.2. Freedom of Access to Information

This freedom will ensure equality of opportunity. It will help reduce the gap between the 'information rich' and the 'information poor'. The widening between the two is not only an issue between the developed and developing countries, but it is so even within a country, especially where the use of information and communication technologies is widespread.

2.5.11.3. Freedom of Information

Freedom of access to information is no doubt essential, but it is of limited value if restrictions are imposed on the use of information accessed. Therefore "Freedom of information is regarded as a fundamental right in some countries, including India. It is therefore necessary that the government policies and laws should ensure the maximum possible freedom to create, publish, disseminate, transmit, store and retrieve information subject only to the limitations imposed by laws or cultural traditions with such aspects as public decency, the protection of minors, national security and the protection of personal (and corporate) privacy."

2.5.11.4. Impact of New Technology

It provides opportunities in two ways :

- (i) gives potential users quicker and more convenient access to information; and
- (ii) gives users a new kind of ability to search through and manipulates information and to create new information by the selection, combination and arrangement of data.

2.5.11.5. Right to Information Act (India)

2.5.11.5.1. Introduction : The need to enact a law on right to information was recognized in India by the Chief Ministers Conference held on 24th May, 1997 at New Delhi. In order to make the Govt. more transparent and accountable to the public, the Govt. of India appointed a Working Group on Right to Information... under the Chairmanship of Sh. H.D. Shourie. The Working Group submitted its report in May 1997 alongwith a draft Freedom of Information Bill.

The draft bill proposed that free flow of information was made available to the public, while, *inter alia* protecting the national interest, sovereignty and integrity of India. The Act was passed on 15th June, 2002. It is an Act to provide for freedom to every citizen to secure access to information under the control of public authorities,

consistent with public interest, in order to promote openness, transparency and accountability in administration.

2.5.11.5.2. Date of Implementation : The act came into force on 12th October, 2005. However, some provisions have come into force with immediate effect viz. obligations of public authorities, etc.

2.5.11.5.3. Coverage : The Act extends to the whole of India except the state of Jammu and Kashmir.

2.5.11.5.4. Scope : The right to information means the right to :

- (i) Inspect works, documents, records.
- (ii) Take notes, extracts or certified copies of documents or records.
- (iii) Take certified samples of material.
- (iv) Obtain information in form of print-outs, diskettes, floppies, tapes, video cassettes or in any other electronic mode or through printouts.

2.5.12. CENSORSHIP

2.5.12.1. Meaning

In modern thought, according to Martha Boaz, “censorship is an effort by a government, private organization, group or individual to prevent people from reading, seeing, or hearing what may be considered as dangerous to government or harmful to public morality.”

Censorship may be exercised on political, religious or moral grounds, making the offence one of treason, hereby or obscenity. According to *Harrod's Librarians's Glossary*, censorship is “prohibition of production, distribution, circulation or sale of material considered to be objectionable for reasons of politics, religion, obscenity or blasphemy.” This action of censorship is usually taken by the state, by the priesthood and by unofficial groups.

2.5.12.2. Development

Historically, religion was the first target of censorship, with punishment for blasphemy and heresy. Then came political ideas, with persecution for treason. Thereafter the subject of sex led to persecution for obscenity. In this way censorship has been in use continuously from antiquity to the present, in every period, in various environments and times.

History is full of instances of censorship of one or the other kind. Literary books were banned from circulation for obscenity; these books were seized and destroyed.

2.5.12.3. Censorship and Law

Many legal provisions were made from time to time to determine whether the work is obscene or not. Some laws came under criticism from the society and changes were introduced. It was provided that a work was to be read as a whole; and that a person should not be convicted if publication was “in the interest of science, literature, art or learning.”

In many countries the law has defended and protected intellectual freedom.

2.5.12.4. Censorship and New Technology

The technological developments have made censorship more difficult as well as made it easier. The broadcasting and telecasting media in some countries is under the direct control of the state. Again, the freedom of press is also limited, and do not publish such materials and may earn the wrath of the government. But satellite television, being international in scope and nature, can telecast news service which might have been suppressed in some countries.

On the other hand, Internet has opened up a whole new field of moral censorship. Many websites are available on Internet which are the electronic equivalent of pornographic magazines. With them available freely, it is difficult to define what is acceptable. It also provides material which is totally illegal, hence such material should not be made easily accessible.

2.5.12.5. Tolerance and Intellectual Freedom

The history of censorship has been a story of repression and persecution, yet it has also been a chronicle of tolerance and freedom. From the ancient times of Socrates to the modern times philosophers and thinkers like Milton, John Locke, J.S. Mill and others expressed a rational defence of freedom of speech. If Locke argued that states should have no control over the religious beliefs and should extend tolerance to non-conformists. Mill believed that every man is the best judge of his own actions and welfare and is competent to choose for himself what he will read or hear.

2.5.12.6. Libraries and Intellectual Freedom

From amongst the library associations, the American Library Association made some concerted efforts at library censorship. The Library Bill of Rights adopted by the ALA stresses the need to resist "all abridgement of the free access to ideas and full freedom of expression."

Even the American President Eisenhower wrote to the President of ALA that : "The Libraries of America are and must ever remain the homes of free, inquiring minds." The ALA statement has been significant in this respect that "censorship of books..... must be challenged by libraries in maintenance of their responsibility to provide.... printout word." It later adopted the "Freedom to Read" statement so as to make available "the widest diversity of views and expressions...."

Censorship is a negative factor, whereas the basic freedoms are positive and are mandatory in a democratic society.

2.5.13. FAIFE

FAIFE (Free Access to Information and Freedom of Expression) is the instrument of IFLA to promote intellectual freedom and the vital mission of libraries as gateways to knowledge and ideas. It is therefore known as IFLA/FAIFE.

2.5.13.1. Origin

IFLA/FAIFE was launched in 1997 based on IFLA resolution adopted in

copenhagen.

2.5.13.2. Office

Its office is located in copenhagen (Denmark). The initiative consists of a committee which has 27 members nominated by national library associations from almost all parts of the world.

2.5.13.3. Fundings

It is funded by the Danish Library Community, the City of Copenhagen and the Danish Govt.

2.5.13.4. Mission and Actions

- The overall objective of IFLA/FAIFE is to raise awareness of the essential correlation between the library concept and the values of intellectual freedom. To reach this goal IFLA/FAIFE collects and disseminates documentation and aims to stimulate a dialogue both within and outside the library world.
 - Networks of collagues, media contacts, human rights activists and others support the work of IFLA/FAIFE. The ambition of IFLA/FAIFE is to act as a focal point on the issue of intellectual freedom, libraries and librarianship.
 - IFLA/FAIFE maintains an updated information service on the Internet and will produce an annual report, for public release, on the state of freedom of access to information and freedom of expression within the library world.
 - It suggests and promotes IFLA general policies in the field of intellectual freedom.
 - It responds to violations of freedom of access to information and freedom of expression affecting libraries and librarianship. It also provides advice and assistance to librarians, libraries or library associations on request.
 - IFLA and IFLA/FAIFE supports and cooperates with relevant international bodies, organisations or campaigns such as UNESCO.
- Thus, through the IFLA/FAIFE initiative IFLA furthers intellectual freedom in all aspects, directly or indirectly related to libraries and librarianship.

2.5.14. Summary

Discusses about the intellectual property and need to protect it. States the intellectual property rights (IPR) and its types. To harmonize national intellectual property law, WIPO was set up and an international organization which ultimately led to the establishment of WIPONET to provide necessary network infrastructure. For protecting the creativity of the author in whatever form copyright has been developed to provide legal rights that works under certain principles. The new technology has created works in new format and posed certain problems regarding digital data. Increasing use of technology and digitization of data also requires the provision for data security of which ethical aspects are taken up. At the same time fair use of literary works is permitted in higher education and libraries. In a democracy every citizen has a right to information and in freedom of information

the government can play important role "Mentions about the Right to Information Act". Still some works need to be censored under legal provisions and impact of technology on censorship, but tolerance and intellectual freedom are important even in the context of libraries. A recent initiative of IFLA/FAIFE is explained.

2.5.15. SELF-CHECK EXERCISES

1. Define intellectual property. Discuss the need for its protection.
2. What is IPR? State its importance in the emerging information society.
3. Mention the objectives of WIPO and WIPONET.
4. Explain the concept of copyright. State the need for copyright law.
5. Enumerate various copyright protection principles.
6. Critically examine the security needs of databases.
7. Describe the concept of 'Fair Use' and its implications for higher education.
8. State the concept of right to information.
9. Discuss the concept of censorship in the context of intellectual freedom.
10. Write a brief note on the mission and actions of IFLA/FAIFE.

2.5.16. REFERENCES

1. Boaz, Martha, Censorship, In: Allen Kent and Harold Lancour(Eds), *Encyclopedia of Library and Information Science*, vol.4, New York, Marcel Dekker, 1970.
2. Satarkar, SV, Ed : *Intellectual Property Right and Copyright*, New Delhi, ESS ESS, 2009.
3. Neelamaghan, A., Freedom of Information, Copyright and Data Protection..., Presented at *National Seminar on Information Policies and Cyber Laws*, 4-6 Dec 2000, Bangalore: Sarada Ranganathan Endowment for Library Science, Paper D.
4. Prasad, K.N., Intellectual Property Rights, In: A Neelamaghan and K.N. Prasad(Eds): *Information Systems, Networks and Services in India: Development and Trends*, Chennai: Ranganathan Centre for Information Studies, 1998.
5. Satarkar, S.P., Ed., *Intellectual Property Rights and Copyrights*, New Delhi: Ess Ess Publications, 2003.
6. Colnish, GP : *Copyright : Interpreting the law for Libraries, Archives and Information Sciences*, Ed. 5, 2009.

LIBRARY AND INFORMATION INFRASTRUCTURE

Structure

- 2.6.0 Objectives
- 2.6.1 Infrastructure : concept
- 2.6.2 Information Infrastructure
- 2.6.3 Need for information infrastructure
- 2.6.4 Physical Infrastructure
- 2.6.5 Financial Support
- 2.6.6 Information System
- 2.6.7 Human Resource
- 2.6.8 Network as infrastructure
 - 2.6.8.1 Definition
 - 2.6.8.2 Categories
 - 2.6.8.2.1 Communication Networks
 - 2.6.8.2.2 Computer Networks
 - 2.6.8.2.3 Information Networks
 - 2.6.8.3 Network Components
 - 2.6.8.4 Essentials of Library Networking
- 2.6.9 Levels of Networking
 - 2.6.9.1 International Networks
 - 2.6.9.1.1 Internet
 - 2.6.9.1.2 Resources and services through Internet
 - 2.6.9.1.3 Information Services of Internet
 - 2.6.9.2 OCLC
 - 2.6.9.3 Nationals Networks
 - 2.6.9.3.1 Inlibnet
 - 2.6.9.4 Local Networks
 - 2.6.9.4.1 Delnet
 - 2.6.9.4.2 Features
- 2.6.10 Digital Libraries
 - 2.6.10.1 Definition
 - 2.6.10.2 Advantages of Digital Materials
 - 2.6.10.3 Purposes
- 2.6.11 Summary
- 2.6.12 Self Check Exercises
- 2.6.13 References

2.6.0 Objectives

After study of this lesson, you will be able to :

- a) Understand concept of Infrastructure;
- b) Know need & factors governing Infrastructure;
- c) Understand role of Networks as tools for Infrastructure; and
- d) Development of Digital libraries.

2.6.1 Infrastructure: Concept

In recent years the concept of 'infrastructure' is being used at national and international level to express such terms as 'national information infrastructure', and 'global information infrastructure'. Of late social scientists of all hues have started taking keen interest in the concept of 'infrastructure'. Two social scientists Star and Ruhleder were among the first to describe infrastructure as a social and technical construct. They described infrastructure as follows :

“It is both engine and barrier for change; both customizable and rigid; both inside and outside organisational features. It is product and process..... with the rise of decentralized technologies used across wide geographical distance, both the need for common standards and the need for situated, tolerable and flexible technologies grow stronger.”

The physical Infrastructure has been in use in the society in the form of roads, railways, telephony and telegraphy, electricity and light, banking, bridges, etc. All these infrastructures are deeply embedded in our social fabric, rely on technical standards, and build upon installed base.

According to star and Ruhleder, the infrastructure dimensions are a complex interaction of technology, social and work practices, and standards; and that infrastructure builds upon an installed base.

2.6.2 Information infrastructure

An information infrastructure, on the other hand, is built upon an installed base of telecommunication lines, electrical power grids, computing technology, available information resources, organizational arrangements, and people's practices is using all these aspects.

In a public policy document of USA information infrastructure is more narrowly defined when its scope includes computing and communications networks, associated information resources, and a set of regulations and policies governing use.

Information infrastructure is also referred to as a technical framework. As defined by US National Research council (1994) an information infrastructure is “a framework in which communications networks support higher level services for human communication and access to information. Such an infrastructure has

an architectural aspect - a structure and design - that is manifested in standard interfaces and in standard objects (voice video, files, email, and so on) transmitted over the interfaces.”

Another conceptualizing of information infrastructure is as a set of interaction between people and technology. According to this definition adopted for National Information Infrastructure agenda for action it “encompasses a nation’s networks, computers, software, information resources, developers and producers.”

The information infrastructures is not a substitute for telephone, broadcast or cable networks, for computer systems, for libraries, archives, or museums, for schools and universities, for banks, or for governments. It is rather a new entity that incorporates and supplements all these technologies and institutions but is not likely to replace any of them.

2.6.3 Need for information infrastructure

The modern society is termed as Information Society. In the present society information is regarded as power, and power is accepted around the globe. All nations intend to possess information so as to be powerful. Therefore information is collected, stored, processed and disseminated at local, regional, national and international levels so that it reaches those who need it most. For this purpose specialized library and information centres have been established in various subjects.

Library and information professionals looking after these centres perform the functions of, among others, analysis and repackaging of information. They are accepting new challenges in the changing landscape and are equipping them with new skills and competencies. Thus library and information professional have now been engaged, in specialized information centres, in such activities as the identification of information needs and matching with the recorded documents, processing the date electronically and transferring the needed information with the aid of the communication system.

Information in this way is becoming the support system or rather taking the shape of infrastructure much needed for the advancement of all types of knowledge. Therefore, a good information infrastructure is required to feed the academic community engaged in teaching, research and development activities.

2.6.4 Physical infrastructure

For collecting, processing and making information available to a variety of users, physical infrastructure is required. It includes buildings for library and information centres; different type of equipment and furniture items like computer and computer laboratory, network and Internet connections, reprographic facilities, fax, audio visuals, teaching aids; various types of furniture articles; and so on.

2.6.5 Financial Support

Another form of infrastructure required is in the form of financial support coming from various bodies. The University Grants Commission (India) is the major funding agency for creating library and information infrastructure. The UGC also gives grants to universities and colleges for maintaining proper standards, ensuring optimum utilization of facilities.

Besides UGC, financial support is also available from the state governments, CSIR, Dept. of Science and Technology (GOI), and other funding agencies, including Raja Rammohan Roy Library Foundation for public library infrastructure.

2.6.6 Information System

Despite the fact that information management has still many problem areas, the use of information technology (IT) has great potentialities in information and knowledge advancements. During recent times, the number of users of IT has been increasing by the day. The use of IT overcomes all barriers like geographical, political, ideological. In view of increasing impact of globalization, a new information and economic order has been emerging. The information society in India is also therefore emerging where information management may be dominating the new economic order. This is likely to make the information system more market-oriented. There is therefore need to create more awareness about information flow, its organization, value, relevance and impact on progress of the society. On account of these developments there is need for developing human resources who could efficiently handle the new IT.

2.6.7 Human Resource

For effective use of IT and also for information management, well-trained and skilled manpower equipped with needed competencies is required. This change has to be brought in by the university teaching departments which will provide quality education and training to new library and information human resources so as to enable them to successfully manage information and provide new information services. This they can achieve by learning new search techniques, search strategies, database formats, repackaging methods, marketing research etc.

In the new emerging library and information environment, the information professionals as information infrastructure, have to develop their skills further in softwares knowledge, network knowledge, knowledge of search and communication devices, strategies, knowledge of new management techniques such as MBO, TQM, SWOT, reengineering, etc.

2.6.8 Network as infrastructure

In the modern library and information environment, network is emerging as an important concept. It is developing as an important infrastructure meant for providing total access to information.

2.6.8.1 Definition

A network has been defined as modes of interaction between people or units, etc. It is “a set of inter-related information systems associated with communication facilities which are cooperating through formal and institutional arrangements.”

2.6.8.2 Categories

There are three categories of networks:

2.6.8.2.1 Communication Networks

John Feather said that “A telecommunication network is a system consisting of communicating devices, such as terminals an interconnecting media, such as cable, and a means of establishing communicating paths through the media between the communicating devices.”

2.6.8.2.2 Computer Networks

“A computer network consists of a set of communication channels interconnecting a set of computing devices or nodes that can communicate with each other. The nodes may be computers, terminals, workstations, or communication units of various kinds distributed over different locations.” In recent years computer networks have greatly increased in number and geographical area.

2.6.8.2.3 Information Networks

These are any formalized system of information exchange. But in modern information networks, technology is utilized to link libraries, specialized data resources, or individuals to the persons or institutions in need of information.

2.6.8.3 Network Components

According to Swank, there are six components in a network:

- i. Information resources;
- ii. Readers or users;
- iii. Schemes for the intellectual organization of documents or data;
- iv. Methods for the delivery of resources to readers or users—the output;
- v. Formal organization - cooperation whether or not contractual using different databases and/or group of users; and
- vi. Bidirectional communication networks.

2.6.8.4 Essentials of Library Networking

Kaul has identified some essentials of library network as follows:

- i. To promote and facilitate sharing of resources available within a group of libraries in order to provide maximum information to users;
- ii. To create bibliographic tools like union catalogues and union lists;
- iii. Inter library loan services and delivery of documents should be fast.
- iv. The participating libraries in the network should be willing partner to pool bibliographic records;
- v. In-house formations should be undertaken by individual libraries;

- vi. All participating libraries should follow a standard format, cataloging code, thesaurus etc.
- vii. E-mail and Interest facilities should be established between libraries to enable them to access international databases.

2.6.9 Levels of Networking

Networking facilities as information infrastructure are to be considered at international, national and local levels.

2.6.9.1 International Networks

There has been rapid increases in the online networks in recent years at the international level. Some of them are given below:

2.6.9.1.1 Internet

The Internet consists of a large number of linked computer networks forming a global network. It contains a large collection of information from many sources on all subjects. A person having an Internet connection can retrieve information on any topic quickly, locate the concerned experts in the field, and even correspond with them. It is the largest and most complete learning tool for a group of people with varied educational backgrounds. It is an essential and indispensable tool for scientists and academicians. It also serves as an encyclopaedia since one can get the desired information in detail on any subject of interest.

“The Internet”, technically speaking, “is a massive, searchable, dynamic, widely available, distributed multi-platform information system which possesses a number of general capabilities.” Objectively speaking, most librarians feel that Internet has open up wide vistas of sources of global basis that previously were unavailable to the average library, or individual researcher.

Thus Internet is redefining network access to information. It has created a global user base of a few million users. Internet has made networking the libraries an almost over night task. There is hardly any college or university library in USA which is not connected with Internet and have developed services to provide capability.

2.6.9.1.2 Resources and Services through Internet

Internet is a massive searchable, dynamic, widely available, distributed, multi-platform Information system having a great potential of resources. Although resources available are changing constantly, a brief review of types of databases and services is given below :

- a. E-mail : It allows users to send messages or files to each other.
- b. News : It informs users of available information.
- c. Remote log in : It allows users to log in to remote sites.
- d. FTP (File transfer protocol) :

2.6.9.1.3 Information services of Internet

1. Listeners and discussion groups on a variety of topics with which the participating libraries can exchange current information, etc.
2. Subject databases, specially from academic institutions in different subject areas.
3. Community information provided by different communities through their public libraries, etc.
4. Government resources at various levels.
5. Library catalogues are being made available through Internet.
6. Commercial resources through commercial information databases.
7. Bulletin boards
8. Shopping and other commercial transactions
9. Document delivery services through Internet by large libraries.

2.6.9.2 OCLC (Online Computer Library Centre)

OCLC began its operation in 1967 the First name was Ohio College Library Centre and is the largest library network. This computer network is interconnected with several regional library networks covering most of the states in the USA and a few in Canada. It has now worldwide membership including Europe and For East. It possesses a large database of MARC format data records, and serves a large number of libraries for producing their bibliographic databases, for reference and ILL purposes.

An important feature of this system is quick retrieval of information by resource sharing and saving in cataloging costs in individual libraries. The member libraries having OCLC terminals can get information of millions of books and other library materials by keying in simple commands.

OCLC functions to achieve the following goals:

- i. to increase the availability of library resources for library users;
- ii. to minimise the rate of use of per unit cost of the member libraries;
- iii. to provide management information;
- iv. to enable users to receive personalised services;
- v. to furnish instantaneous information to users and the library staff alike as and when they need it.

There are some other networks providing information infrastructure at international level such as BLAISE, etc.

2.6.9.3 National Networks

There have been developments in library and information networks at the national level in recent years to provide information infrastructure. Some of these are given below:

2.6.9.3.1 INFLIBNET

The University Grants Commission took the initiative and INFLIBNET was set up

as a computer-communication network linking libraries in colleges and universities in India as well as libraries in institutions affiliated to CSIR, ICMR, ICAR, DRDO and Govt. departments. It became functional in 1991, and provided financial assistance to a large number of university libraries to modernize their operations using computers.

INFLIBNET is envisaged as a multi-service network for providing catalogue-base services, access to databases, document supply service, facilities for computer mediated communications, such as e-mail, confirming, bulletin board etc.

It has been designed to operate at four levels :

- i. **National Level** : The national centre will coordinate the activities and services of the network and provide the policy frame for the network.
- ii. **Regional level** : The Regional centres in north, east, west and south of the country will be established in different regions in designated university libraries. These will maintain regional union catalogues.
- iii. **Sectorial Level** : The Sectorial Centres will be at specialized institutions, e.g., CSIR laboratories, and these will create and maintain specialized databases in specific disciplines.
- iv. **Local Level** : The local centres will be at the colleges, R & D Centres University libraries, etc. where end users will be serviced.

In addition, INFLIBNET proposes the establishment of 100 document resource centres in different universities and R & D Centres.

INFLIBNET is expected to evolve standards based on national and international practices for uniform adoption throughout the network. Thus, the network is undoubtedly conceived as a bold initiative.

But unfortunately, the role of librarians in the execution of the networks programmes has been missing from the beginning.

In the Review committee Report (1996), the achievements of INFLIBNET are listed as below :

- a. Union catalogue has only 50,000 records, whereas it have now included 1,31,57,384 million unique records of retrospective collections of 157 university libraries.
- b. Databases of theses/dissertations with 65,000 records have been created.
- c. A periodicals/serials database having 30,000 records have been developed.

Thus the achievements fall short of the expectations of the Inter-Agency Working Group.

The UGC has drafted a new Memo of Associations and the objectives of INFLIBNET have now been revised as per the recommendation of the Review Committee. It is also now engaged in the manpower development activity by undertaking some

short term training programmes and workshops.

INFLIBNET though has developed SOUL a standardized software for university libraries, it has yet to succeed in developing one for college and other special libraries.

The manpower engaged in the network for various functions is also inadequate. It, however, remains to be seen how soon the UGC will accept the INFLIBNET Review Committee recommendations, and provide library and networking software of international standards to INFLIBNET and the university libraries; and achieve at least half of the targets as originally formulated.

2.6.9.3.1.1 INFLIBNET Centre Publishers : Following publications regularly :

- (a) Annual Report, Current Report
 - (b) INFLIBNET Newsletter : It is quarterly publication.
 - (c) Proceedings of Annual Conventions PLANNED and CALIBER
- Website : www.inflibnet.ac.in/

2.6.9.4 Local Level

2.6.9.4.1 DELNET

DELNET was started at India International Centre Library in January 1988 and was registered as a society in 1992. It was initially supported by the National Information System for science and Technology (NISSAT-Department of Scientific and Industrial Research, Govt. of India. It was subsequently supported by the National Information Centre, Department of Information Technology, Ministry of Communications and Information Technology, Govt. of India and the Ministry of Culture, Govt. of India.

DELNET upto Nov, 2020 has 6992 libraries as its members of which 291 libraries are in Delhi, 6679 outside Delhi in 32 states and Union territories and 25 in overseas countries. Governing Board Members of DELNET for the year 2020-22 is as given below

President : Dr. Jayakumar

DELNET started as the name 'Delhi Libraries Network' and from Sept. 2000, it has been known as 'Developing Library Network'.

Publications :

1. Naclin, 2018 Proceedings (National Convention on Library and Information Networking) : This is annual Publication.
2. DELNET Newsletter : Annual Publication.
3. Director's Report 2017-18.

DELNET Database :

- (a) Union Catalogue of books : It maintains an online Union Catalogue of books available in its member libraries. This catalogue is continuously updated and its growing in size. It has 2,92,70,150 bibliographic records.

- (b) **Union Catalogue of Current Periodicals** : DELNET has created Union List of current periodicals in science and technology, social sciences and humanities. Now, it has 38,184 bibliographic records.
- (c) **Database of Periodical Articles** : This has details of articles which can be searched under the title, author, compiler, name of the periodical and subject. At present the database contains 11,06,228 records.
- (d) CD-ROM Database-61,750.
- (e) Union List of Video Recordings-6000
- (f) Union List of Sound Recordings-1025
- (g) Database of Thesis and Dissertations-1,30,753 Records
- (h) Union List of News Papers
- (i) Database of E-Books-1613 Records
- (j) Profile of Member Libraries for further information
Website : www.delnet.nic.in

2.6.9.4.2 Features

DELNET has created the following to promote resource sharing :

- i. Union catalogue of books
- ii. Union list of periodicals (of 116 libraries)
 - a) Union list of science periodicals
 - b) Union list of social science periodicals
 - c) Union list of humanities periodicals
- iii. Specialists database
- iv. Database of articles
- v. Union catalogue of periodicals
- vi. Database of language publication
- vii. DELSIS, the networking software based on BASIS Plus, is developed by DELNET to retrieve bibliographic records.
- viii. Internet and E-mail facilities made available at DELNET are used by its members.
- ix. It has created a home page on www.
- x. It has arranged several training programmes for participating libraries.
- xi. It has planned programme for resource sharing and these activities are growing.

There are many more services of DELNET which it has been offering to its members. As a first operational network in India, DELNET is progressing rapidly and is expected to meet with its objectives in the near future.

There are many more networks working at the local level. These include CALIBNET, MALIBNET, BONET, ADINET, and so on.

2.6.10 DIGITAL LIBRARIES

Today, the traditional academic and other libraries are facing some challenges. There include the challenge of economic survival, shortage of space, and management of materials. It is therefore imperative for the library and information profession to develop information infrastructure which could open a vast new range of possibilities for information sharing.

A digital library is one such component of information infrastructure which not only collects materials in electronic format, but also includes a strong browser interface, and perhaps a virtual society and virtual space.

2.6.10.1 Definition

A digital library is defined as "computer based information system for acquiring, storing, organising, searching, distributing and displaying digital materials for end user access; not necessarily network based but designed and constructed so as to be capable of attaching or being attached to a network."

Waters has provided the first succinct definition from a librarian's perspective:

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

2.6.10.2 Advantage of Digitised Material

The advantages of having library material available in digital form are as given below :

- i. The data occupies less space and can be replicated easily and made secure electronically;
- ii. The data can be made immediately available through communication networks like Internet to anyone, anywhere;
- iii. Enormous search speed and facility; and
- iv. Reduction in cost, while providing great increase in data availability and accessibility.

2.6.10.3 Purposes

Following are the purposes of the digital library :

- i. to ensure the systematic development of the means to collect, store and organise information and knowledge in digital form;
- ii. to promote the economical and efficient delivery of information to all;
- iii. to encourage cooperative efforts which leverage considerable investment in research resources, computing and communication

Networks; and

- iv. to strengthen communication and collaboration among research, government, and educational bodies.

Although progress has been made in digital libraries, these are still in the early stages of practice. More research is being undertaken for greater advancements in this area. Already work is going on in computing and computation, 'large scale networking', and soon.

It is amply clear from the above that many countries around the globe are promoting the development of information and communication technologies. These countries have established national information infrastructure programmes and associated mechanisms for supporting research and development.

In recent years there has been continued expansion of information infrastructure and application of information technology into more aspects of daily activities. In this context digital libraries are themselves becoming "enabling technologies" for many Other applications.

Now we are in the process of creating a global information infrastructure that will interconnect computer networks and various forms of information technologies around the world.

2.6.11 Summary

Discusses the concept of infrastructure and information infrastructure. While stating the need for information infrastructure it highlights the role of information in the context of modern society. Explains the various types of infrastructure like physical, financial, information system, human resource which play important part. Also discusses network as infrastructure, giving types of networks states that technology and networks bring information infrastructure to the fore, and discusses them at the international level such as Internet, DCLC; national networks like INFLIBNET; and local level networks. In recent times, digital libraries are emerging as enabling technology wherein these will help information resources to reach the end-users. This information infrastructure is being developed into national information infrastructure and sooner than later global information infrastructure is being created.

2.6.12 Self-Check Exercises

1. Discuss the concept of information infrastructure.
2. Briefly state the need for information infrastructure.
3. Discuss various types of infrastructure.
4. Explain network as infrastructure.
5. State various levels of infrastructure.
6. Write a note on Internet.
7. Describe briefly features/services of Inlibnet.
8. Highlight the role of digital library is information infrastructure.

2.6.13 References

1. Awal, RS, Ed. Information Networks in India, 2003.
2. Gopinath, M.A. and Rama Reddy, E (Eds), Information Access through Networks, Hyderabad: Booklines corporation, 1996.
3. Sardana, J.L. (Ed.), Libraries and Information studies in Retrospect and Prospect, New Delhi: concept, 2002.
4. Vashishth, C.P. (Ed), Modernisation in Libraries : Seminar Papers, 33rd All India Library Conference, Dec. 1987, Delhi: ILA, 1987.
5. Prasher, RG and Mangla, PB : Library and Information Science : Parameters and Perspecting, 1997.