



**KARNATAKA STATE OPEN UNIVERSITY
MUKTHANGOTRI, MYSORE –570 006**

**MASTER OF LIBRARY AND INFORMATION SCIENCE
M.Lib.I.Sc - 2**

**ORGANISATION OF
INFORMATION RESOURCES**

BLOCK - 1

M.Lib.I.Sc - 2
ORGANISATION OF INFORMATION RESOURCES

Block

1

Multi Media

Unit-1

Physical Medium of Information

Unit-2

Print Media, Multimedia (Hypermedia) and Hypertext

Unit-3

Non-Print Media: Microform, *Electronic and Optical Media*

Unit-4

Electronic media

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M.Lib.I.Sc - 2: ORGANISATION OF INFORMATION RESOURCES

Block -1: MULTIMEDIA

Introduction

Instant access to information is the single most distinguishing attribute of the information age. The elaborate retrieval mechanisms that support such access are a product of technology. But technology is not enough. The effectiveness of a system for accessing information is a direct function of the intelligence put into organizing it. Just as the practical field of engineering has theoretical physics as its underlying base, the design of systems for organizing information rests on an intellectual foundation. The subject of this block is the systematized body of knowledge that constitutes this foundation.

Integrating the disparate disciplines of descriptive cataloguing, subject cataloguing, indexing, and classification, the block adopts a conceptual framework that views the process of organizing information involved in various kinds of resources. The first block is on Multimedia. This block has three units.

Unit 1 is on physical medium of information. Information is recorded on varieties of media. A wide array of physical forms of documents is created, used and over a period of time has been disappearing from their current use. New forms are being created to form the essential media for recording and storing information for present and future use. In the Unit 1, the traditional and contemporary changing media and those emerging from the influence of technology have been introduced and discussed. To start with the Unit gives the glimpses of the features of different types of media used in ancient times. They include oral media, scrolls, handwritten documents, manuscripts, papyrus rolls, vellum, metals and stones. This is followed by a detailed discussion on the most widely used medium –ie., paper. The paper with printing technology has ruled the information world for couple of centuries. The end of the twentieth century has seen other kinds of [hysical media such as microforms, magnetic and optical media.

The second unit is on Print Media, Multimedia (Hypermedia) and Hypertext. The Unit discusses the characteristics of print media and categories of print media with books as the major category. Other forms of print media like display materials, brief text materials and the new papers and magazines. Finally, an attempt is made to explain the future of print media. Further the Unit provides basic information about Multimedia, and Hypermedia and Hypertext. It also provides reasons for the emergence of multimedia. The fusion of all media - print, non-print, electronic and optical has exciting evidence in Multimedia. Conceptualised by Bush as MEMEX and supporting contributions from Nelson, Englebrat and Kay have brought in the virtual media through multimedia. It represents the convergence between Computers, Digital Video, Digital Audio and Sound synthesis. It is a generic term for “multimedia computing” or “interactive multimedia”: the use of a wide variety of media within a computer interface or hypermedia. The technologies involved in the delivery of Multimedia information is through the hypermedia and/or hypertext methods. Both Hypermedia and Hypertext are concurrently employed in the access, navigation and delivery of multimedia information. The concepts Hypermedia and Hypertext are responsible for providing virtual links to the texts and images, and vice versa, for the information within and outside it.

Unit 3& 4 deals with Non-Print Media :Microforms, Electronic and Optical Media. In this Unit different forms of Non-print media specially the microforms are described. Micorforms include : Micro-transparencies; Roll Microform and Flat Microform and then the Micro-Opaque that include microcard and microprint. The latter are no longer in use. Various types of microforms, roll, aperture card, strips, slides and the microfiche are all described in this Unit. A brief idea on equipments used for the production and use of various categories of microforms is also given. The optical media is another category of electronic media. This media has resolved the mass storage needs, and has carved a new era in electronic publishing. The categories of optical media started Read-only devices. But today there are Recordable, Re-writable discs are also available. Earlier there could be only CD-ROM Read-drives, but with the developments in in-house CD production the Read-Write drives are available and has simplified the production of CDs which is considered to be a boon to Electronic publishing. The categories of

Compact discs available are: CD-Audio, CD- Interactive, CD-ROM, CD-Rewritable and CD-Recordable. Digital Versatile Disc is the new kind of optical media.

Prof. N B Pangannaya

MLIS –02 ORGANISATION OF INFORMATION RESOURCES

Block –01 MULTIMEDIA

UNIT-1 Physical Media of Information

Structure

1.0 Objectives

1.1 Introduction

- 1.1.1 Of Documents and Physical Forms
- 1.1.2 Documents in Information Communication.

1.2 History of Recording Media

- 1.2.1 Man's Endeavour in Recording Knowledge
- 1.2.2 Early Efforts

1.3 Physical Medium of Information

- 1.3.1 Paper as a Physical Medium of Information
- 1.3.2 Writing and Paper Media:
- 1.3.2 Modern Physical Media

1.4 Summary

1.5 Answers to self-check Exercises

1.6 Keywords

1.7 References

1.0 OBJECTIVES

The reading materials consisting of variety of documents are an integral part of learning, teaching and research and are constituents of any library and information center. The media of past and the present have been evolved since the mankind started keeping records of events, activities and achievements, although they were not necessarily the same as they are conceived today and probably in future times. A series of needs and wants were observed in this context of changing media, from the material availability, handling and portability. The constant fear of information growth particularly in print media has always tend to threaten libraries, for the storage,

reference and preservation. Hence all the professionals concerned; viz. librarians, printers and publishers and users alike have contemplated for the search and adopting to a change in the physical media, to accomplish the varying information needs and wants of users.

The Objectives of this Unit are :

1. To familiarize the students with different types of Information Resources.
2. To Help the students to develop an understanding of the need for Organizing and Preservation of Resources.
3. To develop competencies in the techniques and methods of Organizing resources
4. To Provide an understanding of the various Bibliographic Description Formats and Metadata Formats

1.1 INTRODUCTION

1.1.1 Of Documents and their Physical Forms:

It was Dr. Ranganathan who categorized documents on the basis of different characteristics. According to him documents are divided on the basis of their physical embodiment, nature of presentation, publication characteristics, purpose, information content and level of treatment. A Document he conceived as an Embodiment of thought content (Embodied in a Physical Body/Media). The Embodied Thought is a Record of work on Paper, or on other material, for easy physical handling, transport across space and preservation through time. Further more the division would also be on the basis of nature of content and the form of presentation. In addition C.W.Hanson, Dennis Grogan have also attempted to categorise documents; latter as Primary Secondary and Tertiary, on the basis of thought content and not referring to their physical media. This Unit however focuses on Physical Media.

1.1.2 Media in Information Communication.

'Media' is plural of medium which is the conductor, the channel, the means by and through which something is transmitted. For example, paper and pen constitute a medium

for transmitting thoughts in writing. Instruction is more than imparting of knowledge. It entails establishing conditions under which information and knowledge will be received, understood and assimilated in terms of the receiver's needs and previous experience. Instructional media are resources that facilitate the flow *of* information and enable its reception.

Towards transmission of knowledge man has used from oral media, scrolls, handwritten documents. The documents one kind of physical media have been integral part of Information Communication from historical times. Information dissemination, transfer and communication takes place through diverse media., manuscripts, papyrus rolls, vellum, metals and stones and variety of other media in the ancient times. From earliest time man has attempted to preserve his thoughts for future use. Preservation for posterity was though an older adage, but has been in the reckoning in recording and preserving scholarly knowledge for the generations to come, and has been one of the functions of digital document management. For about 5,500 years, people have made written records of their ideas, their relations with others, and the world around them. They have kept their record on a variety of materials: bone, clay, metal, wax, wood, papyrus, silk, leather, parchment, palm leaf, bhurja patra, paper, film; plastic, and computer readable magnetic and optical media. At almost every stage in the development of these materials, people have assembled collections of their records.

The invention of Movable types by Johann Gutenberg in mid 15th Century ushered in an era of mass production of printed documents and their wider distribution thus marked the medieval era. In the modern or so called technology era, efficient methods of printing were developed and adopted to mass production of printed documents. The advent of Photography, along with further improving printing and bringing colour to documents also saw the micro-reproduction of documents in the mid-19th Century. The mid-20th Century saw the libraries to handle a variety of media, the books; paper-back and hard-bound, microform, art prints, periodicals, audio, motion films, slides, film strips, models, realia, and many more which Ranganathan categorized also as neo and non conventional documents. The 1980s onwards libraries began

acquiring new media, with the import of Information technology on “Document” media, thus emerged magnetic, computer processible and readable, the optical and multi-media. Today in addition to this there is an upsurge of video, audio, digital video, on Optical media and the Internet emerging as major information communication media.. Here the role of document and its changing media form has been primarily and contemporaneously in the transmission and communication of knowledge in the present society, where information has been transformed into knowledge.

Thus we all know now that information is available not only in ancient media, in printed formats but is also available in non-print media. Society is now in information and knowledge era, which means that information media has been attempting to keep pace with technology as a means of serving the needs of the library users. The information technologists have been talking of paperless society, but not only paper has a vanishing act, but the media older than paper are still in existence, hence all media invented before and emerging now will continue to coexist as long the civilization of knowledge exists.

Let us now study how the various physical media have developed over the years in the contemporary information and knowledge bearing society. Let us begin first with an overview of human endeavours in this task and how persistently the efforts are being made to invent new media and adopt to his needs.

1.2 HISTORY OF PHYSICAL (Recording) MEDIA

1.2.1 Man’s Endeavour in Recording Knowledge:

In different phases of civilization man has been in constant search for a media to record and store knowledge he has gained through the interaction with environment

around him. He has been searching and adopting the surfaces, trying to find alternatives and for a long lasting permanent, durable media.

An examination of types of physical (recording) media contemporarily used all over the world proves that a vivid changes has been taking place due to variety of reasons and developments. The recording surface has been under constant transformation. Importantly many factors for media change in the early years could be reasoned – the ease of method of recording, permanency, movement of recorded products from one place to another, portability, use and re-use facility, availability of local material and method of reproduction. Furthermore, some of the newer media forms emerged due to some positive impact on the indication of the valuable service that the newer forms could provide in information communication.

These media, their advent, physical characteristics, growth, use by the library and advantages and disadvantages are some of the characteristics that are deliberated and mentioned here. There are number of evidences and reasons for the metamorphosis that has been taking place and has been accelerating since mid-20th Century.

The earliest writing material was stone on which the ancient Egyptians carved. and recorded the happenings using chisels and other sharp tools. In India also there are enough cases where stone has been one of the recording media, particularly found on religious structures. This led to the development of the most widely used writing material before the other materials followed on and gave way for the birth of a series of physical media for recording and disseminating knowledge. The paper in this context has been one of the most important landmark discovery and is evidenced by its longest durability, in the history of recorded knowledge in comparison with others.

Media has served as storage and transmission devices in education for centuries. However, the level of sophistication of newer forms of media, such as computers and video formats is playing greater role not only on its users and producers, but on information professionals as well. As part of the professional domain of information specialists this level of sophistication provides a new role and purpose for librarians. As all media assume more central roles their correct and integrated use will depend upon

guidance from those most familiar with finding solutions to information problems - the information professionals. Therefore, they, are expected to be familiar with them.

1.2.2 Early Efforts

As referred to earlier, the first writing material was stone, and the first pens were chisel implements for scratching, engraving and also painting on the surface. The earliest known man-made marks of this kind are still visible in the caves of Altamira and Lascaux and on the rocks at Tassili in the west and in Ajanta and Vellora caves of the Western India, and Badami and Pattadakallu, the historical monuments of Karnataka in the South. These evidences give us a history of writing surfaces of some 8,000 years. The Rosetta Stone, which was found near the Mouth of the Nile in 1799, was a flat slab of slate bearing three styles of writing – hieroglyphic, demotic and Greek. This is now preserved in the British Museum in London.

The stone was the first attempt by man, towards newer avenues of expression other than speech. The stone was then an ideal in many respects but was static apart from difficulty in recording, that was a great disadvantage. Later on most new physical media were invented and used are to overcome them and to consider the localized materials. Thus at different periods of time new media emerged and this process went on and on.

In different stages of historical periods the types of writing materials used were:

- a) Clay tablets
- b) Stone surfaces
- c) Wooden surfaces
- d) Palm Leaf
- e) Papyrus
- f) Animal Skins

- g) Parchment/Vellum
- h) Metals
- i) Linen
- j) Paper
- k) Cellulose
- l) Magnetic Media; and
- m) Optical Media

Among the earliest media, Clay Tablets and Papyrus Rolls were widely used in the west and in Egypt and Palm Leaf mostly in India. The stone and metals were widely used all over the world. For the 'Books' as reading materials Clay Tablets, Papyrus and Palm Leaf were common and for permanent Inscriptions for recording an individuals achievements, the Stone and Metal surfaces were very common. Since they are no longer in use now, their elaborate discussion is not found desirable here.

The search still continues. It has given rise to three distinct surfaces, print, non-print media and machine-readable media. To record and store knowledge on these surfaces several methods such as 'Scribing, Writing, Creating impressions by machines and so on were adopted.

After a long search and continued efforts, the achievement was finally culminated with paper and printing. Ever since the invention of paper and movable type of printing the dual have revolutionized the knowledge communication and until the mid-1970s it seemed the search for a durable, convenient and mobile media had diminished. But for the various reasons the situation got changed suddenly. Some of the fears that made man to think again for the alternatives are realized as follows.

- Fears of paper shortage, life of print media, cost of printing,
- Fears of information explosion in print and handling of large volumes of data
- Fears of durability of paper for eternal preservation

Besides the above, the needs of different libraries also demanded for the alternatives and the non-print media providing appropriate solution gradually started replacing paper for the under mentioned needs.

- Archives,
- Preservation of historical documents
- Preservation for posterity
- Preservation of classics
- Preservation of documents in different physical forms.

Again cellulose or microforms were used extensively for the above mentioned needs. However they were not used to the original documents, but employed as supplements to paper media only. More discussion on Microforms will follow.

In the continuation of the description of physical media here we would start with Paper as a physical media. We would in brief trace its history, joining with printing technology and its characteristics, varieties, functions and the limitations that have made room for the other media to emerge.

1.3 PHYSICAL MEDIUM OF INFORMATION

Physical medium of information would be conceived as the media for the embodiment of knowledge. But the method of recording, the arrangement of content varies. Hence let us consider here only the physical media on the basis of the concept of embodiment – the physical body. And as a matter of fact all the media from Clay Tablet to the Optical Media are the Physical medium of recording information. But the method of recording varies and that it is not discussed here. Among the physical forms of information enumerated above some of them are extinct and some are extant. Hence only the extant media are described here with their characteristics. For example the media that are primarily focused are the Palm Leaf, Paper (Print), Microforms (Non-Print) and Magnetic and Optical (Electronic) Media.

1.3.1 Paper as a Physical Medium of Information :

Advent of Paper:

Paper gets its name from *papyrus* and was invented in China in 105 AD. by Ts'ai Lun, who served in the court of Emperor He Di Ts'ai Lun used the inner bark of the mulberry tree for fiber. Later, the Chinese found that good paper making fibers could be obtained by pounding rags, hemp rope and old fishing nets into a pulp.

The Chinese art of paper making spread to other parts of the world after several Chinese paper-makers were captured by Arabs in what is now Soviet Turkestan. The Arabs urged the paper-makers to continue their art and teach it to the Moors in the city of Samarkand. The paper industry was established in Baghdad in 795 AD. Paper making spread to Europe where its manufacture is first recorded at Jativa in Spain in 1150 A.D. Its manufacture in England was introduced by John Tate in Hertford. The first paper mill in America was established in Philadelphia in 1690.

For over three centuries paper was made by hand from the cotton rags, but in nineteenth century, age of mechanical innovation changed and manufacture paper entered industry and the hand made paper remained only as a novelty and for special occasions. In 1798, a Frenchman named Nicholas Louis Robert invented a machine to make paper in continuous rolls rather than sheets. The Fourdrinier brothers, who were English merchants, financed improvements in this machine in 1803. The first American Fourdrinier machine was built in 1827.

Paper is often called “the handmaiden” of civilization. The paper media is traditionally used for handwritten and print media. Paper as a Physical media also includes a wide range of other forms—Charts, wall charts, posters, flipcharts, handouts, atlases and folders, apart from conventional documents are commonplace, the size and quantities of paper being variable. It can be expected that these formats will continue to

be popular, both for educational and domestic use.

The invention of paper, writing activity increased considerably. The needs of commerce and industry made writing an essential ingredient to the culture of the time. Paper served as common media for recording. Once written, the record could not be erased and reused. Moreover, when more than one copy was required, hundreds of scribes or slaves made the required duplication. Print Media is one of the first to be associated with mass communication and has played a significant role in the process of democratisation education and spread of knowledge.

1.3.2 Writing and Paper Media:

Even though writing was in existence before the advent of paper, but it is confined to 'writers' who were called scribes. But the advent of paper led to invention of ink, pen and printing as it became a convenient surface to write, and print. Paper revolutionized writing and script. It also led to the development of printing.

With the paper, writing became a common system of communication and writing activity increased considerably. The needs of commerce and industry, the education made writing an essential ingredient to the culture of the time Paper served as fixed media for recording. Once written, the record could not be erased and reused.

Sizes of Paper and Paper Finishes:

Paper is the basic raw material for printing has varieties of qualities and dimensions. For example printing of books, newspapers, magazines, office stationeries like letter heads etc. There are also different types of printing and need for different sizes of and qualities of paper. Normally there are two basic categories of paper sizes viz. British Standards 730 and 1413. The second is German International Sizes. The International Organisation for Standardisation (ISO) has now established a set of paper sizes of which the sizes for book work are known as A series. The International Standards

Recommendation 30000 refers to paper sizes A, B and C. There are Indian (IS:1064-1961) standards on paper too.

The British Standard Sizes are : Foolscap, Post, Crown, Demy, Medium, Royal and Imperial. The International Sizes are designated as : A – Series, B –Series and C – Series. Each series is further sized as for Example – A0, A1, A2,A3 and A4 and so on. The paper qualities on the type of finish are: Machine Finish, Supercalendered, Imitation Art paper, Art Paper, Antique Paper, Featherweight Antique, Twin Wire Paper, Cartridge Paper, Offset Cartridge, Bible and Mould-made Paper.

Machine Readable Paper Media :

i. Punched Cards

A cardboard card used in data processing operations in which tiny holes at hundreds of individual publications denote numerical values and alphabetic codes. The cards have holes punched in certain positions either round the edges (Edge Punched) *or* in the body of the card (Body Punched) to represent specific pieces of information. It used to be a form of input media for the computer.

ii. Punched Paper Tapes

A long strip of paper in which holes are punched to record alphanumeric information for computer processing. It used to be a *form of* input media for the computer.

1.3.3 Modern Physical Media:

As mentioned above several non-paper based physical media appeared later in the late 1960s and early 1970s to supplement the paper media primarily to store and preserve as archives. The microphotographic and photo-reproduction techniques emerged as document management systems in non-paper media. In addition to paper-print media other media have been employed in recorded knowledge. They are:

1. Microforms
2. Motion Films
3. Audio-visuals and
4. Electronic (Magnetic) and Optical media.

Microforms is a generic name identified with visual information originally in paper form which is photographically reduced in size and stored on a cellular media. Microforms are available in different formats, mainly in Microtransparencies and Micro-opaque that include, Microfilms, film strips, slides, Computer Output Microform and Microfiche and so on. More on the microforms will follow later under non-print media.

Motion picture films that includes, documentary and films for entertainment and education are also part of the media that supplemented paper media. It also includes modern video films and on CD and DVD. A full discussion on them will also be given the later Units. Audio-visuals and the Electronic media like the Television are also being considered under the physical media of information. Among the electronic media; the magnetic and optical media are also considered which consisted of Magnetic tapes, magnetic disks and drums. Among the Optical media, CDs and DVDs are the recent physical media which are also used in information storage and communication.

1.4 SUMMARY

The reading materials consist variety of documents. They are integral part of learning, teaching and research and are constituents of any library and information center. A wide array of physical forms of documents are created, used since ancient times and some of them have disappeared from their current use. New forms are created as essential media for recording and storing information for the present and future use by the libraries. Dr. Ranganathan categorized documents on the basis of different characteristics - and divided them on the basis of their physical embodiment, nature of presentation, publication characteristics, purpose, information content and level of treatment.

The physical media have been integral part of Information Communication and Information dissemination. In the transmission of knowledge man has used - oral media,

scrolls, handwritten documents, manuscripts, papyrus rolls, vellum, metals and stones and variety of other media in the ancient times. Paper invented by Chinese spread all over the world to come out as a most durable and long lasting modern physical media for recording and transmission of information. The paper with printing totally revolutionised information communication and has been responsible for the explosion of print media. Today majority of information resources are found on this media. In addition other modern physical media consists microforms, magnetic and optical media. Magnetic and optical media coupled with the computer and communication technology has also paralleled the developments like the paper and print. In this Unit physical media, mainly paper as physical media of information communication is described.

Self Check Exercises

1. Write in short the need for media for the dissemination of information.
2. Enumerate different early writing materials used before the advent of paper.
3. How did the paper get its name? Trace in brief its history.
4. List out types, sizes and varieties of paper.

Note:

- i) Write your answers in the space given below.
- ii) Check your answers with the answers given at the end of this Unit.

1.5 ANSWERS TO SELF CHECK EXERCISES

1. 'Media' is plural of medium which is the conductor, the channel, the means by and through which something is transmitted. For example, paper and pen constitute a medium *for* transmitting thoughts in writing. The documents one kind of physical media have been integral part of Information Communication from historical times. Information dissemination, transfer and communication takes place through diverse media. In different phases of civilization man has been in constant search for a media to record and store knowledge he has gained through the interaction with environment around him. Media has served as storage and transmission devices in education for centuries. For centuries man used only oral mode of communication and he was in search for a physical media on which he can record, store and preserve his thoughts for the future generation. Preservation for posterity though an old adage has been one of the main needs of advent

of several physical media in the transmission and dissemination of knowledge. The search for a suitable, durable and long lasting media led to the discovery of several media and today we find several such physical media in existence on which past and contemporary knowledge is recorded.

2. Man's search for a media with, suitable and stable and easy portability quality led to the discovery and use of several media since ancient times. An important observation that can be made here about the use of these media is that, he mostly depended on the locally available material. A single physical media like Paper has not been found to be in universal use. For example, papyrus was used in Egypt which palm leaf and Bhurja Patra were used in India. It signifies availability of raw materials for them in the local areas. However a variety of writing materials are found to be used in different parts of the world over different periods of time. Evidences of many of them still available in museums, libraries and archives. The list materials used is given below:

1. Clay Tablets.
2. Stone.
3. Metal.
4. Parchment.
5. Vellum.
6. Animal Skin.
7. Papyrus.
8. Palm Leaves.
9. Bhurja Patra.
10. Paper, and so on.

3. Paper gets its name from word *papyrus* that was used as a writing media in Egypt. Paper was invented in China in 105 AD. by Ts'ai Lun. Art of paper making was also known to the Chinese and it was to other parts of the world. The Arabs later urged the paper-makers to teach it to the Moors in the city of Samarkand. The paper industry was established in Baghdad in 795 AD. Paper making spread to Europe and its manufacture is first found at Jativa in Spain in 1150 A.D. In England it was introduced by John Tate in Hertford. The first paper mill in America was established in Philadelphia in 1690.

In 1798, a Frenchman named Nicholas Louis Robert invented a machine to make paper in continuous rolls rather than sheets. The Fourdrinier brothers, who were English merchants, financed improvements in this machine in 1803. The first American

Fourdrinier machine was built in 1827.

4. There are basically two types of paper they are according to British Standards 730 and 1413 and German International Standards. The types also specify their different types of utilities. The printing and need for different sizes of and qualities of paper. Normally there are two basic categories of paper sizes viz.. The International Organisation for Standardisation (ISO) has now established a set of paper sizes of which the sizes for book work are known as A series. The International Standards Recommendation 30000 refers to paper sizes A, B and C. The Indian standard is IS:1064-1961.

The British Standard Sizes are : Foolscap, Post, Crown, Demy, Medium, Royal and Imperial. The International Sizes are designated as : A – Series, B –Series and C – Series. Each series is further sized as for Example – A0, A1, A2,A3 and A4 and so on. The paper qualities on the type of finish are: Machine Finish, Super-calendared, Imitation Art paper, Art Paper, Antique Paper, Featherweight Antique, Twin Wire Paper, Cartridge Paper, Offset Cartridge, Bible and Mould-made Paper.

1.6 KEY WORDS

- Clay Tablets** : The earliest writing material used by Sumerians. A wedge shaped stylus of metal or ivory or wood was used to write on them when the clay tablet was wet. They were later baked to make it hard. There were libraries with Clay tablet ‘books’
- Palm Leaf** : A writing material widely used in Southern part of India. Number of Libraries with Palm leaf manuscripts are still in existence in India.
- Papyrus** : Another writing surface or media used in ancient periods made from the Bark of a plant. This plant was mainly found in Egypt on the banks of Nile Rive. Hence the papyrus was specially used in Egypt as writing material. Papyrus rolls stored in earthen pots were found in the Alexandria library.

1.7 References

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MLIS –02 ORGANISATION OF INFORMATION RESOURCES

Block –01 MULTIMEDIA

Unit-2:Print Media, Multimedia (Hypermedia) and Hypertext

2.0 Objectives

2.1 Introduction

2.2 Print Media

2.2.1 Paper and Printing : Proliferation of Print Media

2.2.2 Categories of Paper Print Media

2.2.3 Book : The Ubiquitous Print Media

2.2.4 Characteristics of Books

2.2.5 Textbooks and Research Publications

2.2.6 Journals, Magazines and Newspapers

2.2.7 Future of Print Media

2.3 Summary

2.4 Multimedia (Hypermedia) and Hypertext

2.4.1 Introduction

2.4.2 Definitions

2.4.3 Need and Purpose of Multimedia.

2.4.4 Delivering Multimedia : Hypertext and Hypermedia.

2.4.5 Hypertext and Hypermedia: *Meaning and Definition*

2.4.6 Hypertext : Historic perspective

2.5 Summary

2.6 Answers to Self-check exercises

2.7 Keywords

2.8 References and books for further reading

2.0 OBJECTIVES

In the Unit-1 the evolution of different physical media is traced that appeared before the emergence of Paper. In this Unit the Paper-print media and multimedia; and its various components such as hypertext are described.. The influence of Paper on Printing, Publishing and on Education and on Libraries is enormous. The Unit would deal with:

- the integration of paper with printing and the growth of print media
- understand the concept of print media,
- different forms of Paper -Print Media and their characteristics
- future of paper-print media
- introduce the multimedia; hypermedia and hypertext.

2.1 INTRODUCTION

The fundamental objective of information storage on any media is its retrieval when needed, and to help the user to provide access for its fullest use. The printing has evolutionised paper as physical media, and the libraries developed different methods of storage and retrieval of information contained in them. For example, Classification and cataloguing of books. Here we would start with the advent of Paper as an important and integral component of print media and then progressively profile its utilities, influences and the limitations.

2.2 Print Media

2.2.1 Paper and Printing : The Proliferation of Print Media

Among the man's most significant achievements if script is the first revolution, second revolution is invention of printing by movable types. Perhaps no event in human cultural history exceeds importance of printing with movable types. Since Johann Gutenberg in about 1440 AD invented the movable types printing press, the printed world has been shaping the civilization of

the World. Newspapers, Magazines and Books have become familiar in every part of the world as representatives of Print Media. The combination of paper and the printing press has probably done more to preserve man's accomplishments than any other single human achievement.

Print media, composed of several media, no doubt is more popular and common than any other media in practice. The fact that written medium is a source of great instructions and directional medium in formal communication. The print medium is very powerful medium and is likely to remain as the core- medium of communication in the days to come in spite of the emergence of new technologies in printing and information communication and thus it brought in the book-culture. Book as a print-media has effectively used for control and content and found to be very effective in handling historical information. The permanency and immutability of books is a great strength, is also a weakness. But this dominance of printed media is on the threshold of big change, with Newer media, the Electronic Media is gaining dominance over print media.

All Print Media share one common characteristic i.e., they are composed of words inscribed on some sort of paper by some sort of ink. The Book is a common form of Print Media. Newspapers and Magazines constitute other forms of Print Media meant to be produced quickly and cheaply.

The development of Print Media requires a proper study of the audience it serves. In the beginning the Print Media only catered the needs of *elite audience*. The situation changed gradually and the Print Media is catering to the needs of every group.

2.2.2 Categories of Paper Print Media

The table below shows categories of print media in use:

Brief Text	Paper-based Visual	Continuous and	Machine Readable
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Media	Material	Lengthy Text	Paper Media
Sheets	Displays	Book	Punched(Paper)Tape
Folders	Mobiles	Journals & Magazines	Punched Card
Leaflets	Charts	News Papers	
Handouts	Flip Charts		
	Posters		

I. Brief Text Media

i) Sheets

A sheet is a large piece of paper as manufactured. It can be used for- printing as it is or it may be folded and cut after printing.

ii) Folders.

A publication consisting of one sheet of paper folded to make two or more leaves but neither stitched nor cut.

iii). Leaflets

A small sheet of paper folded once and printed on to make two or four pages following in the same sequence as in a book but not stitched or bound. It is also' often used to indicate a small thin pamphlet.

iv) Handouts

Pre-prepared notes, diagrams and tables can be given to students in the form of handouts.

This can save the student from tedious and perhaps inefficient note taking, thus allowing him or her to concentrate better on what is being said. Thus, the student has some involvement in the process, and interacts better with the handout.

v) Pamphlets

A non-periodical publication of at least 5 but not more than 48 pages, exclusive of cover pages (Defined at General Conference of UNESCO, 1964). It usually is an independent entity, not being a serial, but it may be *one of* a series of publications having a similarity of format *or* subject matter. Pamphlets usually provide information on topics of interest and are not intended to be exhaustive in their contents, but to provide the user with some specific information.

II. Paper-based Visual Materials

vi) Displays:

Book Fairs, festivals, exhibitions, carnivals etc, would give an opportunity for installing or arranging displays. They are prepared and presented powerfully to attract the attention of the public and create desires and interests on the things displayed at important places like fairs and exhibitions. The methods of display, are Open display; Closed display; Architectural display; Platform display; Ledger and Wall display and Interior display. On the other hand, display may be interior, which follows certain factors of layout, decoration and product display at counters.

vii) Mobiles:

A 'mobile' is, in essence, a three - dimensional wall chart in which the individual components can move about. Mobiles can be used in virtually any situation where learners have to acquire and consolidate a set of related facts and where a wall charts would normally be used to reinforce this material.

viii) Charts:

The term "chart" denotes a map showing some information. It may be a table or diagram giving information, situation, possessions etc. Generally, charts are used to depict non-numerical information. They show the relationship of non-numerical nature systems and activities etc. The organizational chart is an example to illustrate a chart.

A chart is a pictorial presentation of a table or a diagram of information about a particular subject. A chart depicts numerical relationship and a graph depicts quantitative relationship.. The various forms of charts are wall charts and there are various types of charts such as lines, bars, mathematical graphs, cartograms, diagrams, area graphs, paragraphs, grouped bar, subdivided bar, range bar, stop bar, twin bar, paired bar, deviation bar, sliding bar, column bar, histogram, curve graph, slice graph, matrices graph, multi-scale graph, cumulative graph, cumulative frequency graph or give index graph, chart, frequency polygon, semi-log graph, band graph, etc

ix) Flip charts:

These constitute a simple, and, when used in an appropriate context, highly effective method of displaying information to class or small group. Such charts consist of a number of larger sheets of paper, fixed to a support bar, easel or display board by clamping or pinning them along their edges so that they can be flipped backwards or forwards as required. Such charts can be used in two basic ways. First, they can be used to display a succession of pre-prepared sheets, which can be shown in the required order either by flipping them into view from the back of the suspension system one by one or by revealing each successive sheet by flipping the previous one over the back of suspension system out of the way. Second, they can be used to provide an instantly renewable series of blank surfaces on which material can be jotted down on an important basis in the course of a lesson, group discussion or other activity. They can, for example, be used to list replies from class members to questions or ideas generated by buzz groups. 'Electronic flipchart's are now coming in to use in educational and training institutions. These provide a reduced - size- out of what has been written on the '*chart*', which can be photocopied and distributed to the class.

x) Posters:

A poster is a large notice or advertisement for sticking on a wall. A written document, a placard pasted or displayed in public places as an announcement or advertisement. It may include pictorial or picture poster, a placard consisting mainly a picture of illustration. A poster gives an opportunity to the by-passer to see and read. A poster is prepared based on planned specialization; and all the activities relating to the poster exhibition are effectively supervised and controlled. A poster in a prominent place attracts a great variety of cross sections of the

people. Posters are generally used for product advertisement. The posters are called “Billboards”. Their main use in the classroom as a means of providing decoration, atmosphere and motivation, all through they could also be used to make or remind learners of key points. As with charts and wall charts, ready-made posters are available from a large number of sources – very often free of charge. The job of the poster is to stop the hurriedly passing person, thrust the message upon him quickly and lead him to action immediately or eventually. The best example of posters in library and information science are DDC - 21 poster available on Dewey Web Site, and the Poster prepared by Indian Library Association during Dr. S.R Ranganathan’s Birth centenary year.

In the context of International conferences the “Poster sessions” are displayed to make clear the idea or exact facet of the presented paper, hence the posters are having an immense value in communicating nascent thought to the audiences.

III. Continuous and Lengthy Text:

xi) The Book

At the General Conference of UNESCO, 1964 a book was defined as a non-periodical printed publication of at least 49 pages, exclusive of cover pages. A book has a set of blank sheets of paper bound along one edge and enclosed within protective covers to form a volume. Books in libraries are the most familiar form of physical media. Books can be of various sizes, categories or forms e.g. reference books, text books, atlases, dissertations, etc.

The books have been controversial because of their *content* rather than for *their form*. In an age when new electronic channels of communication are taking hold, the question being heard is: 'Will the book survive? Certainly this refers to, the contents but to its physical form as *print on paper*. The television set and the computer epitomize the electronic challenge to books-by extension to Print Media as a whole.

The marriage of computers with television makes possible communication systems that are flexible and speedy, and that compete directly with the printed page. as a means of displaying text. Computer controlled video discs can store thousands of books on a thin plastic sphere, specially adapted TV sets, can call upon millions of pages *of text from* remote data banks. These technologies pose a threat to print in general and. to the book in particular. To answer the, question 'does the' book have a future?' requires an understanding of the process, rather than the physical products. It may be mentioned here that *it is the process of publishing* that results in books being produced, while it is the *process* of acquiring information - for education, for work, for personal enrichment and relaxation – that results in books being bought.

2.2.3 Book : The Ubiquitous Print Media:

At the General Conference *of* UNESCO-1964, a book was defined as a non-periodical printed publication of at least 49 pages, exclusive of cover pages. A book has a set of blank sheets of paper bound along one edge and enclosed within protective covers to form a volume. Books in libraries are the most familiar form of print media. Books can be of various sizes, forms e.g. reference books, text books, atlases, dissertations, etc.

In an age when new electronic media gradually taking hold, the question being often asked is: 'Will the book survive? It is not the intension of this Unit to answer either “Yes” or “No”. It is the intension to highlight the Book as an integral part of Print Media.

2.2.4 Characteristics of Books:

All books have certain common characteristics; some strengths and some weaknesses:

1. They are extensive bodies of information, whether they are integrated wholes or aggregation of discrete data
2. They are generally viable only if a market of several thousand purchases

is available for the total aggregate of information in an identical form.

3. They are fixed, and additions or corrections of the data contained can be achieved only at the cost of a whole new edition,
4. They are slow to produce, and the information in a book is typically old even at the very moment of publication.
5. Though alphabetical or chronological, arrangement can make it easy to locate an individual fact in a book if the approach is a standard one, books do not 'usually offer alternative approaches to individual items in their content..
6. They are convenient. Easily portable and require no apparatus or connection to read.
7. They are, or can be aesthetically pleasing, one can read it at leisure and convenience compared to reading from the screen of a computer print out.

The above furnished information suggests that there are only certain functions that books serve well, leaving an enormous area of service for the *new electronic media*, which do superbly many things books cannot do at all or do very poorly. But, it also suggests that books still *perform better than any other medium* the services within their special competence. In particular, the work that is intended to be read as a whole and that can: command an audience will continue to be more effectively disseminated in traditional book form - inexpensive, compact, portable, requiring no equipment to use and easy .to handle and read. Therefore, books are gradually be affected by any of the new computer-based technologies.

The competition they encounter from the electronic world is indirect, in the competition , for recreational time and attention. Book reading has faced this type of competition one form or

the other and books have survived.

The real competition between books and computer-based information technology might be in the field of *those books* which are designed to be consulted rather than read (i.e. reference books), from which the reader seeks specific item or a concise element of information rather than an extended text. Dictionaries, encyclopaedias, directories, etc., are examples of this type of book. In these cases the CD-ROM Technology has already entered and facilitating their use more comfortably than before.

More complex operations of '*looking up*' by online as to a database are more practical . and in fact are already in a very widespread use. Most of those more widely used, replace the task of *looking up* a fact in a paper file rather than in a book: e.g. finding current balance in a bank account, learning the recent trading price of a stock.

In such cases, the need for *up-to-date* or *up-to-the minute* data makes print an *obviously impossible medium*. Other look up uses cases involve databases which have been maintained in print as well. (the earliest example being Index Medicus) Some full text online access has been extended from bibliographies to texts themselves. The advantages of such systems is not in the storage and presentation of text, at which *print remains superior, but in their indexing power*, which facilitates easy retrieval of relevant prices of information.

2.2.5 Textbooks and Research Publications

A multimedia package could quite conceivably replace the textbook. One possibility would be, development of the video disc for, this purpose. As with reading for entertainment, it is uncertain whether lengthy texts of continuous prose will appear as anything but print-on-paper in the near future. Presently, the considerable capital investment tied up in the text books will tend to slow down any change. So text books may provide an excellent example of a product on print-on-paper that is likely to resist rapid modification.

Although changes in production methods (or example preparation of camera ready copy) have made it possible for research journals to operate or survive with lower circulations, small research communities are experiencing difficulty in publishing their research work. One of the

suggestions received in this direction as a solution to the problem is the establishment of electronic journals. For the transmission of short text. For longer texts one of the possibilities, envisaged is the establishment of a *system of on demand publishing*. It is a conjecture whether either of these developments would socially or financially viable. Suggestions for on-demand publishing mainly revolve around the use of microform. When microform first appeared it was considered to be in direct competition with print-on-paper. But at present, it is seen as a valuable supplement for use when print-on-paper would not be viable

2.2.6 Journals, Magazines and Newspapers

Although in physical appearance the periodicals may look like some pamphlets, they are totally different. They are published on a regular or periodical basis, identified by title and classified volume, issue and date, and that a periodical has a continuity

Newspapers constitute an important area of Print Media. They are mainly devoted to the presentation of current information in different fields of activity. Newspapers also provide commentaries on current affairs and play a vital role in shaping the public opinion. They have a definite advantage over other media like radio, Television in that they are in a position to cover detailed accounts of information on their contents In spite of the growth of other media such as Radio, Television, newspapers are growing in number. Electronic media has influenced newspaper production to a very large extent. Today the technology is used in their production is entirely like a inhouse production though coverage is world wide. The news rooms of todays newspapers get their every inputs directly on to the Editors desktops. Apart from this, full text computer based systems have been designed for general news reports. Newspapers are bulky, printed on paper quick to disintegrate, and in general difficult to preserve. Even though the back files of newspapers may be available on microfilm. In .such a case, it would more convenient to obtain a printout from the computer-based information system. than from the library. In the current state of their developments it is likely that the Newspapers, small and big, local or international would totally go electronic and accessible online and online system would deliver at least the current news via their web sites. The dual forms for the reasons above, of the newspapers as a *print media and electronic media* would continue for a long time to come.

One thing must be clearly mentioned here and that is the reason or reasons as to why alternatives to the traditional book or journal/newspaper are being thought of as a matter of intense concern. Some of the reasons could be: production costs of print-on-paper have been growing rapidly. On the other hand the speed of access and dissemination has improved substantially in the last couple of years. In comparison, the electronic transfer of information has become least expensive, handling of data has improved markedly and speed of transmission is high. There is some kind of cross over point where the virtues of electronic media may outweigh those of a print-on-paper.

2.2.7 Future Of Print Media

In conclusion it might be stated that integration of printing and electronic technologies offer unique advantages for information transfer; flexibility, rapid delivery at low-cost, compact storage, and interactivity. But it would be difficult to make a wholesale substitution of print by electronic media. This also makes it rather unrealistic to assume that the technology *will replace* print as a major medium of dissemination, and transform everything into electronic or what is now redesignated as Digital Form, and the it would not happen in the foreseeable future.

On, the contrary; the arguments put forward in favour of electronic systems suggest that there would be considerable need for, and demand for those back up and archival mechanisms provided by printed media. There will be many areas where electronic systems might be very useful, but the need for print on paper will continue. In fact far from threatening the viability of print, the emergence of a whole new spectrum new technologies along side print, may well increase rather than decrease the use of printed formats, by generating many new opportunities for those communication activities for which print is most suitable. Such an interaction already exists between television and books.

There is a complimentary growth of bibliographic databases and full text journals both in printed electronic form. This pattern is likely to be extended as new media can come into more

general use, and their capabilities for information transfer are being very high. The print media on the other hand would suitably fulfill the needs of back ups and archivals. One of the urgent problems awaiting solution is to provide the means of integrating the present fragmentation and lack of compatibility between various electronic systems. In other words the new multimedia communication is emerging. In this environment a variety of media co-exist and complement one another and where specialization of function in terms of such criteria as cost and convenience is likely to develop. This will certainly, increase the flexibility and the efficiency of information transfer. But specialisation and complementarily are not simply a matter of whether different kinds of information will be finally accessed by the user in the soft copy form, via a screen or in, some form_ of *print on paper product*.

The technology will stand a substitute for Print media or vice versa. But their principal will be, on the one hand to afford kinds of information dissemination not possible by the use of print and therefore not previously available, and on the other, to make the production, marketing and delivery of print media much more economical and efficient. The deliberation on the survival of Print media and its future is an ongoing debate. This co-existence will continue, and has no disadvantages either.

2.3 Summary

The concept of Print media began with the invention paper and the Printing by movable types invented by Gutenberg. The Unit also discusses the characteristics of print media and categories of print media with Books as the major category. Other forms of print media like display materials, brief text materials and the new papers and magazines. Finally, an attempt is made to explain the future of print media.

Self Check Exercises

- 1) Explain in a few sentences the concept Print Media. Does it have a bright future?
- 2) Enumerate the important characteristics of book.

3) List the categories *of* paper print media.

Note:

i) Write your answers in the space give below.

ii) Check your answers with the answers given at the end of this Unit.

2.4 MULTIMEDIA (Hypermedia) and HYPERTEXT: *A Vision of Media Fusion*

2.4.1 Introduction:

The Art and Science of multimedia is not only a marvel of integration of computer and optical storage media, but it is due to the parallel developments in the fields as diverse as art, film, television, telecommunication, digital optical storage, psychology and of course computer science. During the four decades of its development phase from 1945-1985, number of visionary thinkers, artists, writers, computer scientists have contributed to its present realization. The team headed by Vennever Bush, includes others like, Ted Nelson, Alan Kay and Douglas Engelbart, who have been chiefly responsible for the conception, architecturing and bringing in a world of virtual reality, which the mankind had never realised except in some Indian Mythological stories.

The major steps in this media fusion process and developments were, started with telephone and telegraph networks and then cinematography in the 19th Century, the invention of television in the 1930s, the digital computer in the 1940s and 1950s, and the emergence of personal computer in 1970s. It was the convergence of these technologies in the late 1970s and early 1980s that finally provided the framework for consumer usable interactive multimedia.

Combining still and moving images, sound, text and interactivity, is the multimedia in the sense, has initially culminated in a new way of communication of information using computers. To repeat again it is the convergence of computer, digital video, digital audio and sound

synthesis. The media on which multimedia is held are number of them – CD-ROM, CD-I, and CD-A, and similar varieties of DVD and so on.

Multimedia has become one of the oft referred media in education, culture and for the learning process. It has become one of the highly influential application in every sector of personal, professional and business environment. It is imperative that in the present context every one is aware of multimedia, especially Libraries, the impact on which has been highly revolutionary and transformed the whole image of a printed book, from a physical object to a virtual media. Today think any product, in the form of illustrative materials, learning kits, particularly Reference books in the Libraries all are widely available in multimedia format.

2.4.2 Definitions:

Multimedia in its initial years was somewhat *confusing* and *inadequately* defined meaning different things to different people. Libraries especially had a different connotation of the term multimedia. Although explanation can be provided to clarify the meaning of the term but it is difficult to provide an acceptable definition of the term to all. By definition multimedia is rather has two contexts. In the context of earlier libraries a multimedia referred rather to a variety of media possessed and held by libraries such as Illustrative Materials – Maps, Atlases and Globes, Audio, Visual and Audio-Visual Materials like the Sound Recordings, Charts, Microforms, and the Motion, Documentary and Educational Films.

But in the present technological context it is a single product enabling computational facility integrating or combining, sound, animation, graphics, text and displaying them all at once. It is a seamless integration of data, text, images and sound within a single digital information environment. Technical multimedia can also be oversimplified. It represents the convergence between Computers, Digital Video, Digital Audio and Sound synthesis.

A simple definition of multimedia is “It is a generic term for “multimedia computing” or “interactive multimedia”: the use of a wide variety of media within a computer interface or hypermedia programme. Also used to describe art works that combine several different media.

A new British Magazine 'Multimedia computing with sound and motion' published in 1990 in its first editorial suggested "multimedia is all things to all people". The name can convey a highly *specific meaning or less than nothing* depending on your audience. In fact, multimedia is a singular mix of disparate technologies with overlapping applications in pursuit of a market and an identity.

In 1990, the Journal Byte published a special feature on multimedia. It was a detailed one. But, it seemed to flounder whenever it attempted *to pin multimedia down with a rigorous definition*. It only offered the following: even if you are not sure what multimedia is, you probably know it when you see it (or hear it).

From the meaning of the word if its usage be discovered, then multimedia means the processing of *information derived from or present in several different media*. The 2nd Edition OED describes multimedia as 'design pertaining to a form of artistic, educational or commercial communication in which more than medium is used.

To-day, computer science and technology provides a single medium with the power to integrate diverse types of information. Therefore, the first stage of identifying *modern multimedia* is to focus on *its power to draw together* different forms of communication, smoothly integrating them within a digital environment and providing access to the stored information using computer systems which are fast, friendly, and interactive.

This calls for four important factors in all multimedia system. First, they need very large memory stores, second, specialized and powerful processing technology is essential to handle retrieval, processing and display of the large volumes of information. Third, in addition to text and numeric, output and display architecture has to be capable of delivering both sound and images to the required standards of any given application. Fourth, the rich and complex environment becomes useless unless users can easily find their way around it, locating and accessing the information that they require. The above mentioned factors determine the character of successful *multimedia platforms*. The publicity that multimedia is receiving to-day indicates that the technological capability has arrived and it is only the human design skills needed to put the technology to work and create powerful applications that requires to be

developed.

A stand-alone Multimedia system would almost always include the following components:

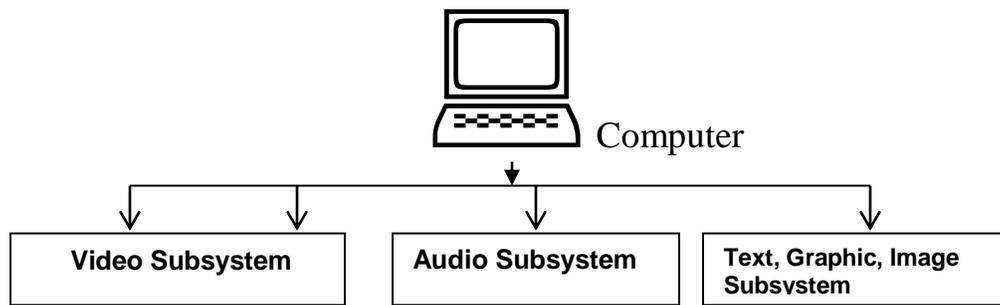
- ❖ Personal Computer
- ❖ Colour Display Unit (Monitor)
- ❖ User Interaction device – Mouse or a Remote Switch, Touch Screen
- ❖ CD-Drive (CD-ROM or CD-I)
- ❖ Sound Synthesiser
- ❖ Stereo Amplifier, Speakers or Headphones

2.4.3 Need and Purpose of Multimedia.

It may be stated that multimedia is aimed at satisfying the demand for '*better access to and presentation of* information. The uniqueness of multimedia may be stated as its ability to present rapidly a variety and quality of information to meet the varied needs of different users. In any effective communication user comprehension is of utmost importance.. The application of multimedia will certainly solve the problem of presenting quickly and effectively the right kind of information to a variety of users

Multimedia has provided better access to and for the presentation of information in almost virtual form. The term virtual reality has almost been synonymous to multimedia. The unique feature of multimedia is its ability to present rapidly a variety of information to meet the varied needs of different types of libraries and /or users. In Libraries user satisfaction and effective communication of information is primary and multimedia certainly fulfills this need effectively. Multimedia has certainly solved many problems of presenting quickly and effectively a variety of information in different forms. It is being effectively utilized in applications in education and training, business and professional applications and in Book trade

and publishing apart from commerce.



Components of a multimedia

2.4.4 Delivering Multimedia: *Hypertext and Hypermedia*

The technologies involved in the *delivery of Multimedia information* is through the hypermedia and/or hypertext methods. The word Hypermedia is so much linked with multimedia that some times used as a synonym for multimedia. The term hypermedia is generally used to refer to information containing high proportion of graphics and images and is almost always used, where the information also includes video sequences or any form of animated information. Let us first understand what is hypertext and hypermedia.

2.4.5 Hypertext and Hypermedia: *Meaning and Definition:*

Simply stated, hypertext consists of nodes(or chunks)of information and links between them. According to glossary of multimedia Hypertext is “Text which allows user to “hyper-jump”. Hypertext is basically same as regular text, with one exception: Hypertext contains connections within the text to other Web documents. The rationale behind the development of hypertext was a simple one; to optimise the processes of writing, storing textual information, and accessing that information. The connections are denoted, generally, as underlined, coloured text. The “documents” to which the hypertext connect may be local, remote, perhaps even in different location. The hypertext is a software tool that enables the user to read texts linked in a variety of linear and non-linear ways and to create new links between words or passages of text. Stated thus, it is easy to find early 'examples of hypertext-any text which references another can be seen as two nodes of information with the reference forming the

link, any text which uses footnotes can be seen as containing nodes of information (the text and footnote), with the footnote marker providing the link or pointer from one node to the other. The idea of a node is very general, and there are no rules about the size of a node (how big a node should be) or what it should contain. Similarly, there are no rules governing what gets linked to what. What makes hypertext different, and sets it apart from the most conceptually inter-linked paper document, is that in hypertext the links are '*machine supported*'. When a reader selects a hypertext link, the movement between two nodes takes place automatically. It is for this reason that the advent of hypertext had to wait for the combination of processing power and display embodied in the modern computer.

It may be noted that the concepts of *node* and link are rather flexible. A node of information can be a piece of text, fragment of music, a map, a complete film anything which the author thinks can sensibly be presented as a unit. Even if a particular hypertext system always displays one screenful of information at a time, a node can consist of several consecutive screens. Similarly, a link is arbitrary in the sense that there are no rules to determine where a link shall be made. A link can be made between any two nodes which the author considers to be connected in some way. In some hypertext systems, there are several types of links and the author should specify which type he would like to make at any one time. ,

Hypermedia, on the other hand "hypertext" with links not only to text, but also to other forms of media – sounds, graphics, movies, video, animation and so on. Hypermedia consists of hypertext combined with still or moving images and sound. Unfortunately, 'hypermedia' and 'hypertext' are two more terms that may be wrongly interchanged. Strictly speaking, hypertext relies on text only. A technical definition of Hypermedia is " Interactive programmes in which information is stored in a number of different media and organised so that it can be retrieved and presented in a variety of ways that amplify meaning for the user. Hypermedia involves the presentation of information in media that most effectively communicate its content, and provides the user with the means to sequence information in ways that are most appropriate to a given task. It is found that hypermedia has now become the "front end" for all Information Technology systems of all kinds – whether they be design of systems, cash machines at Bank, Control systems in a factory or database in an information

system.

The first major tool to establish hypermedia as a practical environment for multimedia applications was *Apple's Hyper Card*. Today hypercard and its related product supercards are used by professionals to create very sophisticated hypermedia products. It is based on the process of linking together multimedia data elements, and allowing different options for getting from one to another. It is a particularly powerful approach in knowledge-based systems, where large information resource can be explored in a *fast* compelling fashion that suits the natural strategies; institutions and curiosities of the human mind.

Very often the two terms hypermedia and hypertext are used to mean the same thing. Although hypertext strictly refers to textual information and is concerned with the presentation of information in a non-sequential fashion, it sometimes refers to bodies of information containing graphics and images as well. Later the description of historical perspective of Hypertext will help to make such distinction between them.

Interactivity is one of the key features of Multimedia. The interactivity in multimedia is facilitated by the hypermedia or hypertext, which is the need to link text and to images and vice versa in a multimedia product. The extent of interactivity involved in multimedia is of the careful consideration and evaluation of multimedia products. Though hypertext differs significantly from printed text in its structure, it shares many similarities for the reader, for example the earlier, programmed instruction texts. Despite their node and link structure, hypertexts are still composed of units of text at paragraph level and there is no reason to believe that they are read differently from units of conventional paper or electronic media.

2.4.6 Hypertext-Historic Perspective

The origins of hypertext can be traced back to some considerable length of time for example, in the works of Aristotle, that in the past there was an appreciation of the interconnectedness of information. But its overview in the technology era is only appropriate and its brief overview of the history is given here.

The following enumeration of historical events show the chronicle of development of

hypertext and the individuals associated its various intricate concepts.

Date	Nature of Contribution
1945	Vannevar Bush proposes Memex.
1965	Ted Nelson coined the word Hypermedia and used the term Hypertext.
1967	Andy van Dam- the Hypertext editing system and FRESS Brown University
1968	Doug Engelbart invented mouse and multiple window screens and many components of hypermedia. He produced the NLS (oN Line Sytem) which embodied features that were to become prototypes for all hypermedia systems.
1968	Alan Kay built cardbaord model of Hypermedia system called the 'Dynabook'
1978	Aspen Movie-Map, first hypermedia videodisk Andy Lippman, MIT Architecture Machine Group.
1984	William Gibson used the term 'cyberspace'
1984	Filevision from Telos; limited hypermedia database widely available for Mac.
1986	OWL introduced Hypercard, first widely available hypertext
1987	Apple introduces Hypercard, which now an all purpose Supercard product.

It was Vannevar Bush who enunciated the idea of hypertext as early as in 1945, The paper "As we may think" by him was most often cited as the birth place of hypertext. Bush was appointed as the first Director of America's Office of Scientific Research and Development by President Roosevelt in 1941. He saw the problems associated with ever increasing volumes of information. To cope with this plethora of information, Bush designed (Conceptually, at least) the *memex*, 'a device in which an individual stores his books, records, and communications and which is mechanized so that it may be consulted with exceeding, speed and flexibility'. More than simple repository, the 'memex' was based, on "associative indexing, the basic idea of which is a provision whereby any item may be caused at will to select immediately and automatically another. This is the, essential feature of memex. In conception, memex was a remarkable scholar's Workstation and Bush anticipated that it would allow a new form of publishing with documents 'ready-made' with a mesh of associative trails running through them, ready to be dropped into the memex and there amplified. Unfortunately, the technology of the day was not

up to the task of instantiating the memex.

Bush assumed that microfilm would cope with the bulk of storage problem, which might have been true then. However, the level and complexity of indexing and retrieval required by memex was certainly beyond microfilm-based technology. Though Bush is often regarded as the founding father of hypertext or multimedia, he did not name this nascent field of endeavour.

The term *hypermedia* is attributed to Theodor Nelson. Nelson was by no means the only person working on the ideas of hypertext. Many others have contributed towards the development of the concept hypertext. The pioneering work of Dong Engelbart is an example. Bush, Nelson and Engelbart represent three different views of hypertext.

"The Bush view sees hypertext as somehow 'natural' reflecting, the mind or (in the strongest form of this position) modeling the mind; from this perspective, hypertext should feel easy-to use. The Engelbart view of hypertext is an augmentation environment, the user of hypertext, should be able to achieve more than what would be possible without it. Although Nelson's vision is as a storage and access mechanism; the user of hypertext should be able to access any document, and such ease of access any document, and such ease of access should work to break down subject boundaries. These views are not mutually exclusive. It is possible to advocate a hypertext system which provides ready access to all information and therefore allows user to perform new tasks. However, the fact that different views can proliferate illustrates the point that hypertext is not a unitary concept, not a single thing which can be defined precisely.

Hypermedia and Hypertext Features of Multimedia:

One of the salient features of multimedia is use of hypertext linking to variety of media simultaneously. It provides for a non-sequential access to information unlike in the paper texts, where information is generally referred to page by page. Hypertext helps the user to navigate through their own sequence throughout the product. It is in fact is known as interactive mode of use and it is the special feature of multimedia. The information in hypertext mode, which is normally a presentation followed in multimedia, is extensive and highly interlinked and can be

regarded as a means of browsing through a database of information. The importance of hypertext resides in the fact that it may alter the way in which we read, write and organize information.

Hypermedia on the other hand is a hypertext in which contents of the nodes may include, text, graphics, digitized speech, audio, pictures and video clips and so on.

Application in Libraries and Education:

Multimedia is widely acknowledged as an environment with great potential in education. It is able to assist both student and teacher in new ways of learning and teaching. In this age of information explosion, rapidly expanding volume of information presents problems of access, shifting and cost of acquisition to the ultimate user. In this context many of information sources are now being made available in multimedia mode. Reference books like, dictionaries, encyclopaedias are now available in this mode hence multimedia is going to revolutionize the information access and use in the libraries.

2.5 SUMMARY

This Unit provides basic information about Multimedia, and Hypermedia and Hypertext. It also provides reasons for the emergence of multimedia. The fusion of all media - print, non-print, electronic and optical has an exciting evidence in Multimedia. Conceptualised by Bush as MEMEX and supporting contributions from Nelson, Englebrat and Kay have brought in the virtual media through multimedia. It represents the convergence between Computers, Digital Video, Digital Audio and Sound synthesis. It is a generic term for “multimedia computing” or “interactive multimedia”: the use of a wide variety of media within a computer interface or hypermedia.

Multimedia is widely acknowledged as an environment with great potential in education. Many of information sources are now available in multimedia. Reference books like, dictionaries, encyclopaedias are now available in multimedia.

The technologies involved in the *delivery of Multimedia information* is through the hypermedia and/or hypertext methods. The word Hypermedia is much linked with multimedia some times is a synonym for multimedia. Hypermedia is generally used to refer to information containing high proportion of graphics and images. Hypermedia on the other hand is a hypertext in which contents of the nodes may include, text, graphics, digitized speech, audio, pictures and video clips and so on. Both Hypermedia and Hypertext are concurrently employed in the access, navigation and delivery of multimedia information. The concepts Hypermedia and Hypertext are responsible for providing virtual links to the texts and images, and vice versa, for the information within and outside it.

Self Check Exercise

4. What is multimedia ? Explain its characteristics
5. Define Hypermedia and Hypertext and their role multimedia information transfer.

Note: i) Write your answer in the space given below.

ii) Check your answer with the answers given at the end of this Unit.

2.6 Answers to Self Check Exercises

1. The Print media is one of the first media associated with education and mass communication. It has played a significant role in the process of universal education and democratisation of knowledge. Print media is composed of words inscribed on paper with ink using the type faces as alphabets to inscribe.

The Print media is considered to be most stable and durable and survived for centuries. It consists of several categories, from brief text to lengthy texts. The predominant are Books, Journals and News Papers.

As for the future of Print media, the new technology will only substitute print media like the Microforms supplemented it. But the modern electronic/digital technologies a step ahead of microform and have basically provided more benefits. However the future of print media is not threatened but its utility will be diminished and will again be supplemented by electronic media.

2. The book is considered an ubiquitous and all pervasive print media. A definition of book is given by the General Conference of UNESCO in 1964, A book has a set of blank sheets of paper bound along one edge and enclosed within protective covers. Books in libraries are the most familiar form of print media. Books can be of various sizes, forms e.g. reference books, text books, atlases, dissertations etc. The Characteristics of Books are :

- i. They are extensive bodies of information
- ii. They are fixed, and additions or corrections of the data contained can be achieved only at the cost of a whole new edition,
- iii. They are slow to produce, and the information in a book is typically old even at the very moment of publication.
- iv. Though alphabetical or chronological, arrangement can make it easy to locate an individual fact in a book if the approach is a standard one, books do not usually offer alternative approaches to individual items in their content..
- v. They are convenient;. Portability, no apparatus required to read.
- vi. They are, or can be aesthetically pleasing, one can read it at leisure and convenience .

3. The Categories of print media are as given in the following table:

Brief Text Media	Paper-based Visual Material	Continuous and Lengthy Text	Machine Readable Paper Media
Sheets	Displays	Book	Punched(Paper)Tape
Folders	Mobiles	Journals & Magazines	Punched Card
Leaflets	Charts	News Papers	
Handouts	Flip Charts		
	Posters		

4. The Art and Science of multimedia is not only a marvel of integration of computer and optical storage media, but it is due to the parallel developments in the fields as diverse as art, film, television, telecommunication, digital optical storage, psychology and of course computer science. A simple definition of multimedia is “It is a generic term for “multimedia computing” or “interactive multimedia”: the use of a wide variety of media within a computer interface or hypermedia programme

The four important characteristics of all multimedia system are ; i) they need very large memory stores, ii) specialized and powerful processing technology to handle retrieval, processing and display of the large volumes of information. iii) deliver text and numeric, output and display architecture and capable of delivering both sound and images. iv) the rich and complex environment becomes useless users can easily find their way around it, locating and accessing the information that they require.

Multimedia is being effectively utilised in applications in education and training, business and professional applications, publishing, book trade and libraries and also in consumer appliances

and entertainment. Any product, in the form of illustrative materials, learning kits, Reference books in the Libraries all are widely available in multimedia format.

5. The term *hypermedia* is attributed to Theodor Nelson. A technical definition of Hypermedia is “ Interactive programmes in which information is stored in a number of different media and organised so that it can be retrieved and presented in a variety of ways that amplify meaning for the user. Hypermedia, on the other hand “hypertext” with links not only to text, but also to other forms of media – sounds, graphics, movies, video, animation and so on. Hypermedia consists of hypertext combined with still or moving images and sound. Unfortunately, ‘hypermedia’ and ‘hypertext’ are two more terms that may be wrongly interchanged. The first major tool to establish hypermedia as a practical environment for multimedia applications was *Apple's Hyper Card*.

According to glossary of multimedia Hypertext is “Text which allows user to “hyper-jump”. Hypertext is basically same as regular text, with one exception: Hypertext contains connections within the text to other Web documents. Simply stated, hypertext consists of nodes(or chunks)of information and links between them.

Although hypertext strictly refers to textual information and is concerned with the presentation of information in a non-sequential fashion, it sometimes refers to bodies of information containing graphics and images.

The salient features of multimedia is use of hypertext linking to variety of media simultaneously. It provides for a non-sequential access to information unlike in the paper texts.Hypertext helps the user to navigate through their own sequence throughout the product. Interactivity is one of the key features of Multimedia. The interactivity in multimedia is facilitated by the hypermedia or hypertext. The two; hypermedia and hypertext will provide access to and deliver the information to the user.

2.7 KEY WORDS

Hypermedia : Interactive programmes in which information is stored in a number of different media and organized so that it can be retrieved and presented in a variety of ways that simplify meaning for the user. Hypermedia involves the presentation of information in media that most effectively communicate its content, and provides the user with the means to sequence information in ways that are most appropriate to given task.

Hypertext : Software that enables the user to read texts linked in a variety of linear and non-linear ways and to create new links between words or passages of text. 'Text' which allows users to 'hyper-jump'. Hypertext is basically the same as regular text with one exception hypertext contains connection within the text to other Web documents.

Multimedia : Generic term for 'multimedia computing' or 'interactive computing'. the use of a wide variety of media within a computer interface or hypermedia programme. Multimedia includes; Text, Graphics, Sound, Motion (Video and Animation) Interactivity for accessing multimedia resources.

Printing with Movable types : Movable word type faces made of metal to compose text. It was Johann Gutenberg who around 1450 invented the printing with movable types.

2.8 REFERENCES AND BOOKS FOR FURTHER READING

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MLIS –02 ORGANISATION OF INFORMATION RESOURCES

Block –01 MULTIMEDIA

Unit–3: Non-Print Media :Microforms, Electronic and Optical Media

Structure

3.0 Objectives

3.1 Introduction

3.1.1 What is non-Print Media ?

3.1.2 Why non-Print media ?

3.1.3 Definitions

3.1.4 Categories of Non-print media

3.2 Microforms

3.2.1 Definition and evolution

3.2.2 Essential characteristics of microforms

3.2.3 Formats of micro-transparencies

3.2.4 Benefits of microforms in libraries

3.3 Summary

3.6 Answer to Self check Exercises

3.7 Key Words

3.8 References and Books for further reading

3.0 OBJECTIVES

Information explosion in print form is one of the main reasons for the advent of non-print media, especially the microforms. The growth of specialised documents like Reports, Patents, Thesis etc., which found limited utility unlike the books, were confined to be published in microforms for the purpose of storage and quick delivery. They acted as supplement to print media to such documents which need to be preserved, due to mutilation and occupancy of large storage spaces. The Unit deals with :

- The non-print media
- The categories of different kinds of non-print media
- The familiarity with microforms and their use in the libraries
- The introducing and familiarity with Magnetic Media
- The introducing and familiarity with Optical Media

3.1 INTRODUCTION

The non-print media alternatively called as non-book material also, could be broadly grouped as Microforms and Audio-Visual Materials for the convenience purpose of study in this Unit. There is always some variant use of these terms. For example Ranganathan termed them as non-conventional documents, which generally included the Audio-Visuals. As already mentioned the Microforms were introduced for specialised and archival materials primarily from the preservation point of view. The Micropublishing like Book Publishing also emerged as a specialist publishing activity during 1970s and 1980s. The advent of Electronic Media, and the integration of micrographics with computer science and technology, rather relegated the microforms and their importance gradually diminished. The COM and CIM techniques however continued for some time and the Special Libraries are still in possession of varieties of micro-reproductions on some specialised documents. With advent of Compact Disc and the Multimedia Concept in its newer form, also made a similar fate of the Audio-visuals as of microforms. This discussion on Non-print media is purely of academic value here, and also to highlight their important role in the Libraries. Here only some of the salient features of these

media has been deliberated, avoiding the details on their production and maintenance aspects, as the production processes are no longer practiced now.

3.1.1 What is non-print media ?

In point of fact non-print media or non-book materials are not just like books, they are distinct methods of storing information in a manner that avoids the problems of book storage. Their use need use of machines and/or equipments. They are called by different names too; such as non-book materials, non-book form, non-print media and so on. To understand and distinguish them from print media it is better to define and understand the differences.

3.1.2 Why non-print media ?

The advent of direct reproduction technology that is the convergence of printing with computer science and technology facilitated for the advent of new media. Role of different libraries handling different forms of information sources in the renewed role of libraries and information centers and the following reasons to adopt the non-print media:

- a) Radical change in dissemination of information – Advantages –knowledge absorbing; Information in Audio-visual aids has higher power of retention. Knowledge absorbed through five senses has the following proportion.

Sight 75% Hearing 13% Touch 6% Smell 3% and Taste 3%.

The Chinese saying corollary to above is: I see I remember, I Hear I forget, I Read I understand

- b) Embodiment of knowledge – Retention, handling convenience
- c) Technological impact:
- d) Socio-economic implications

3.1.2 Why study non-print media ?

Study of handling problems of non- print media

- a) Problems of handling new media by libraries – acquisition, storage, and use
- b) Problems of format
- c) Study of user needs and change of media
- d) Instability
- e) Copyright problems
- f) Cataloguing, Documentation and other processing work

3.1.3 Definitions:

There however no suitable definition is either available to encompass precisely or it is difficult to provide a suitable and acceptable definition. An old rule of linguists states that when no general definition will definitely describe a certain group of things, then they simply must be listed. Therefore the non-print media that normally include the following;

1. Photographs, film slides, transparencies,
2. Realia, mock-ups, models and specimens
3. Phono-recordings, including discs,
4. Audio tapes, cassettes and cartridges
5. Motion pictures, Video Tapes, Kinescopes
6. Portfolio, kits
7. Maps, Atlases, Globes
8. Microforms
9. Magnetic Media
10. Optical Media

The other definition of non-print media states:

“The Sources of information available in non-conventional form – i.e. non- print material. It may be audio-visual and varieties of microforms Even maps, atlases and globes etc. are sometimes included.

3.1.4 Categories of Non-print media:

There are varying opinions on inclusion of non-print media of different categories. Primarily we would include “Audio-visuals” and “ Electronic Media”. Audio-visuals include also the microforms. These are primarily useful in the context of libraries. Maps, atlases and globes which would be considered as audio-visual but are in printed form, and they are separately known as non-book material.

3.2 MICROFORMS

Paper and printed media although unrivalled, today technological strides fear the existence of printed media in future. The growth of paper media is often compared to that of population explosion. This medium thus faced a situation of dual crisis-present unwieldiness and future shortage.

The three most common medias that are prevalent and used for storing information are paper, electronic storage and microforms. The electronic storage is catching up widely and paper has not only become dearer, but becoming unmanageable day by day. This has led in 1970's for the arrival of microforms. Libraries have adopted microforms to over come their budget cuts and inflation, to avoid unlimited extension of library stacks, to maximize acquisition of relevant information with their inelastic budgets, to cut the delays in acquiring information and to achieve ease in handling and storage. Microforms were once considered modern, efficient, compact and powerful medium with their own advantages and disadvantages.

The main advantages of microforms are: (i) economy, (ii) saving in space, (iii) speedy acquisition, (iv) file integration, (v) easy mechanization and automation, (vi) low cost on-demand information dissemination and distribution, (vii) easy to archive and have security of information and protection of records, (viii) easy to store, handling and retrieve, (ix) ecological value and control of paper, pollution and cost, (x) integrity and durability of collection, (xi) easy reproduction and aesthetic quality.

The microforms came in a situation where they could provide some kind of solution to paper media explosion. It is stated “since 1930’s prophecies have warned that microform revolution will soon render books absolute”. And predictions and guesses are attributed to contain whole of Library of Congress in a small room with meager maintenance costs. The problems the Libraries faced are regarding space and the crisis of increasing paper shortage. Such critical situation was solved with the solutions provided by microforms and with them the collection development found to be more fruitful and economical. There was a strong contention to advocate only a selective collection development in microforms and not for a total replacement of print media. Their use was first made in transmitting secret messages/documents in military operations. The use of microforms was brought in library environment in or around 1930’s. An exploratory phase began since then and in 1970’s and 1980’s they were very much part and parcel of the library science and technology.

3.2.1. Definition and Evolution :

Microform is a generic term identifying visual information originally in paper form, which has been photographically reduced. Microforms are available in different formats, including microfilm, microfiche and micro-opaque materials. In other words it is a term for any medium, transparent or opaque, bearing micro-images. The process is a photographic process of making greatly reduced documents which can be read only by magnification and the process of their reproduction is called Microphotography and has been one of the main divisions of Reprography. Technologically it is generally called as micrographics.

The history of microforms is traced to Microphotography – the process of making photographs on a greatly reduced scale. The first attempt to produce micro-images through photography was made by John Benjamin Dancer in 1839. Microfilm which is one of the products of Microphotography was initially used only to save storage space and to provide security to the contents of valuable originals, now finds many more applications in science and industry, and as a working tool it has a vast and exciting future. Between 1870-71 it was used by Rene Dagron in Franco-Russian War, and the famous ‘Pigeon-post’ made the beginning of carrying messages in

microforms. In World War II the Dagron experiment was repeated and called by the name V-mail. These events resulted in a major growth of microform technology, with the need for European countries to preserve documents from destruction. In 1929 and in 1935 the microforms found application in document reproduction – the League of Nations Committee considering Microfilming for documentation and the U.S. Government for National Recovery Administration. By 1960s, micro-publishing was an established publishing industry, serving the information acquisition and storage. In its current, and most advanced form, computer output microform (COM) is produced directly from the data text generated by a computer onto film.

The main categories of microforms by their physical format are two: Roll and Flat media. However by their processes they are categorised as :

- a) Micro-transparencies; and
- b) Micro-Opaques

a) Microtransparencies read by transmitted light can be further subdivided as:

- i) Roll Film
 - ii) Unitised Microfilm and
 - iii) Sheet Microfilm or Microfiche.
- b) Micro-opaque – a sheet of opaque material bearing number of micro-images in two dimensional array are micro-cards of 3” x 5” size microcopies made on a sensitized photographic paper. Microprint – 6” x 9” microcopies made by Lithographic printing.

The paper being much cheaper than film, their use in publishing was found more economical .Several types of micro-opaques or micro texts are known, the commonest of which are Microcards and Microprint. All differ in size and in the number of images they contain. Originally, these opaque cards were produced by contact printing from 16 mm or 35 mm microfilm cut into specified lengths and positioned in a special frame. Micro-opaques suffer two serious disadvantages against conventional, transparent microforms.

1. They are not of extremely high resolution as possible in micrographics .
2. They require a considerably brighter light to view the reflected images

In the 140 years of its existence micrography has changed from a difficult and often unpredictable process to a simple, effective and repeatable technique for the storage of all types of images. The problems of high-quality microimage production have largely been solved. However, two important aspects still remain as a barrier to the much wider application of microforms, namely satisfactory reader design and simple, but rapid methods of retrieval. The technology of production and use of micro-opaques has been totally outdated and hence further discussion of the subject is attempted here.

3.2.2 Essential characteristics of Microforms:

The three R's of Reprography; *Reduction, Reproduction and Retrieval* apply to microforms also.

- a) It is a Photographic copying method: True facsimile copy of MSS, old material copied as it is.
- b) Possibility of intentional or unintentional error or tampering with original is avoided.
- c) Accuracy
- d) Process of production is cheap
- e) The purpose of reproduction : Exchange of documents, Supplement to document gaps in libraries, cost of reproduction, Single edition production etc.
- f) Light weight, less bulky, less storage space
- g) Copies are permanent, At least permanent as much as in paper and more.

3.2.3 FORMATS OF MICROTRANSPARENCIES :

a) **Roll Microfilm :**

It is the transparent (translucent) media, pages arranged sequentially. This form is available in 8, 16, 35 and 70 mm sizes. The roll runs to a length of 100 feet. The roll films are packed in reels, cartridges and cassettes. The roll films are photographed in different modes. Cine mode, comic mode, Duo mode and Duplex mode. The reduction of roll films ranges between 10x and 24x. Roll films are still a popular choice because of large quantity of information can be stored in very little space, at a very low cost. Microfilm on reels provide high measure of file integrity, are desirable when information is added continuously in sequence and updating is infrequent.

The frame sizes vary with or without perforation. Thirty-five millimeter reel microfilm has such a long history of use in library applications that some authorities consider it, for better or worse, the *de facto library* standard. The 35 mm film width affords the large image area necessary for the reproduction of newspapers, maps, charts, and other documents at low to medium reductions. The greater film width also permits the recording of deteriorating books and manuscripts at reductions as low as 9X to 12X. While it is the only microform capable of accommodating the full range of library materials, many system designers contend that 35 mm microfilm is incompatible with effective retrieval and should, consequently be avoided whenever possible. Although many libraries have invested heavily in 35mm reel microfilm collections, micrographic equipment manufacturers, with a few exceptions, have not considered the library market sufficiently lucrative to design products specifically for it. Consequently, much 35 mm display equipment is archaic in concept and difficult to use. New models are rarely introduced and seldom represent significant improvements in the state-of-the-art.

Because 16 mm reel microfilm is used in many commercial applications, a wider selection of newer reader/printer is available. For letter-size documents, the 16 mm width requires a minimum reduction of 18x. Most applications utilize a 24X reduction, which is compatible with the NMA standard for microfiche of source documents. Many industrial and technical libraries, contending that these somewhat higher reductions are compatible with acceptable image quality for typewritten or printed source documents in good condition, refuse

to buy 35 mm microfilm and, instead, maintain their journal backfiles and similar materials on 16 mm microfilm reels, cartridges, or cassettes. Commercial micropublishers have encouraged the adoption of 16 mm microfilm, since economies are possible through the simultaneous production of 16 mm microfilm and microfiche at 24X reduction. Academic libraries with substantial investments.

i) Advantages of Roll Microfilms

The microfilms are the most well-known media that remain the cheapest form of reproduction where a single copy is needed. For inter-library loan, making a microfilm and mailing it, is much less costly than the postage on the original document. The raw film is also more readily available. Voluminous publications, and sets of journals are more secure in reel microfilms, than in a number of 'microfiches' or 'microcards'. Pilferage and mutilation is thus virtually eliminated. They save about 75 to 90 percent in storage space.

ii) Disadvantages of Roll Microfilms

There are serious disadvantages with roll microfilms. To find out what the roll microfilm contains, it must be run through a microfilm reader. Threading a roll microfilm in the reading machine itself is an exasperating task. Finding a particular reference takes a long time because the roll microfilm may have to be run to and fro, to come to the particular page. Care has to be taken that during frequent running that the film is rewinded on the original spool, otherwise the end of the book will precede the title. Considerable length of the film is wasted as 'leader' and 'trailer' in a reel or roll microfilm.

The defects have been remedied to a great extent by cutting the films in short strips of 23 em. In use, these strips can be sandwiched between two glass plates and are, therefore, secure against scratches. These strips do not have leaders and trailers and are, thus, more economical. While they are convenient for short articles of a few pages, they are not convenient for a document of many pages, where more such strips would be needed, and it becomes more difficult to keep track of which strip follows which. All commercial microfilms are, therefore, made in the form of rolls, so that pages follow in order.

b) Unitised Microfilm:

It is prepared from roll microfilm and usually it is in the form of :

- i) Strips containing 10 pages each
- ii) Acetate Jacket containing a strip or strips of film
- iii) Aperture Card or Window Cards mounted on a Punched Card with an aperture for the frame. It also includes slides.

c) Aperture Cards:

Aperture cards may contain a single image, or up to eight page-size images on one 35 mm frame. The aperture cards are more common for drawings. A frame strip of 35mm film is permanently fixed on to an Aperture mode on a punched card. The punched card also bears the brief information about the contents of the strip and can be read without magnification. More than one image with related texts can also be combined into an aperture card, similar to Jacket films. These can be used for mechanical storage and retrieval as well as for handling in manual form.

Aperture cards may be produced either in a two-stage method, by cutting and mounting film produced in roll microfilm camera, 'or directly by a special aperture card camera designed specifically for the purpose. Many aperture card cameras also incorporate a processing system so that the original may be photographed, processed and the resulting aperture card delivered in one combined operation. Aperture cards are available in several sizes but the one in most common use is 82.5 m x 187.25 mm. The card itself may be key punched with data and access information and devices are available to automatically search and retrieve information stored in this way. The widest use of aperture cards is properly in the field of engineering and architectural drawings although they are suited to other types of about it. Users are generally attracted by the suitability of microfiche as a unit record for documents less than a few hundred pages in length and by the development of microfiche standards that have made possible the production of inexpensive, high-quality readers and reader/printers. Because of their microimage capacity, reel microfilm cartridges, and cassettes are often referred to as non-unitized microforms. A single reel, cartridge, or cassette may contain many, possibly unrelated documents. Microfiche, on the other hand, are generally considered a unitized microform, Unitized microforms present a unit of

information with related microimages. With their much lower microimage capacity, microfiche establish a one-to-one correspondence between unitized and non-unitized microforms. While generally valid, they must be made with caution. Roll microforms can effectively unitize large document collections, such as newspaper or periodical backfiles. On the other hand, many micropublishers offer very large document collections on microfiche.

c) Sheet Microfilm or Microfiche :

It is a form of a Unitised microfilm, sheet microfilm or flat film is large in size than microfilm which may contain number of pages. A microfiche, or “fiche”, is a sheet of transparent sheet of film containing multiple micro images in a grid pattern. It usually contains identification of information, which can be read without magnification. Available in a variety of styles, microfiche generally permit unitized data storage and updating. Microfiche’s flat pages are arranged in rows and columns contain from a few to several hundred images in different reduction ranges. A Microfiche of standard size is 105mm x 148mm (4”x6”) with various reduction ratios from 18X to 150X. Microfiche is normally in the standard size of 148 x 105 mm with 98 frames. But there are also fiche with 60 frames and as well as on the higher side of 98 pages. Microfiche have the advantage over roll microfilm of being easier to use and to handle, and to identify. They can also be used to produce a microfiche positive print with simple equipment. Microfiche have not been used for single copy reproduction to any great extent, though there does not seem to be any difficulty.

The *Ultrafiche and Superfiche* are the terms applied to microfiche produced at high or ultrahigh reduction ratios. Generally speaking the varying reduction ranges are used for distinguishing them by type. For example the Reduction Range 1:1 to 10:1 is for Microfiche, 51:1 to 89:1 is for Superfiche and the 90:1 and above is for the Ultrafiche. These are ultra high reduction microfiche. The National Micrographic Association defines “Ultra-fiche” as microfiche at reduction in excess of 90x. The reduction parameters range between 30x and 90x and are termed from medium to high rate. There are even examples of very high reduction up to 150x. The National Cash Register’s PCMI Library has microfiche with 3200 images on a 148 x 105 mm size. Ultra fiche permitting thousands of images per fiche, offered the advantage of

storing (packing) more information in less space than standard microfiche.

d) Computer-out-put Microform: (COM)

COM is the end product of a process that converts machine-readable, computer-processable digital data to human-readable textual or graphic information on microfilm or microfiche without first creating documents. This is a combination product of computer technology and microphotography. The text stored in computer media can be directly reproduced on film with the help of CRT without creating a paper copy. A simplified account of COM, avoiding the technical complexities, is given here because of its importance in library cataloguing.

Computers deliver the information stored in them either by ephemeral picture or text on a screen (visual display unit) or in permanent form usually by an 'impact printer' which may be equated to a crude form of type writer, automatically operated. COM is an alternative to the impact printer. The workings of a COM recorder are highly sophisticated, but one may think of photographing the picture on the computer's visual display unit on to microfilm, so that the computer's permanent output is microfilm, not typed paper. There are other systems of recording but output is the same. There is no need to go further into the mechanics of COM recorders, as their cost is such that a library would not buy one but would rely on the services of a COM bureau. COM not only saves dramatically on storage space, but it also conserves the use of paper which is becoming a scarce commodity and is very costly. COM is particularly useful when multiple copies of output from the computer is needed, e.g. book catalogues. Multiple part stationery for impact printers is expensive and there is a limit to the number of copies which can be produced at a time. Copies can also be indifferent in quality. But duplication of microcopy is so cheap that it is possible for a library to have a copy of its COM produced catalogue for each of its service points. The cheapness of the whole procedure is in fact such that frequent updating is feasible: a new COM film merely replaces the old, having had new material inserted by the computer, not by tedious manual filing. The recorder can manage both upper and lower case letters and the most advanced handle graphics (the line illustrations, graphs, plans, etc.). The final advantage is of less concern to the librarian using a COM service bureau, but has been claimed to be up to 30 times faster than an impact printer in operation.

COM's are available in 24x, 42x and 48x reduction. They are both in horizontal and vertical modes. The storage capacities of COM's are much higher than normal reduction of 48:1.

The COM of 148 x 105 mm contains 270 frames hence can store 270 pages. COM's are found very useful in bibliographic recording and controlling and many libraries these days are producing their library catalogues in COM. Number of libraries in United Kingdom and US are using this technology for the production of their catalogue.

I. Equipment for Copying and Use:

All machines designed so far, have in common, their reliance upon conventional optical systems for image enlargement. This places considerable constraints upon the designer, in that the resulting image size and quality is largely dependent upon the efficiency of the optical system, the focal length of the enlarging lens and the distance of the optical path of projection. With modern techniques of microcircuitry it seems that a new generation of microform readers should be possible in which the image-forming principle is based, not upon conventional optics, but upon the conversion of light into electrical impulses. These electrical impulses would be modulated by the changes in density in the microimage" and would control the darkening or lightening of corresponding areas on the special type of viewing screen. The advantages of such a technique are that the freedom from conventional optics should enable an improvement in image quality to- be obtained (it is generally conceded that the present range of top quality lenses are probably the best that can be made) and further, because the designer will no longer be restricted by. the requirement of an optical projection path, a more compact type of reader will be possible.

The equipment for copying are normally the cameras in the following classes:

- a) The Flow type or Continuous type or Rotary cameras
- b) The Flatbed Cameras.
- c) Step and Repeat cameras for the Microfiche.
- d) In addition to copying there are duplicating equipment which are used in the production of duplicate copies of the microfilms and microfiche.

The equipment for use are :

- a) Microfilm/fiche Readers and
- b) Reader Printers.

3.2.4 Benefits of Microforms in Libraries:

The advantages of microforms are many:

- a) They are a way of preserving information contained in rare documents;
- b) Microform copies are. easy to make;
- c) They are less expensive than books;
- d) Microform editions are never out of print;
- e) They are tough and durable;
- f) The temptation to mark and underline text, to add marginal notes, is not there.
- g) Space : Microforms save as much as 90% of the space occupied by paper media.
- h) Maintenance : Maintaining back volumes is cheaper in microforms
- i) Cost of Binding would be nil.
- j) Durability and Mutilation : Mutilation and wearing out of often used volumes is eliminated by preserving them in microforms
- j) Accessibility : Finding volumes and issues is easier as one has to deal with a set of microfiche pertaining to whole collection
- k) Cost-benefit analysis of microforms can be worked out shows much savings in the microform collection development.

The possible disadvantages of microforms are as follows:

1. Although microforms save space, a certain amount of space must be allocated, for the equipment to 'read them;
2. Users dislike using microforms because they are un-browsable, and they cannot high light or make notes in _he margins. Prints can be of poor quality if the equipment

is not maintained properly, Or if the microform is of poor quality;

3. Microforms require machine or device to enlarge them to readable size;

The last two decades of the last century saw some new physical media for recording information, in addition to paper and print media, other media have been employed in recorded knowledge. They include microforms, audio, visual and audio-visuals, and now optical or digital media. They can also be termed as Non-print or Non-book materials.

3.3 SUMMARY

In this Unit different forms of Non-print media specially the microforms are described. Microforms include : Micro-transparencies; Roll Microform and Flat Microform and then the Micro-Opaque that include microcard and microprint. The latter are no longer in use. Various types of microforms, roll, aperture card, strips, slides and the microfiche are all described in this Unit. A brief idea on equipments used for the production and use of various categories of microforms is also given.

Self Check Exercise

- 1) Write a short note on microforms
- 2) State at least three modern physical media of information.

Note: i) Write your answers in the space given below.

ii) Check your answers with the answers given at the end of this Unit.

3.4 ANSWERS TO SELF-CHECK EXERCISES:

1. The microforms provided some kind of solution to print explosion. Microform is a generic term identifying visual information originally in paper form, which has been photographically reduced. In other words it is a term for any medium, transparent or opaque, bearing micro-images. it is a photographic process of making greatly reduced documents which can be read only by magnification and the process of their reproduction is called Microphotography. It has

been one of the main divisions of Reprography. There are basically two categories of microforms: Micro-opaque and micro-transparencies.

Their main advantages are: (i) economy (ii) saving in space (iii) speedy acquisition (iv) file integration (v) easy mechanization and automation (vi) low cost on-demand information dissemination and distribution (vii) easy to archive (viii) easy to store, handling and retrieve (ix) ecological value and control of paper, pollution and cost, (x) integrity and durability of collection (xi) easy reproduction and aesthetic quality.

2. The categories of non-print media include; Micrographic Media, Electronic Media and the Optical Media. The Micrographic Media includes; Microforms, the Magnetic Media; Magnetic tape, Magnetic Disk and Magnetic Drum. The Optical Media: Compact Disk with variety of read, read and write and re-writable media and emerging Magneto-optical media. The latest ones are the Digital Versatile Media which are popularly called DVD.

3.5 KEYWORDS

COM (Computer Output Microfilm) : A microfilm produced directly from computer data without the intervention of hard copy or photographic process.

Microforms : A generic term identifying visual form originally in paper form, reproduced photographically in a highly reduced form. It consists of Roll Films, Aperture Cards, Filmstrips, Microfiche, Microcard and Microprint.

Compact Disc(CD): Compact Disc, a digital medium formed of a 12cm **polycarbonate substrate**, a **reflective metalized layer**, and a protective lacquer coating. The physical format of CDs is described by the ISO9660 industry standard.

CD-A : CD-Audio. The music CD's play music with Windows' Media Player, although typically you would use the software that comes with the CD-

ROM Drive.

CD-I : CD- Interactive, originally developed by Phillips and defined in the green book, is a special way of storing information on a CD, which provides much more efficient support for interactive multimedia applications

CD-R Compact Disc-Recordable. This term is used to describe the technology of recordable CD as well as the equipment, software and media used to make recordable discs. **CD-Recordable** discs also have an organic dye data layer between the substrate and the metal reflective layer.

CD-ROM : Optical storage media, as typified by the CD-ROM is a much increased storage media required for multimedia applications. The CD-ROM is rather like a traditional long playing record, but different in tracks, which in CD are read at constant linear velocity. A typical CD-ROM can store up to 650MB data, which corresponds to 250,000 pages of A4 text, 7000 full screen images, 72 min of full bandwidth animation or full screen video, or 19 hours of audio.

CD-RW : A CD - Rewritable (CD - RW) is computer data storage media that works just like a standard CD except that you can write to it over a thousand times. These CDs are made from new virgin material, all the packaging is recycled - the jewel cases are made from recycled plastic and the info sheet is made from recycled paper. These CDs are environmentally more friendly because they hold a large amount of information and because they are reusable.

3.6 REFERENCES AND BOOKS FOR FURTHER READING:

1. Fothergill, R. and Butchart, I.(1978) Non-book materials in Libraries :A practical guide. London, Clive Bingley.

2. IGNOU Course Material (July 2001): Information sources, systems and programmes. MLIS-02. Block 1: Multimedia.

3. Teague, S John (1985). Microform, video and electronic media librarianship. London, Butterworths.

UNIT – 4

ELECTRONIC MEDIA

- 4.1 Introduction
- 4.2 Magnetic Media
- 4.3 Optical Media
- 4.4 Rewritable Magneto-Optical Disks
- 4.5 Digital Versatile Disk (DVD)
- 4.6 Summary**

4.1 INTRODUCTION

We now consider another class of media, viz. electronic media for the storage, distribution, and transmission of information. The term electronic media includes magnetic, optical, digital and magneto-optical media. This Unit focuses on Sources of information on Electronic media, which has been growing worldwide accruing advantages from electronic publishing. In this Unit, however, we consider magnetic media first, followed by optical and digital media. Also, we will be concerned with media that is normally used with a computer system or in association with a telecommunication system but not with media that are an integral part *of* the Central Processing Unit (CPU) of a computer system, e.g. Core Memories, Random Access Memories, Read-Only Memories, Bubble Memories.

The electronic media (confined to physical media) has changed the concept of a library's role in society. With all the electronic developments continually taking place, in the near future a large component of the physical media of information will be on electronic media especially on

magnetic and digital media. This information is stored in computer storage discs and these disks provide very fast, high capacity direct access to information to the user.

An important characteristic of the information scene today is that large amounts of text, images, and numeric data are now created and distributed in electronic form.

Sometimes the electronic form is produced in parallel with a conventional print-on-paper version, sometimes it is an intermediate stage in the production of print, and sometimes it is the only form in which the information exists. Information in electronic form is of great interest, as it is machine readable, and is searchable by computer software. Editing, sorting, updating data in electronic form can be done fast. Besides these, information in electronic form can be transmitted quickly and reliably to remote locations.

In the following sections, the different types of electronic media in use are discussed, and their advantages, disadvantages and applications are described.

The term electronic media consists of Magnetic media, Optical and Magneto-optical media. The electronic media is considered for storage, distribution and transmission of information electronically stored. The corollary to electronic media today is the digital media. The developments in computer and communication technology has been responsible for the prolific growth of electronic media in recent years. A large volume of text, images, sound and numeric data are now created and distributed in electronic form. The advantage of electronic form is that it is machine stored and can be searched and retrieved by computer instantly, faster than the print media, and it can be transmitted instantly across remote locations. The access through network has added advantage of Electronic Media. Today a wide range of sources of information- primary and secondary periodicals, Reference Books, Patents and Reports, standards and specifications, theses and many more specialized documents are available in electronic or digital form. The advent of Compact (Laser) Disk has still accelerated the growth of sources information in electronic media, and that are now considered as Optical media and extending from Compact Disc(CD) to Digital Versatile Disc (DVD) and the forthcoming Blu-ray Disk (BD). The categories of electronic media discussed in this Unit are; Magnetic Media, Optical Media and Digital Media.

4.2 Magnetic Media

The Magnetic Media in Computer is termed as Secondary Storage or External Storage. The primary or main memory storage being the part of the Central Processing Unit, which is not described here. Secondary storage has great capacity but is slower and less expensive. But for the Bulk storage in computers its role is indispensable. The Internet back up information is largely in magnetic media, and it is being one of the main reasons that most astonishing developments have happened in this Media.

Magnetic media consists of :

- a) Magnetic Tape
- b) Magnetic Drum and
- c) Magnetic Disc

a) Magnetic Tape:

Magnetic tape was introduced as a data storage medium in 1950s when it was employed as an auxiliary or secondary storage medium for the Mainframe computers and later in Mini computers. For about the next decade, almost all digital computers used magnetic tape for secondary storage. But, by the mid-1960s magnetic drum and magnetic disk devices arrived to augment the tape units in mainframe systems designed for scientific and business data processing applications. The main use of magnetic tape was for archives and bulk information transfer from one machine to another.

Data on the magnetic tape are stored as tiny invisible magnetized spots on an iron-oxide

thin film material coated on one side of a plastic tape. The stored data can be read many times. The data can be preserved for years or until erased by the recording of new data. Magnetic tapes have a high storage density (ranging 800 bytes or characters per inch (BPI) to over 6,000 BPI). Thus, it is possible to store over 100 million characters on a single 10.5 inch reel of tape. The cost per bit stored was obviously very small.

- Unlimited length of records: Any number of characters can be placed in a magnetic tape record. Sequentially organised files can be as long as necessary.
- High data density: A typical of 10-1/2 inch reel of magnetic tape *of* 2,400 feet long and is able to hold 800, 1600 *or* 6250 characters per inch. (The actual number of characters per inch depends on the tape drive used). Thus, if 6250 characters are held in each inch of tape, and if the tape is 28,800 inch long, then the maximum capacity *of* the tape is 180 million characters.
- Low cost and ease of handling. A 10-112 inch reel *of* tape costs less than \$20. Additional cost benefit is that tape can be erased and reused many times. The tape would be easy to carry due to its compact size and light weight.
- Rapid transfer rate: Compared to Punched cards or Punched Paper tape the magnetic tape had many advantages. Some of the limitations of Magnetic Tape are; Lack of direct access to records : magnetic tape is a medium which is ideally suited to batch processing applications which must read all the data on the tape for it to be processed. It is used for the entire tape to be read and processed to update the sequentially organized records in the file. If frequent access to file records is needed on a rapid and random basis, then magnetic tape is not the best medium.

Although in theory, magnetic tape has high storage density, in practice, physical records on magnetic tape need to be separated from each other by inter-record gaps. Such gaps can occupy a large portion of the tape, reducing the effective capacity of the tape. It is usual, therefore, in using magnetic tapes to make locks of several logical records to enable better utilization of tape space. Each block gets separated from the adjoining one by the inter block gap. However, the use of the information on the tape requires that the records are de-locked before they are processed. Environmental problems: Specks of dust and uncontrolled humidity or

temperature levels can cause tape-reading errors. Tapes and reel containers must be carefully labeled and controlled so that an important file is not erased by mistake.

b) Magnetic Tape Applications :

As already pointed out though magnetic tapes have gone out of use today, but were the main physical storage media for archival storage and safekeeping of data. Most computer centres used magnetic tape to periodically back-up data in files that are stored on hard or removable disks. Magnetic tapes are used as a medium for the distribution of bibliographic databases and updates to such databases. Similarly, library networks and utilities in the West use magnetic tape to distribute catalogue records to member libraries and such records are used in the member library to update their on-line catalogues. Magnetic tapes are often used as intermediary media only.

c) Magnetic Disc :

Magnetic disc technology was almost simultaneously was introduced with magnetic tape as a secondary data storage media in 1960s. A magnetic disk is a flat, circular, metal or plastic plate coated on both sides with iron oxide, or other readily magnetizable material. Input signals. . These represent data, and are recorded on the surface of the disk as magnetic patterns in circular tracks divided into units called sectors, by a recording head, while the disk is rotated by a drive unit. The heads, which are also used to read the magnetic impressions on the disk, can be positioned anywhere on the disk with great precision. A collection of disks (often 11 in number), called a disk pack, mounted vertically on the spindle, which is equipped with multiple reading/writing heads.

d) Floppy Disk

Small, flexible plastic disks, were developed in the 1970s. Floppy disks derive their name from the recording media itself, which is an oxide-coated flexible disk enclosed within a protective plastic envelope. The read/write head mounted on a carriage that moves on the read/write area in the floppy disk.

Magnetic disk, has replaced the magnetic tape. It is also in the beginning was used as a secondary storage in computers, until the storage density, and the comparative cost per bit stored came down considerably. Today magnetic discs in two formats – Hard and Floppy Disc are major storage and distribution media, especially on the Internet.

e) Magnetic Drum

A rotating cylinder coated with ferromagnetic material. Binary digits are stored on its surface in the form of locally magnetized sub-regions.

However once again magnetic discs were used for storage and transmission of information electronically rather than a physical distribution. Mostly the magnetic media is used for the archival storage and in many cases as supplement to print media viz. for Books and Periodicals. For example, the Floppy Disk is being used as supplement to print media just to store a voluminous data and/or sometimes programs and so on.

4.3 OPTICAL MEDIA

The “Compact Disc” is a household word, worldwide. Even in India, it has become well known. But ‘Compact Disc” or CD-Audio known generally, is the only one member of the family of Optical Storage media, which includes various important and diverse devices. Optical media, besides having revolutionized musical storage has a very significant impact on data storage, for Libraries, Government, Industry and Business Organisations throughout the world.

The two directional changes in IT from Micro-electronics to Opto-electronics provided necessary facilities for creating mass storage devices like the Optical storage systems. In this context compact disc read only memory or popularly known as CD-ROM is one of the most popular of the optical storage media and is being used as a mass storage device, primarily

in Libraries. Made of Al/Plastic base 4.72" diameter CD-ROM holds around 680-1000 MB of data.

Started as an archival storage device now being used as a media for computerised reference and full-text databases, dictionaries, encyclopaedias, directories and the primary journals. Some of the most outstanding and apparently distinct advantages of optical storage device over magnetic storage device have made the computer storage media more attractive and popular in recent years. Today compact disc is household name in the world of computers and communication systems. Optical storage or optical memory technology has revolutionised not only music storage systems, but has also made impact on data storage for Libraries, government, industry and business organisations throughout the world.

CD-ROM drives read the information contained on the disk by focusing low-powered laser beams on the microscopic pits. An optical unit measures the pit's reflectivity back into a binary signal that can be read by a computer. In order to set up a CD-ROM workstation the following system components are required:

CD-ROM can be used with virtually any size of computer as well as with stand alone or dedicated systems. It offers the opportunity to develop new applications software as well as the distribution of many computer-based versions of the same computer software programs. "A single CD-ROM disk can be used to distribute a family of software applications with fully interactive tutorial and menu-driven functions, also, multimode programs that combine high-fidelity audio and graphics.

Other information distribution applications that may use CD-ROM, include on-demand research reports, and product information. In addition, computer databases, archives, indexes, and directories can be distributed on CD-ROM. Any large variety of fields are now using CD-ROM for the distribution of scientific, medical, legal, financial and statistical information. It can also be used as a library database with archival content. All of these information distribution applications are finding a niche in professional and commercial environments and may eventually find their way into homes. It is ideal, for the storage of images (of text, graphics or a combination); Images are notoriously data intensive. Until the development of affordable

optical storage devices such

a) Optical Video Disk System

These were pioneered by Philips with their Laser vision system but Sony, 3M and others are now active. In optical videodisk systems the recorded signal is read by a low-power laser in the videodisk player. A photo-diode collects light reflected by the videodisk and reconstitutes the recorded signal from the variation in light intensity as the laser strikes pits in the surface of the videodisk. Production again involves the creation of the master user, a laser beam, sub-mastering and stamping. The final videodisks are then, coated with a reflective aluminum surface and a transparent protective layer. Two single sided disks are laminated together to make the final double-sided product.

b) Audio Compact Disk

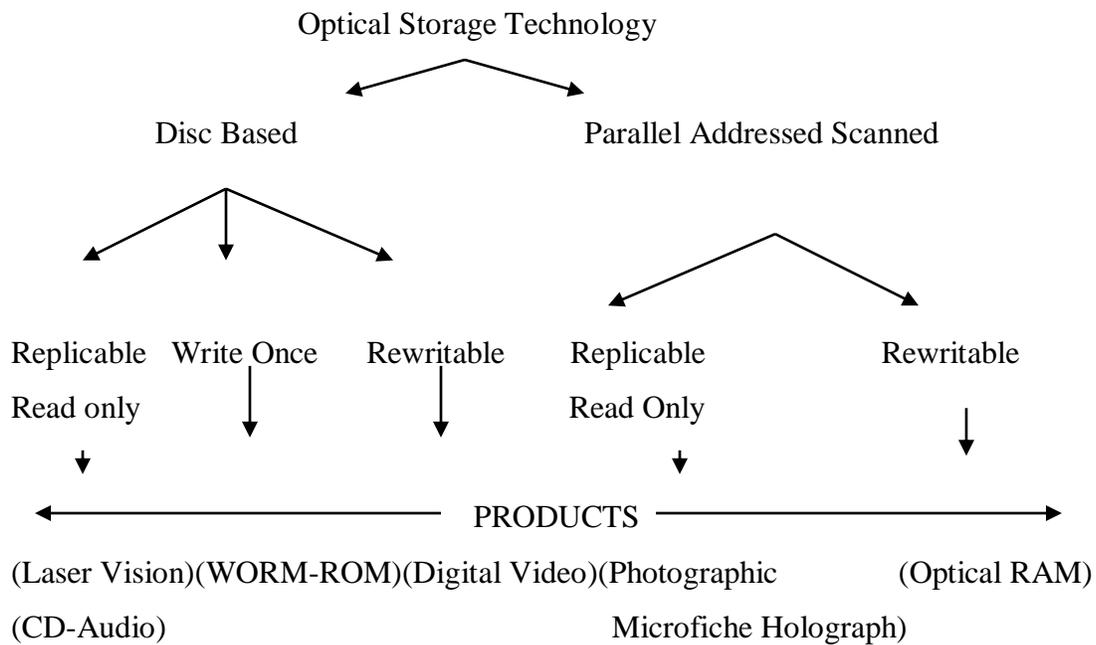
Designed as a high quality alternative to records and cassettes, compact disks are all made to a standard specification (12 cm) developed by Philips. The audio information is digitally recorded (by converting the amplitude of the sampling frequency of 440000 per second) before production of a master and copies in much the same way as for videodisks. Playback involves a reflective laser system and a digital-to-analogue conversion step. A sophisticated error correction and detection system developed by Philips and Sony ensures the accuracy of the recorded signal and the information stored on a typical 60 minute, 12-cm, disk amounts to 5-gigabits.

c) CD-ROM (Compact Disk-Read Only Memory)

CD-ROM represents an exciting breakthrough in information storage technology. It is a new publishing medium, the centre of a new genre computer applications, and an educational tool of unprecedented power. CD-ROM is the first practical

2. 5 1/4 " is the most popular at present for computer storage
3. 4 3/4" compact disc audio and compact disc read only memory (CD-ROM)
4. 3 1/2" Erasable magneto-optical type(Three and half Magneto- optical TMO)

ii) By recording technology or by the data recording format.



c) Two types of data recording formats:

1. Constant Angular Velocity or CAV
2. Constant Linear Velocity or CLV

CAV disk rotates at a fixed speed and data is also written at fixed rate and spacing between signal elements increases as the track radius increases (MCAV).

CLV - Avoids the limitations of CAV. The rotation speed varies according to radius and signal spacing same as per every track (MCLV).

Examples of Compact Discs:

1. Read-Only:

Entertainment and computer storage. (Laser Disc(Video)).

CD-AUDIO, CD-I, CD-ROM used in Electronic publishing, data storage.

2. Re-writable- Erasable:

Erased and replaced by fresh data. Dye-polymer and electron affinity.

3. Write One and Read Many:

WORM or DRAW (Direct Read After Write) computer data storage, Archival and Backup storage, Handwritten macros, signatures, drawings with 100000 to 1 million images of data can be stored on a single disc/juke box.

Some of the commercially available types:

I. Read only type optical memory systems.

- i) Laser Video Disc
- ii) CD-AUDIO a music CD. It plays music with Windows' Media Player, with the software that comes with the CD-ROM Drive.
- iii) CD-I :Compact Disc Interactive, developed by Philips/Sony, includes audio, full-screen video and interactive capabilities.
- iv) CD-R : Recordable Used for backup and archive, catalogs and other large documents and multimedia.

v) CD-ROM – Compact Disc Read-Only Memory. From single session, single-speed units. Compact Disk - Read Only Memory (CD-ROM) is an electronic form for storing print information on a small laser disk. CD-ROM requires the interfacing of a CD-ROM player and a micro-computer. They generally contain entire database and by using key words or descriptors, data can be quickly located, thus saving many hours of tedious searching through indexes for any particular information.

CD-ROM disks have silvered surfaces, which are 1.2 mm thick and 12 cm in diameter. Their benefits are plenty - libraries can have economic access to information, a large quantity of information is stored on a small disk, (a single CD-ROM disk can hold 200,000 pages of printed text), it is easy for the user to use and search. The operation that previously took days to perform can now be done in minutes.

vi) Write Once Read Many (WORM) CD's Used for archiving/backing up storage of catalogs, directories and other computerized data. Write Once Read Many (WORM) These are very high capacity discs where users can input original data in order to create their own CD discs. Unlike magnetic discs, write once discs cannot be erased and rewritten in whole or in part. Users continue to record sections of data onto the disc over a period of months or even years, until the disc is full. But it is not possible to over-write data onto an already written section or to erase anything once recorded. That is why they are called WORMs for "write once read many". Another type of write once disc is called DRAW for "direct read after write". This allows the data in a block to be checked for accuracy as they are being written. In practice the WORM systems are costly but ideal for specific, major corporate applications as storage media impacts, In other words, we can describe multimedia as the seamless integration of data, text, images and sound within a single digital information environment.

Write-Once Read-Many (WORM) and erasable (rewritable) disks', image systems were limited to mainframes. Today, image systems can be handled in a PC environment. WORM drives appear to be a good solution to the image storage dilemma. . Generally WORM optical discs are best for high access or quick retrieval applications.

Archival storage on WORM optical disks is the most cost-effective alternative for a growing number of information management environments. Film-based storage remains the alternative of choice for high volume, low-retrieval applications, where records are permanently stored. However, in situations where access to stored- products is frequent, where quick retrieval is necessary. or where records can be purged after several years, WORM often provides the most efficient solution at the lowest cost. In addition to fast retrieval, WORM disks provide fast turnaround, increased security over magnetic tape storage.. and enormous space efficiencies over both tape and paper..

vii) CD-RW: CD-ReWritable An erasable CD-ROM called CD-RW or CD-Re Writable. This new technology has a erasable CDs, a flexible new storage solution for mass storage, holding 500 times more data than a typical floppy. They appeared in 1997 and are being used in the current CD Drives. CD-RW technology is different from the technology of CD-Recordable (CD-R), which can be recorded on only once.

4.4 Re-writable Magneto-Optical. Disks

The ability to read; write and erase at will has been realized in re-writable magneto-optic disks The ever increasing memory capacity of computers has made it imperative' for storage media to keep pace. Emerging magneto-optic technology has opened up exciting possibilities in this sphere sometimes called removable "Winchester" devices and can be used for on-line as well. as off-line, back-up .and data-distribution applications. Since the coercive force to flip a bit is very high at room temperature, there is very little chance of erasing data accidentally.

Magneto-optic technology combines the erasability of conventional magnetic storage devices with ultrahigh capacity, non-contact, no head crash and removability features associated with optical storage devices. In magneto-optic devices a laser beam is used to read, write and erase magnetic information. The write/erase mechanism of magneto-optic (M-O) system is based on a thermo-magnetic. process whereas reading data is based on the magneto-optic phenomenon called Kerr effect.' CD-ROM has advantages over magnetic storage. It

provides high capacity at a comparatively low cost. The capacity is usually regarded as sufficient to enable search software to be included on the disk. The disks can be mechanically reproduced on a large scale. It avoids the cost of going online to a remote database. In a library environment eliminating printed subscriptions which have become available on compact disks, is a possibility. As CD-ROM is still basically single user/single workstation, there would be no alternative for use of data if all workstations are busy. Until networking becomes more established and less expensive, the printed version maybe too important to cancel. The CD-ROM's digital format, with powerful error correction, is well suited to computer applications. With optical-read-out, the high density information on the disk is protected from wear and deterioration; it is highly "resistant to damage, and there is no risk of disk crashes like here is With magnetic media. There are some disadvantages too. As the name implies, the duplicated disks are read only; data cannot be Written on them. The information on the disks cannot be as current as it is possible to be with an online retrieval system using magnetic storage. Access. time as compared with hard magnetic disks is slow. The systems are single-user: the database(s) on a disk play be accessed by only one user. Although the capacity is large, it is not really large enough for the largest databases, such as MEDLINE. As a result, searching a large efforts to formulate standards for erasable magneto-optic disks have been undertaken at the international level by ISO/IEC Joint Technical Committee (JTC)1. Once a well established standard is followed there will be widespread usage of this medium in the coming years. database involves the user-friendliness of CD-ROM based systems. Cost is still a major factor for libraries in deciding whether to take the plunge with CD-ROM. Unlike storing journals or books, a large initial investment is required to purchase hardware, furniture, electrical connections, and. software to set up workstations.

A major advantage of magneto-optic disk is its removability. Due to 'the non-contact method of recording and the presence of a 1-2 mm transparent cover over the information surface layer, erasable magneto-optic disks. are unaffected by dust, wear and tear and other tribology problems that plague conventional magnetic media.

e) Major Common CD-ROM Features .

Minimum data transfer rate from the CD-ROM drive to the host computer of 153
1 . kilobytes per second with a nominal data transfer rate of 176 kilobytes per second.

The rotating speed of CD-ROM disk is anywhere between 200 rpm at the disk's outer rim and 530 rpm at the disk's inner track. Access time varies anywhere from about one-half second to 2 seconds. The total number of blocks on each disk is 270K and each block size is 2K bytes (2048 bytes to play both CD-ROM and digital audio compact disks).

The Application of CD-ROM Technology

- CD-ROM electronic publishing applications are actually information distribution, applications in which information has any one of the following characteristics :
- Static/archival quality."
- Need for only periodic updating.
- Economic distribution of large amounts of data.
- Local availability of information.
- Each disk follows the Philips/Sony World Standard format. basically all

The potentiality of the CD-ROM lies in its compactness (12 cm & .2 mm thickness), portability, reduced shelf space, maintenance cost and durability. The exciting features of CD-ROM are its ability to handle and play a wide variety of material viz. Books, Periodicals, directories, education materials, games, music, movies, communication mode data types include animation graphics, software, sound, text, video and capacity to hold up to 660 MB of information, which is equivalent to 440 1.44 MB Floppy discs, 18 hrs of sound and up to 700 million characteristics of text and up to 74 minutes of movies or the video. CD-ROM's, are non-interactive discs used in computer and some TV based players. Data recording: recording of data on CD's is in the form of 'Pits and Lands.

Data type handled and other measures:

- * TEXT : Up to 680 Million Characters i.e. 680 MB
380 times of DS/DD FD, 330,000 Typed Pages
- * VIDEO : Up to 100 minutes of movies or video

* SOUND : Up to 18-20 hours of everything from beep to professional music

* GRAPHICS: Thousands of charts and computer renderings, static virtual elements

* ANIMATION: Graphics with movements

Advantages and Disadvantages

Advantages

1. High storage capacity - Over 650 MB in a disc of 4.75" dia.
2. Low cost portability
3. Can be used like a floppy disc with a drive
4. Stored data cannot be erased; over written, no chance of head crash, wear & tear.

Disadvantages:

1. Read only device
2. Medium is slow
3. Slow performance
4. System are now single user
5. Cost is still a major factor for libraries because of capital investment

Application of CD in Libraries:

From technology fusion to media fusion - Multimedia Libraries long ago embraced CDROM as a cost effective means to serve a wide range of information needs. Many libraries are now providing online data retrieval using CD-ROM Databases. Multimedia - It is one of the enabling technologies of Hypermedia/hyper text. The enabling technologies are:

- a) TV Style displays
- b) Computer graphics
- c) Video Graphics
- d) Video disc
- e) Audio-compact disc
- f) Laser-read digital optical discs

i) Examples of CD-ROM Products:

- i) DIALOG On-Disc - Discovering selections from Multiple
- ii) Silver Platter Medline
- iii) ADONIS - Full text biomedical journals
- iv) LISA : Library and Information Science Abstracts
- v) PsychLit
- vi) Kirk-Othmer Encyclopedia of Chemical Technology
- vii) Grolier's Encyclopedia
- viii) Oxford English Dictionary
- ix) CHCD Dictionary of Organic/Inorganic Compounds

Standards for Compatibility

Established in 1980, the Philips/Sony World Standard reflects the interdependence of CD-ROM hardware (drive, interfaces, and .the disk itself) and software. It ensures physical

conformity of the CD-ROM disk, and suggests standard data encoding and decoding convention, as error-correction schemes. the encoding of specific operation data on the CD-ROM disk.

A crisp colour picture and 10 seconds of narration for each of 3000 segments of an educational or reference programme (almost 8 hours of content)The text content of 150,000 printed pages (enough to fill 250 big books)Sharp images of 15,000 pages of business documents (enough to fill two tall filing cabinet)The contents of 1200 standard 5.25 inch floppy disks

.A crisp colour picture and 10 seconds of narration for each of 3000 segments of an educational or reference programme (almost 8 hours of content) Yet because of . standard does ensure a basic compatibility between CD-ROM drives, it .'provides for the eventual interchangeability of CD-ROM disks if driver software and applications software can be standardized.

4.5 Digital Versatile Disc

DVD, which was initially known as Digital Video Disc has been the Digital Versatile Disc, is a high capacity CD-size disc for video, multimedia, games and audio applications. Capacities for the read-only disc range from 4.7GB to 17.1GB on a 12cm disc with a throughput equivalent to 12-speed CD-ROM drive.

DVD adopts a “one-size fits all” types of a philosophy allowing storage of home entertainment, computer and business information with a single digital format. The high quality of video and audio has helped DVD-Video to replace VHS for pre-recorded titles and to increase the overall video market in most regions. The general term DVD actually subsumes two types : DVD Video and DVD-ROM

a) DVD Formats and Media:

DVD disc vary in capacity, application, and storage format. It is important to know the formats and media. There are : a) Physical Formats b) Formats for DVD Applications and c) Formats for Data storage.

i) Physical Formats :

Physical formats are based on the physical characteristics of DVD discs. The following four types of physical DVD disc formats are available.

DVD-5 : Is a single sided, single-layered DVD with 4.7 GB storage capability.

DVD-9 : It is also single sided but dual-layered with 8.5GB storage capability.

DVD-10: Is double sided, single layered with 9.4 GB storage capability.

DVD-18: Is double sided, double layered with 17 GB storage capability.

ii) Application Formats:

The physical formats describe the media on which the data is stored, and application formats describe what kind of data- software, video or music, is stored and how. These include:

DVD-Audio: Provides higher quality audio storage than what is available for CDs.

DVD-Video: It has capability to produce near-studio-quality video using high-quality MPEG-2 Video compression.

Data DVDs : A DVD disc can also be used for storing ordinary data from a computer, such as printed documents.

iii) Writable Formats or Formats for Data Storage:

The physical application formats as listed above, tell the physical characteristics of a disc and the type of data stored on it. The writable formats define the different ways data is written to and read from the DVD disc, be it audio, video or computer data. There are several formats in this category.

- **DVD-ROM** :These are similar to CD-ROM discs, but the storage capacity is much greater than CD-ROM. DVD-ROM can be read in DVD Video players and computer DVD drives.
- **DVD-RAM**: DVD-RAM discs are like virtual hard disc with random read-write access. The discs are re-writable discs for more than 100,000 times. Their capacity ranges from 2.6 GB to 9.4 GB per side for computer data storage and archive applications, although this

format is also used in some DVD video recorders. They can only be used in DVD-RAM drives not in DVD-Video Players or Drives.

- **DVD-R** : These are similar to DVD-ROM, but discs are write-once discs with a capacity of 4.7GB per side and 9.4 GB both sides. Two versions have been defined: DVD-R for Authoring and DVD-R for General use. They can be read in DVD players and drives on computers. Note that copy protected content cannot be written to DVD-R discs.
- **DVD-RW** : Developed by Pioneer, are re-writable version of the write-once DVD-R format and can be written up to 1000 times. The discs with a capacity of 4.7GB per side for consumer applications such as video recording. They are readable in most modern DVD players and drives, but may not be compatible with many older players and drives.
- **DVD+RW** and **DVD+R** : These discs are not officially part of the DVD family, but are similar to the corresponding DVD-RW and DVD-R for General formats. They are different re-writable version of DVD-R format and fully compatible with all DVD players and drives. The DVD+RW can be written up to 1000 times and suitable for both real time video recording and random data recording. Whereas DVD+R can be written to only once. They can store 4.7GB and are the best format available and may soon replace all other formats.

To write to a certain format DVD disc, you need to have a compatible DVD Writer /Recorder. This means that to write to a DVD+RW disc you need a DVD+RW recorder only, a DVD-RW or DVD-R or DVD+R recorder won't do. It may let you read DVD+RW discs but will not allow you to write to them. Prices of course vary depending upon the number of formats supported by a recorder. Both recorders and discs for these formats are now available and include PC drives, video recorders and camcorders. More hardware will be available soon and prices are expected to continue to fall. Compatibility is an issue as not all formats will play on existing DVD players and DVD-ROM drives. DVD has been available since 1997 and already new formats with yet more capacity are being developed and are due to become available by about 2006.

c) DVD Applications

Despite the success of the compact disc there has been a clear need for a higher capacity format to meet additional application requirements.

- **DVD-Video**, which was launched in 1997 in the USA, has become the most successful of all the DVD formats, as it has proved to be an ideal vehicle for distributing video content from the movie industry. It can store a full-length movie of high quality video with surround sound audio on a disc the same size as a CD.
- **DVD-ROM** is beginning to replace the CD-ROM and provide a new high capacity disc format for the computer industry. New PCs are now provided with DVD drives instead of CD drives. The entertainment industry has developed new games consoles (e.g. Sony's PS2 and Microsoft's X-Box) which incorporate DVD-ROM drives for more sophisticated and realistic games applications.
- **DVD-Audio**, which was launched in 2000, is slowly gathering momentum to become the format for very high quality, surround sound music, offering the music industry new revenue opportunities.
- Recordable formats such as DVD-RAM, DVD-RW and DVD-R are now being extensively used in PCs for computer backup and short runs of DVDs and in standalone products such as video recorders and camcorders.

d) DVD Features

DVD as mentioned earlier started as the Digital Video Disc but now means Digital Versatile Disc or just DVD. It is a multi-application family of optical disc formats for read-only, recordable and re-writable applications. The main features of the DVD formats are:

- Backwards compatibility with current CD media. All DVD hardware will play audio CDs and CD-ROMs (although not all hardware play CD-Rs or CD-RWs)..

- Physical dimensions identical to compact disc but using two 0.6 mm thick substrates, bonded together.
- Single-layer/dual-layer and single/double sided options.
- Up to 4.7 GB read-only capacity per layer, 8.5 GB per side maximum.
- Designed from the outset for video, audio and multimedia, not just audio.
- All formats use a common file system (UDF).
- Digital and analog copy protection for DVD-Video and DVD-Audio built into standard.
- Recordable and re-writable versions are part of the family.

e) **DVD-Video Requirements**

The Hollywood based Motion Picture Studio Advisory Committee defined the following requirements for the DVD-Video format:

- 135 minutes on one side of a single disc (covering 99% of all movies).
- Video resolution better than Laserdisc (LD).
- CD quality surround sound for true home cinema listening.
- 3 to 5 languages (audio) per title on one disc
- 4 to 6 subtitles per title on one disc
- Pan-scan, letterbox and widescreen formats
- Parental lock features
- Copy protection
- Compatibility with existing CDs
- Chapter division and access (like Video CD)
- Manufacturing cost similar to current CD costs.

The **Video CD** format was studied, but was rejected as it could not offer the necessary combination of quality and playing time, hence the need for a new higher capacity disc format that has been realised in DVD. The above requirements have all been met in the DVD-Video specification.

f) DVD-Video Features

The DVD-Video specification provides the following features:

- 133 minutes of high quality MPEG-2 encoded video with multi-channel surround sound audio.
- The choice of wide-screen, letter box and pan & scan video formats.
- Audio in up to 8 languages
- Subtitles for a further 32 languages
- Menus and program chains for user interactivity
- Up to 9 camera angles to give the user more choice
- Digital and analogue copy protection
- Parental control for protection of children

Most DVD-Videos also include extras that cannot be included on a VHS, such as biographies, director's commentary, making of the movie etc. An increasing number include DVD-ROM content, which can range from links to relevant websites to a full game based on the movie. The use of websites can allow the disc to be used in different ways with updated text and graphics information on the website complementing the video on the disc.

The DVD-Video specification is based on a pre-recorded DVD (DVD-ROM) with **UDF Bridge** file system. A DVD-Video can therefore be a DVD-5, DVD-10 or DVD-9 disc depending on the playing time required and other factors.

g) DVD-Audio Features

Though DVD-Video can provide audio, video, stills and navigation DVD-Audio format is needed. However, while DVD-Video offers multi-channel LPCM audio, the available bit rate is only 6.144 Mb/s compared with DVD-Audio's 9.6Mb/s, which is further enhanced by MLP to offer the maximum sampling rate and quantisation with maximum playing time. DVD-Audio is also designed to play in audio-only players (such as in-car players) and offers slideshows and text that are optimised for audio. Finally DVD-Audio offers CPPM, which is much stronger than CSS for DVD-Video.

Beyond DVD:

a) Blu-ray

The Blu-ray format is being developed by the Blu-ray founders group comprising the following companies: Hitachi, LG, Matsushita, Pioneer, Philips, Samsung, Sharp, Sony, and Thomson. Mitsubishi joined the group in 2003 and Dell and HP have recently announced their support.

Blu-ray discs offer a capacity of up to 27 GB per layer. This is achieved by the use of a blue laser at 405 nm wavelength, an increase in numerical aperture to 0.85 and a reduction in the cover layer from 0.6 mm for DVD to 0.1 mm. However, this presents significant manufacturing problems and requires new mastering and replication equipment and processes.

Sony has already launched a Blu-ray recorder aimed specifically at the Japanese market for recording HD video from the Japanese HDTV satellite broadcasts. 23 GB single layer rewritable media are also available. Product launches of Blu-ray products in the USA will probably not happen until 2006 with any European launch being later.

A pre-recorded version (called BD-ROM) is also under development, but it is not yet clear whether this will offer a full 27 GB capacity. Pre-recorded discs are due to be available in some markets from 2006.

b) HD DVD

An alternative version has been developed by Toshiba and NEC and a provisional specification approved by the DVD Forum. The original name was AOD (Advanced Optical Disc). There are three versions in development.

1. HD DVD-ROM discs are pre-recorded and offer a capacity of 15 GB per layer per side. These can be used for distributing HD movies.
2. HD DVD-RW discs are re-writable and can be used to record 20 GB per side for re-writable versions.
3. HD DVD-R discs are write-once recordable discs; a capacity of 15GB per side.

Like Blu-ray discs they need a blue laser of 405 nm wavelength, but are physically similar to DVD discs, as they use a cover layer of 0.6 mm. Therefore HD DVD discs can be manufactured using existing DVD lines, and existing UV mastering equipment.

4.5 Summary

The optical media is another category of electronic media. This media has resolved the mass storage needs, and has carved a new era in electronic publishing. The optical disc also knows compact laser disc began as an audio device and gradually entered as the computer storage device and now it is the main contributor for the digital information content. The categories of optical media started Read-only devices. But today there are Recordable, Re-writable discs are also available. Earlier there could be only CD-ROM Read-drives, but with the developments in in-house CD production the Read-Write drives are available and has simplified the production of CDs which is considered to be a boon to Electronic publishing. The categories of Compact discs available are: CD-Audio, CD- Interactive, CD-ROM, CD-Rewritable and CD-Recordables.

The developments in the Optical media have been unprecedented, earlier it was Compact disc, now it is Digital Versatile Disc, having astonishingly large storage capacity. Where compact discs could store up to 1GB, in some category of DVD the storage is as large as 25GB on a single disc. Like the CD the DVD has also emerged with different formats too. The future media after DVD has also been predicted as Blue Ray and HD-DVD.

Self Check Exercise

3. What are the categories of optical media?
4. Write a short note on Compact Disc- Read Only Memory(CD-ROM)
5. Examine the application of Compact disc in Libraries.
6. Give a descriptive account on the features of DVD.
7. Enumerate different categories of DVD.

Note:

- i) Write your answers in the space given below.
- ii) Check your answers with the answers given at the end of this Unit.

4.6 ANSWERS TO SELF-CHECK EXERCISES

3. The optical media revolutionized the concept of information storage and distribution. The emergence of digital content delivery and the multimedia concepts are primarily due to the advent of compact disc. The storage of textual, audio, visual and animated information, pictures graphics all in one media is a new era of awakening. This is facilitated by different categories of Optical media. That includes: CD-Audio, CD-Interactive for Multimedia, CD-ROM and WORM for mass textual storage and databases, Periodicals and Reference Books. In addition to these, there CD-Recordable and CD-Re-Writable discs are also now available.

4.. Compact Disc - Read Only Memory one of the most extensively used format is now a main compact storage device for Text and Non-textual Information It can be used with virtually any size of computers - with stand alone and/or in Networked servers and juke boxes. The exciting features of CD-ROM are its ability to handle and play a wide variety of material viz. books, periodicals, directories, education materials, games, music, movies, communication mode data types include animation graphics, software, sound, text, video and capacity to hold up to 660+ MB of information, which is equivalent to 440 1.44 MB Floppy discs, 18 hrs of sound and up to 700 million characteristics of text and up to 74 minutes of movies or the video. In addition to the above features, the CD-ROM production has been simplified and it has been one of the most exciting feature of the Compact disc.

5. In Library applications the CD-ROM has been playing greater role than other categories of compact discs CD-ROM represents an exciting breakthrough in information storage technology. It is a new publishing medium, the centre of a new genre computer applications, and an educational tool of unprecedented power. It is also used to store entire database and by using key words or descriptors, data can be quickly searched located, thus saving many hours of tedious searching through indexes for any particular information in printed form. The benefits are;

libraries can have economic access to information, a large quantity of information is stored on a small disc. CDROM database is found to be cost-effective than the Online Systems. Use of CDROM in libraries has come as a great solution for storage of Databases, Full Text Journals, Reference Books and as a Multimedia products.

6 The Digital Video Disc now known as Digital Versatile Disc(DVD) and the other optical storage systems have now facilities for non-linear access too.**DVD**, which was initially known as Digital Video Disc is now Digital Versatile Disc, a high capacity CD-size disc for video, multimedia, games and audio applications. It is a multi-application family of optical disc formats for read-only, recordable and re-writable applications. Capacities for the read-only disc range from 4.7 to 17.1GB on a 12cm disc..

DVD adopts a “one-size fits all” types of a philosophy allowing storage of home entertainment, computer and business information with a single digital format. The high quality of video and audio has helped DVD-Video to replace VHS for pre-recorded titles and to increase the overall video market in most regions. The general term DVD actually subsumes two types : DVD Video and DVD-ROM.DVD started in 1994 as two competing formats, Super Disc (SD) and Multimedia CD (MMCD). DVD now is the result of an agreement by both camps on a single standard to meet the requirements of all the various industries involved.

7. DVD disc vary in capacity, application, and storage format. It is important to know the formats and media. There are : a) Physical Formats b) Formats for DVD Applications and c) Formats for Data storage.

Physical Formats :

Physical formats are based on the physical characteristics of DVD discs. The following four types of physical DVD disc formats are available.

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DVD-Video: It has capability to produce near-studio-quality video using high-quality MPEG-2 Video compression.

Data DVDs : A DVD disc can also be used for storing ordinary data from a computer, such as printed documents.

c) Writable Formats or Formats for Data Storage:

The physical application formats as listed above, tell the physical characteristics of a disc and the type of data stored on it. The writable formats define the different ways data is written to and read from the DVD disc, be it audio, video or computer data. There are several formats in this category. All these categories and formats are represented by: **DVD-Video**, **DVD-ROM**, **DVD-Audio**, and the Recordable formats such as DVD-RAM, DVD-RW and DVD-R are now being extensively used in PCs.

4.7 KEY WORDS

Magneto-Optical: They use polarized plastics and lasers rather than iron oxide and

Disc magnetic heads to store and read data. These are another type of discs in use today, and they are bit different in the sense that zero and one bits are recorded on an MO disc with bits of plastic that are aligned with either a left or right polarization.

WORM : Another storage niche technology – WORM – Write Once Read Many. These

can write to a medium that is initially blank, but only one time write.

DVD : Digital Video Disc has been the Digital Versatile Disc, is a high capacity CD-size disc for video, multimedia, games and audio applications.

DVD-ROM : Similar to CD-ROM discs, but with higher storage capacity. DVD-ROM can be read in DVD Video players and computer DVD drives. The read-only disc is 4.7GB to 17.1GB on a 12cm disc.

DVD-RAM : DVD-RAM discs are like virtual hard disc with random read-write access. The discs are re-writable discs for more than 100,000 times. Capacity ranges from 2.6 GB to 9.4 GB per side for data storage and archive applications

DVD-R : Similar to DVD-ROM. Write-once discs with a capacity of 4.7GB per side and 9.4 GB both sides. Two versions: DVD-R for Authoring , DVD-R for General use.

DVD+RW and **DVD+R** : Not official part of DVD family, but similar to the corresponding DVD-RW and DVD-R for General formats. DVD+RW can be written up to 1000 times and suitable for both real time video recording and random data recording. Capacity 4.7GB per side for video recording. DVD+R can be written to only once.

DVD-Video: Launched in 1997. Has become the most successful of all the DVD formats, and proved to be an ideal vehicle for distributing video content, and movie.

DVD-Audio : Launched in 2000. Slowly gathering momentum to become the format for very high quality, sound, music, offering the music industry new revenue opportunities.

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MASTER OF LIBRARY AND INFORMATION SCIENCE

M.Lib.I.Sc - 2

**ORGANISATION OF
INFORMATION RESOURCES**

BLOCK - 2

Block
2

Non-Documentary and electronic resources

Unit-5
Human resources

Unit-6
Institutional Resources

Unit-7
Electronic resources

Unit-8
USENET and Gateways

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M.Lib.I.Sc - 2: ORGANISATION OF INFORMATION RESOURCES

Block-2: Non-Documentary and electronic sources

Block Introduction

Over the year most information resources have appeared in electronic form on CD-ROM, Remote On Line Database and more recently on the world wide web. As students of library and Information Science have to learn these various electronic information resources and know the corresponding search and retrieval techniques.

Apart from the documentary sources there are intangible sources of information in unit -5 you are given an understanding of the personal and institutional sources of information subject specialist, consultants, experts, technological gate keepers, quality circle, information brokers and library and information professionals are important resources each category of human resources are briefly described in unit -4. so much information is available on the web on human resources this unit describes out find information about people on the web.

General features of the personal homepages and the sources to locate; and on experts' database are also explain with the examples.

Unit – 6 takes you to institutional resources both traditional forms such as Professionals Association, R & D Organisations, Government Departmentnets are institutional resources are explained. House journals, News Letter, Animal Report, Company Profils and related web resources are given.

Information resources available through the web are numerous and they vary from personal to institutional web pages, research and academic information to business information such as products, advertise materials; form publication such as Books and Journal to database and Digital Libraries. How quickly (effectively) and how easily (efficiency) they can be identified and located from among the Millions available on the web. There search Tools that help us find whether and where the information we are looking for is available are the concerns of unit -6. It deals briefly with each category of electronic resources and there features.

Prof. N B Pangannaya

MLISc -2

ORGANISATION OF INFORMATION RESOURCES

Block – 2

Non-Documentary and Electronic Resources

Unit - 5

Human Resources

Structure

5.0 Objectives

5.1 Introduction

5.2 Traditional Human Resources

5.3 Human Resources on the Web

5.3.1 How to find Information about People on Web

5.4 Personal Home Pages

5.4.1 General Features of Personal Home Page

5.4.2 Sources of Personal Home Pages

5.5 Experts' Databases

5.6 Conclusion

5.7 Summary

5.8 Answer to Self-check Exercises

5.9 Keywords

5.0 OBJECTIVES:

In the previous Units we have studied the documentary sources; mainly the physical forms or tangible forms of documents. There are intangible sources of information which are also good sources of information. The impact of information and communication technology on these sources of information and emerged as personal websites and also the electronic mail services and experts databases. In this Unit a brief account of the traditional forms of personal and institutional sources of information is given and then the electronic sources of these categories are described.

The main objectives of this Unit are :

- To introduce the human or persons as information resources
- To enumerate different categories of traditional human resources
- To show the impact of ICT on these resources
- To describe the categories of Human Resources

5.1 INTRODUCTION:

Among the non-documentary resources of information there are two categories of sources. They are Human Sources and Institutional of Information. Institutions and individuals are potential sources of information and form a substantial part of the communication system and provide something that other documentary sources do not and

perhaps cannot provide. In some circumstances, it is more helpful to put the user directly in touch with an expert or specialist who can provide an immediate answer than to furnish documents or written summaries of information from which the user must extract what he wants to know. Here oral communication between two individuals forms another important channel through which information is communicated. In the present scientific and technological developments with increasing specialisations greater reliance is found on information obtained from persons or human resources.

5.2 Traditional Human Resources:

Among the human sources of information or persons as sources information following may be included.

- i) Subject specialists
- ii) Consultants
- iii) Experts
- iv) Technological gatekeepers
- v) Quality circles
- vi) Information Brokers
Contractors, Vendors, Suppliers and Volunteers
- vii) Library and Information Professionals

They are self-sources and offer pin-pointed referral services.

A short description of each of the above categories of human resources of information is given below in order to understand the functions of them.

i) **Subject Specialists:** Is person who has specialised in a narrow area of a subject field and has carried out extensive research in that narrow field.

ii) **Information consultants** is a person or firms involved in various activities including library/information centre design, database design, records management, hardware and software selection and training etc. Consultants can also refer to for profit provide the information services.

iii) **Expert** – human being who has developed a high level of proficiency in making judgment in a specific usually narrow domain. Specialisations in different fields of knowledge has made it imperative on the part of those involved in the study of subjects to learn more about a narrow area of discipline and become themselves experts of knowledge in that limited area.

iv) **Technological gatekeepers** are those who act as a link between the internal users of any organisation, institution etc., and the external sources of information. The role of the Gatekeeper is getting enhanced in this era of electronic formats, networks and gateways and also with the radical changes in information's shape and form.

v) **Quality Circles:** Is a small group of between three and twelve people who do the same, or similar work voluntarily, meeting regularly for about one hour per week, in paid time usually under the leadership of their own supervisor, to identify, analyse, and solve some of the problems in their work, presenting recommendations to management and where possible, implementing the solutions themselves.

vi) **Information broker** refers to those individuals or firms who provide information service for a fee. The broker provides information on demand. A great impetus for the growth of information brokers has come from the recognition that knowledge is a business and information is a commodity.

vii) **Library and Information personnel** of different categories are also human resources who provide information and information services to the users. The Library personnel include: Library Administrators, Classifiers, Cataloguers, Indexer, Reference Librarian, Library Science Teachers, Thesaurus Constructors, Bibliographers and Bibliometricians. The Information personnel are: Information generators, Information gatherers, Information processors, information disseminators, Information Recorders and Information Retrievers.

The list given above is not exhaustive, as new types of individuals are surfacing resulting from fragmentation of subject and due to the impact of Information and Communication Technologies.

In the previous paragraphs short descriptions on individuals as resources of information is given. The impact of ICT has created domains which are intangibles in the form of Web-sites or personal homepages. They perform similar functions and activities but the services are normally delivered through the electronic media particularly the World Wide Web or the INTERNET. In the following sections such of the Human Resources are described which are now part and parcel of the Web.

5.3 Human Resources on the Web:

We have witnessed a tremendous growth in the quantity of printed publications representing books, journals and conferences. Similarly among the Human resources also there are new categories like the information brokers, information consultants and so on.

Today INTERNET and its related technologies like the WWW or simply Web has resulted in the rapid proliferation of electronic resources in print and non-print form and also persons. The Web has proliferated so rapidly and now there are efforts to “taming the web”. . Apart from various types of subject-based information resources available on the Web, There non-documentary resource types representing Institutions and people which are Institutional and Human Resources. As for the Human resources available on the Web some of them that can be named are: Experts/Scientists Directories.

5.3.1 How to find Information about People on Web:

The basic tool for finding information on people on Web is to use the Search Engine like Google or Yahoo or any other. But there are some specific tools that help in finding people on the Web. These help to locate a person's e-mail address. Many a times the required e-mail address will not be retrieved through these tools. Alternatively, any search engine can be used to search the e-mail address. Some search engines provide special option for people search. Some search engines recognise common names. For example Infoseek. If the person's affiliation is known, Yahoo directory can be used to locate the institution and e-mail address of the person. The advantage of using the search engine is that the search is simple and quick. However it is a prerequisite that the person has registered himself or through his affiliated organisation with the Web service being used. The searcher should also know the Surname or at least the forename of the person, otherwise there will be unmanageable number of hits.

In this unit two types of Human Resources available on the Web are described. They are a) Personal Home Pages and b) Experts' Databases.

5.4 Personal Home Pages:

A Homepage is part of webpage intended to provide an introduction or an entry point to a Website. The Personal Home Pages are the type of information resources

provided in similar to Who's Who, in the print form. However there may be some additional features like it may contain more images and with videos etc.

The 'Personal Home Page' is a new genre brought into existence with the Internet era. The Personal Home pages are online multimedia texts which address the question, 'Who am I '? Since the Web is amongst other things, a global publishing system, such pages make public the personal.

The Personal home pages appear in different environments. For example personal home pages of academicians. These are written by themselves or by their students or both. Sometimes they are written by the Institution to which they are affiliated to. The Web is one of the first venues where individuals can construct portrayals of themselves using information rather than consumer goods as their platform.

Traugott Koch, Personal homepage - Mozilla Firefox
http://www.lub.lu.se/netlab/staff/koch.html



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Persistent name authority record (OCLC LAF): <http://errol.oclc.org/laf/n2003-4015.html>

1991-2004: [NetLab](#), [Knowledge Technologies Group](#), Lund University
1998: [Visiting Distinguished Scholar](#) at [OCLC, Office of Research and Special Projects](#), Dublin, OH. ([List of visiting scholars](#))

5.4.1 General Features of Personal Home Page:

Below given are some broad headings of personal home page and they vary according to the context in which the home pages are constructed. These headings are divided into groups and under each group the details to be furnished is given.

I. Personal Information:

- i. Biographical Details
- ii. Roles : Positions held etc.
- iii. Personal Qualities
- iv. Interests, Hobbies, Ideas, Beliefs
- v. Friends, Acquaintances, 'Icons'
- vii. Employers
- viii. Peers, References
- ix. Modes of Addresses

II. Technical Details in the Context of Web:

- i. Links
- ii. Access
- iii. Page layout
- iv. Frames, Forms
- v. E-mail, Chat Box

- vi. Code Used (HTML or Java etc.)
- vii. Background colour
- viii. Typography
- ix. Photographic Album
- x. Graphics, Still and Moving Images, Animation
- xi. Sound
- xiii. FAQ

III. Content organisation and Index (Site Map)

5.4.2 Sources of Personal Home Pages:

There are a very large number of sources in the form of Directories of persons which are sources of Personal home pages. Some of them are global and some of them are by country. The **YAHOO Directory** itself is a good source of personal home pages and you can search the home pages by giving name or even organisations. There are personal homepage directories by country and one which is available on the Web has the following features:

- Locate friends and colleagues
- Search for Home Pages and E-mail addresses world over.
- Add yourself to the Directory or Update your entry
- Changes can be made instantly
- Over 170 Country information and can be searched by country, state and by Surname and First name.

On the net there is a prolific growth of Personal home pages and it is due to the fact that the Hosting a website, either personal or institutional has become very cheap and cost-effective.

5.5 Experts' Databases:

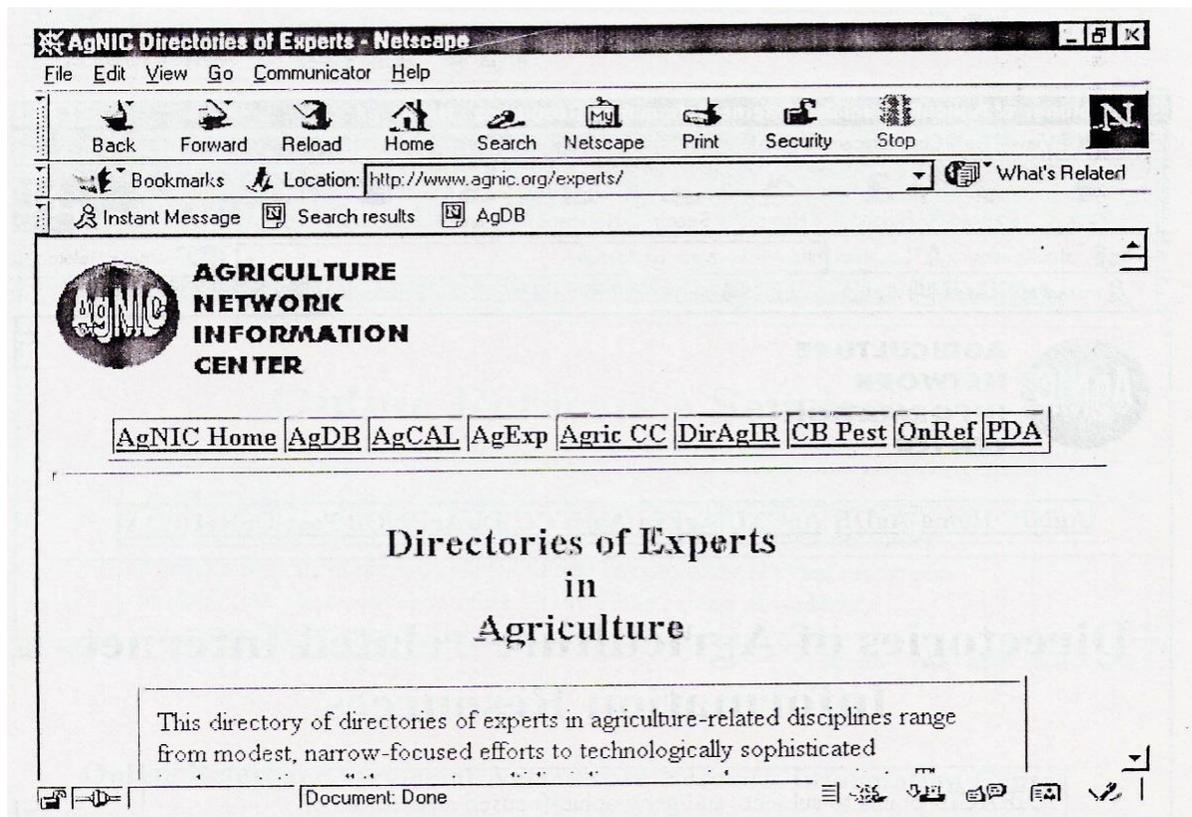
Another category of personalised information on the Web is the availability of Experts' Databases.

Identifying experts in an organisation is a first step toward collaboration. The key objective of building experts' databases are; one to find the methodologies and technologies used to build experts databases and second is to initiate sharing culture of the organisation. The database of experts consists of multidisciplinary resources for anyone interested in the subject area. It is tool that will help one to reach and network with specialists in different or same areas of specialisations.

The contents of Experts' databases include profiles of leading personalities/subject experts in specific fields. Provide details regarding their areas of expertise, affiliation, contact information, other research interests. The experts' databases are very useful to identify people working in the related areas to exchange information and know-how. Some examples of Experts' Databases are:

1. AgExp (Directories of Experts in Agriculture)

This directory of directories of experts in Agriculture and related disciplines range from modest narrow-focused efforts to technologically sophisticated implementations all the way to multidisciplinary special access projects. The headings based on a broad cut of of the semi-hierarchical AGRICOLA Subject category Codes are organized alphabetically.



2. AgNIC : Agricultural Network Information Center.

It provides access to agriculture-related information, subject are a experts and other resources. It was established jointly by the National Agricultural Library and the land-grant universities, and other organisations committed to the public access to agricultural and related information. It went public in October 1995. www.agnic.org.

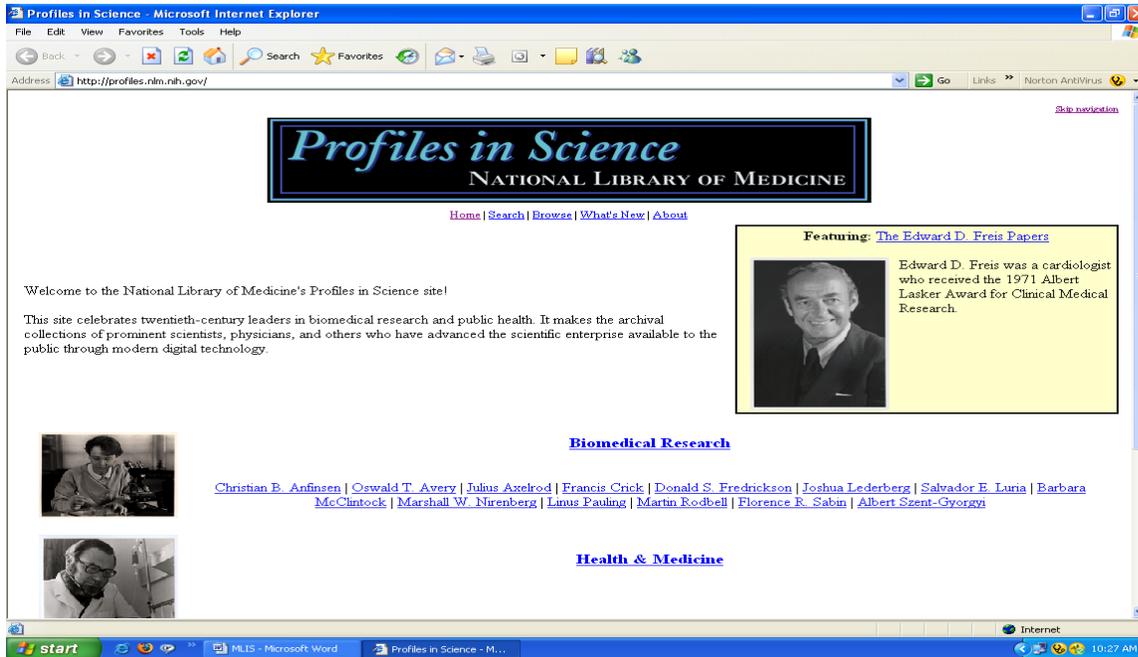
3. Online Profile of Academic Community of Indian Universities:

Database provides the academic and research profile of the senior level faculty members working in Indian Universities, Colleges and other R&D organizations. The data covered in this database is provided by respective individual faculty members and university libraries. Registrars of the universities have also contributed in great deal in compiling the profiles of faculty members of their respective universities. It is updated on regular basis. To update the existing data or to include your profile, one can use the on-line registration form. This database has large number of records and is continuously growing. Profiles can be retrieved by using "Name", "University", "Subject" etc. search options. This is also available from INFLIBNET. www.inflibnet.ac.in

4. Profiles in Science –

This site celebrates twentieth-century leaders in biomedical research and public health. It makes the archival collections of prominent scientists, physicians, and others who have

advanced the scientific enterprise available to the public through modern digital technology. www.profiles.nlm.nih.gov.



4. Experts Database of INFLIBNET : Provides useful data relating to the name(s) of experts in different disciplines. This database has more than 15000 records of experts and is steadily growing. www.inflibnet.ac.in.

5. Experts Database in Science and Technology (EDST):

EDST is the premier database of profiles of scientists / researchers and faculty members working at leading R & D and other institutions involved in teaching and research in India. It provides important information about expert's educational qualifications, area of expertise, contact address, skills and accomplishments. The

database is being developed under the project funded by NISSAT, Ministry of Science and Technology, Department of Scientific and Industrial Research, New Delhi. The database offers expertise of more than 24,000 faculties from the nation's leading institutions. Attempt has been made to provide access to relevant and accurate information collected from various sources. Web enabled interface has been incorporated to facilitate the search and update the names listed in the database. It can be accessed from INFLIBNET.

<http://www.nissat.inflibnet.ac.in>

7. TIFAC (Technology Information, Forecasting and Assessment Council):

Experts Database.

The databases of Experts also possess good search facilities. They can be searched by name of the expert, organisation if it is global. If it local it can also searched by Areas of Interest. Further the searches help in providing detailed information about the experts and their fields of specialisations and the kind of problems also handled by them.

5.6 Conclusion

Among the Human Resources there are also informal sources of information, such as Invisible Colleges, Technological Gatekeepers and so on. They are part of communication media hence are not described here. The Human resources are very important because in most of the cases the users can be answered directly and in other

cases they serve as referral sources. The human resources have been influenced by the applications of information technology and are becoming widely accessible, like the personal home pages. Sometime these pages of celebrities are also available in multiple numbers. For example the experts' database may appear as a personal homepage as well as part of an Institutional Home Page.

5.7 Summary :

Among the non-documentary resources Human or persons and Institutional Information Resources have been identified and very reliable and authentic. These two categories of sources are. potential sources of information and form a substantial part of the communication system and provide something that other documentary sources do not and perhaps cannot provide and. it is more helpful to put the user directly in touch with an expert or specialist. Oral communication between two individuals forms another important channel through which information is communicated. The traditional human resources have been in quite large number and they are not easily visible or exposed. The impact of technology has also been seen on the developments in Human Resources. The two types are ; Personal home pages and experts databases. One has to follow a definite structure to compile data about individuals and create the databases and put them on the web. The personal home pages are similar to Who's who is traditional form. Like there are directory of directories, so also there are Directory of Personal home pages – the

Yahoo Directory. On the other hand there are number of web sites on these categories of human resources for example the Experts database of INFLIBNET.

Self Check Exercises

1. Write in short about the Human Resources.
2. Which are the traditional human sources of information?

Note:

- i) Write your answers in the space give below.
- ii) Check your answers with the answers given at the end of this Unit.

5.8 Answers to Self-check Exercises

1. Human Resources are one of the two categories of non-documentary resources. They are widely available and used, are potential sources. In the circumstances where documentary sources fail to provide answers to users queries, the human experts or specialists will be used. The traditional sources are many, such as Experts, Specialists, Quality circles, Library and information professionals and so on. On the internet the same information is available in the form of Web sites or web pages. The two main categories

of Human Resources available on the Web are the Personal home pages and the experts databases. Some of the examples of the latter are *Experts Database* of INFLIBNET and the *AgNIC* of National Agricultural Library, USA. The Online Profile of Academic Community of Indian Universities:

2. The important traditional Human Sources of information include :

- i. Subject specialists
- ii. Consultants
- iii. Experts
- iv. Technological gatekeepers
- v. Quality circles.
- vi. Information Brokers
- vii. Library and Information Professionals.

5.9 Keywords:

Experts Database : Experts' databases are profiles of leading personalities/subject experts in specific fields. The experts' databases are very useful to identify people working in the related areas to exchange information and know-how.

Personal Homepage: An online multimedia text which address the question, 'Who am I
'?

Unit – 6

Institutional Resources

6.0 Objectives

6.1 Introduction

6.2 Types of Institutional Resources

6.3 House Journals or Newsletters

6.4 Annual Reports

6.4.1 Web Definitions of Annual Reports:

6.4.2 Select Websites and Sources on the Annual Reports:

6.5 Company Profiles

6.5.1 Need for Company Profile Documents:

6.5.2 What Information Company Profile provides ?

6.6 Institutional Home Pages

6.7 Conclusion

6.8 Summary

6.9 Answers to Self-check Exercises

6.10 keywords

6.0 OBJECTIVES

In the previous Units we have studied one distinct category of non- documentary resources; the Human or persons as sources of information. In this Unit we would study yet another category of non-documentary resource – the Institutional resources. There are intangible sources of information which are also good sources of information. The impact of information and communication technology on these sources of information has been very large as the emergence of the ‘dot com’ era is attributed to representation of Institution on the Web. In this Unit also a brief account of the traditional forms of institutional sources of information is given and then the electronic sources of these categories are described.

The main objectives of this Unit are :

- To introduce the Institutions as information resources
- To enumerate different categories of traditional institutional resources
- To show the impact of ICT on these resources
- To describe the categories of Institutional Resources on the Web.

6.1 INTRODUCTION:

Among the non-documentary resources of information there are two categories of sources. They are Human Sources and Institutional of Information. Institutions and individuals are potential sources of information and form a substantial part of the communication system and provide something that other documentary sources do not and perhaps cannot provide. Institutional resources have emerged as one of the very important and authentic sources of information, because the information contained them is provided with a mandate, as a legal responsibility they owe to the society and members of the organization. In this context it may be stated that the Institutions themselves are established under the law of the land and it becomes mandatory to enlighten the member of the society about their activities and the contribution to the welfare of the society as a whole. Some of these are issued at regular intervals and some of them are given in other sources like the directories.

6.2 TYPES OF INSTITUTIONAL RESOURCES:

There are a very large number of Institutions which can be considered as very potential sources of information. In a way both Human and Institutional resources are complementary to each other. For instance a subject specialist or an expert is affiliated to an institution of an organization. Given below are some of the traditional categories of Institutions with examples in each which provide useful and mandatory information.

- i) Professional Associations:
Such as Study Circles, Working and Special Interest Groups.
e.g. ILA, ALA, IASLIC, IMA, CRG and so on.

- ii) Learned Institutions, Societies and Academies
E.g. American Chemical Society, Indian Academy of Sciences
Royal Society of London, Indian Medical Council etc.

- iii) Academic and Technological Institutions:
Universities : General and Subject, IITs, IIMs etc.

- iv) Industrial R & D Organisations
E.g. Data Banks, Clearing Houses, Depositories

- v) Public and Private Sector Organisations
E.g. BHEL, BEL, TISCO, TCS, WIPRO, PTI., Press.

- vi) Chambers of Commerce and Industry, Productivity Councils,
Business/ Industrial Federations. e.g. FICCI, CII, FKCCI, NPC

- vii) Government Departments

Ministries, Departments, Libraries and Publications.
Central Board of Irrigation and Power, CWPR & S,
Planning Commission, NIC and so on.

viii) Institutional Referral Resources

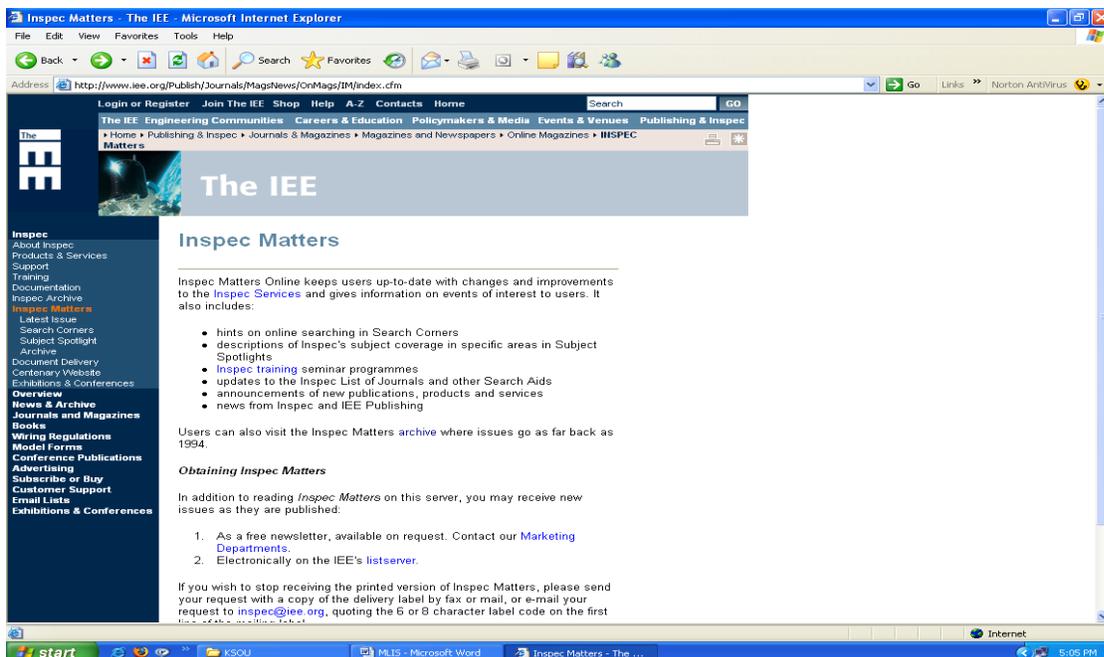
Each one of the following types of information resources has :

- Individuals
- Library and Information Centres
- Publications : Journals, New Letters, Annual and Administrative Reports, Research in Progress, Ongoing Research

Among the Institutional information resources we have already discussed about the individuals as sources of information for the institutional and other information. Libraries and information centres of course are part and parcel of any Institutional information system. Here we will in particular discuss on House Journals, Annual Reports Research in Progress as printed sources and their electronic versions, in the form of Websites etc.

6.3 HOUSE JOURNALS / NEWSLETTERS:

A serial publication issued by an institution or organisation – commercial, industrial or R & D Organisation. Their main purpose is promotional and to profile on the internal activity of the organization. They are distributed free to their customers and interested individuals and institutions on a mailing list agenda. The most direct approach to promoting the interest of the organization can be seen in the house journal which publishes items dealing with their products and services. House journals or News Letters can be useful sources of technical information but their value is not much appreciated. Now they have become part and parcel of the Web-based information of Institutional websites and the News Letters and House Journals have been included in their websites. Examples : 1.INFLIBNET Newsletter 2. INSPEC Matters.



Online Newsletter of INSPEC (The INSPEC Matters)

6.4 ANNUAL REPORTS :

These are periodic reports of activities and progress, usually issued annually, by government agencies, corporations, societies and public and private sector undertakings. They are considered as important documents for any institution and organisation. It is an account of the activities of an organisation or institution for the previous year. Submitted by the head of the institution to the parent body to justify the existence and activities.

6.4.1 Web Definitions of Annual Reports:

1. A voluntary report published by a foundation or corporation describing its grant activities. A growing number of foundations and corporations use annual reports to inform the community on their contributions, activities, policies and guidelines .

2. The Annual Report is issued yearly by Public Corporations to its shareholders and contains the detailed financial and business information required by law. The front part of an annual report often contains marketing material such as impressive graphics and narrative highlights about the company's successes over past year. This term also can refer to the document filed with the Securities and Exchange Commission containing all the information required of an annual report by the proxy rules and more.

3. Annual Report sometimes called the 10-K. This is the principal document used by public companies to communicate financial information to shareholders. It includes

financial data organised into one or more balance sheets, income statements, and cash flow statements. Narrative information on subsidiary activities, product plans, important operating information and if applicable, research and development activities.

6.4.2 Select Websites and Sources on the Annual Reports :

Given below are some websites on the availability of annual reports in hard copy as well as full text in electronic form that can be downloaded.

- **REPORT GALLERY** : A collection of over one thousand online annual reports. Many of these reports are in PDF format. There is also a link on this site to sources of international annual reports for companies in UK, Japan, Korea, South Africa.
- **Annual Reports.com**: This site is regarded as the “most complete and up-to-date listing of Annual Reports online. It is Americas largest annual report service” with annual reports available online for 2600 companies searchable by company name, ticker symbol, stock exchange, industry or sector.
- **Annual Reports Service** : Claimed as one of the largest annual reports source in America. The site offers Annual reports, prospectuses and 10K filings for 3800

companies, searchable by name, industry or state. Annual reports may be ordered, free, from the sources but not reports are available online.

- **Hoovers Online** : This site provides extensive information on over 12,000 companies worldwide. Each company profiled includes a link to the company homepage, on which company annual reports may often be found in the investors Relations section. Hoovers Online also offers access to company SEC filings.
- **Historical Annual Reports/Collection** : The two sites are on the collections of annual reports available at a) Lippincot Library at the Wharton School, University of Pennsylvania, which contains facsimiles of corporate annual reports from the Lippincot Library. They are available in PDF format. The second b) The collection at the Angelo Bruno Business Library at the University of Alabama includes paper copies of corporate annual reports from 1900 companies from the late 19th Century to 1980. While reports are not available via inter-library-loan, photocopies of the reports may be purchased. A list of companies and annual report years is provided by the site.

Indian Sources :

- **PROWESS (CMIE)**: This database contains information on over 9300 large and medium Indian firms. These comprise all companies traded on India's major stock exchanges and several others including the central public sector enterprises. The

database covers most of the organised industrial activities, banking, organised financial and other services sectors in India. These account for more than 75% of all corporate taxes and over 95% of excise duty collected by the Government of India. This also provides detailed information on each company. Includes a normalised database of the financials covering 1500 data items and ratios per company. It packages a normalised database in a versatile and amazing powerful software. The software permits unlimited querying power to the end user.

The source is: Centre for Monitoring Indian Economy, Mumbai. www.cmie.com.

- **IBID (Informatics (India)):** The Indian Business Industry Database is available on CD-ROM as well as online. Compiles and consolidates vital information on Indian Business and Industry from over 70 newspapers and business magazines covering over 35,000 companies and 1,35,000 articles. The database enables business and industry around the world to know about Indian Business/Industry scenario. Searchable by Company names. Updated Weekly and CD-Quarterly. www.informindia.com
- **Company Directory Series :** It covers nearly 5 lakh companies registered with Registrar of Companies in India. Information on branches/subsidiaries of foreign companies in India has also been provided. Data is supported with search software facilitating company search, business activity, mailing address, title search etc.

Source: Government of India, Ministry of Law, Justice and Company Affairs, Department of Company Affairs, Registrar of Companies, Bangalore.

- **RBI On Internet** : The Reserve Bank of India (RBI) site has homepages for disseminating the banking and foreign exchange information. It provides Weekly statistical supplement, ANNUAL REPORT, RBI Bulletin, NRI Investments and Publications etc. www.reservebank.com

6.5 COMPANY PROFILES:

The Directories of Industries, Business Houses and Organisations are the printed resources which provide Company profiles. For example the Thomas' Register of American Manufacturers and the Kothari's Industrial Directory in India are the respective sources in America and India to profile industries.

The directories profiling companies are also available on Internet or Web. They include a comprehensive list of addresses of suppliers/buyers in case of business directories and provide with their addresses. Most of them are available free on the Internet and allow them to browse as well as searchable by name, products, state or country. They help in establishing contact either for business or for research purposes. Directories in print or on the Web are the best sources for the Company profiles. Now let us understand a company profile by its definition.

a) A Company Profile corresponds to a file with company specific data. Travel guidelines or company data can be stored there and included in a booking where needed.

b) A synopsis of a company's performance including licensing data, a rating by authority, financial information regarding company's assets and liabilities. Complete history and a record of activities as it pertains to the interest of the state or country.

6.5.1 Need for Company Profile Documents:

The establishing a particular company for a particular activity and obtaining full details and documents registered at an appropriate agency like, Registrar of Companies may be required for the following reasons.

- ***Due Diligence*** : To satisfy requirements when confirmation of a companies existence is paramount.
- ***Assets Tracing*** : To ascertain what further details may be disclosed from such documents, as facts may arise to assist any tracing exercise to be undertaken.
- ***Legal*** : When certified documents may be required for evidential purposes.

The content of a company profile would consist of :

- i) Introduction to the Company
- ii) Mission of the Company

- iii) History
- iv) Strategy
- v) Quality
- vi) Market Approach
- vii) Products and Services
- viii) Executive Team
- ix) The Board
- x) Corporate Strategy
- xi) Corporate Governance
- xii) Conclusion

6.5.2 What Information Company Profile provides ?

Many databases on the Web on company profiles provides information on companies all over the world. Due to economic, political and other jurisdictional reasons, depending upon the country of origin of the company varying contents of information are available. However the following details are usually available.

- ◆ Full Name of the Company and affiliation. E.g. Ltd., Inc., Govt. etc.
- ◆ Company Number ; date of incorporation, incorporation agent
- ◆ Company status. e.g. Active/dissolved, Merged/Amalgamated, Split etc.
- ◆ Company's Registered address.
- ◆ Share Capital, names of the Directors, Board, principals, bankers

- ◆ Trading Activities, Profiles, and Financials and Registry documents etc.

Some of the web resources on the Company profiles are given here. These sources provide Company name and description of business. They also provide company analysis including ranking and rating of international companies.:

- Fortune Global 500 : www.pathfinder.com/fortune/global500
- Hoover's Online : www.hoovers.com. This provides company profiles and access to large number of records on public and private organisations.
- Thomas Register : www.thomasregister.com. This provides details about American manufacturers free of charge on the Internet.
- www.Best3Websites.com
- www.123india.com/123trade
- www.braintrack.com
- www.unesco.org/general/eng/infoserv/db/dare.html
- Forbes 500 Annual Directory : www.forbes.com
- www.company-documents.com

Corporate Information on Magnetic Medium (CIMM) :

Is a computerised database on more than 3500 India's medium and large companies combined with a powerful easy to use querying, report generation and charting software. The coverage includes listed and public sector companies, joint sector

companies, cooperatives and several others. Additional features include Corporate analysis, Industry research and investment.

6.6 INSTITUTIONAL HOMEPAGES :

Institutional homepages are different from company profiles in the sense that, the term institution referred to the academic and administrative bodies, voluntary organizations and other not for profit organizations. The company profiles are for particularly business, manufacturing and industrial houses and for profit making organizations. The content and objective of Institutional homepages is a social and institutional obligations.

In print sources, the well known “World of Learning, Universities Handbook, Commonwealth Universities Year” are the sources of Institutional information. The electronic versions of them are the Websites of these publications and for each Institution listed in them will have their own websites.

Examples Institutional websites and each one will have an Institutional homepage..

<http://www.sit.ac.in>

<http://www.iisc.ernet.in>

<http://www.iimb.ac.in>



Example of an Institutional Home Page

6.7 CONCLUSION

The Institutional information resources like the Human Resources are in large number. Every Institution, Business and Industrial Organisation is a rich source of information. In traditional system different categories of directories were providing this information. For example the ‘World of Learning’ , ‘Kothari’s Industrial Directory’ and so on. Now on the web there are directories as well as individual websites of them and which provide the basic information about the institution or organization in the form of Homepage. Here only a few of them are given, the number of profiles on the Web run into millions. The size of the Web in fact has increased only due to the Institutional and

Organisational information and the dot com era (.com) was prolific on due to the increasing number of websites of them.

Among the non-documentary resources of information there are two categories of sources. They are Human Sources and Institutional of Information Resources. Institutions and individuals are potential sources of information and form a substantial part of the communication system and provide something that other documentary sources do not and perhaps cannot provide. Institutional resources have emerged as one of the very important and authentic sources of information, because the information contained them is provided with a mandate, as a legal responsibility they owe to the society and members of the organization.

There are a very large number of Institutions which can be considered as very potential sources of information. In a way both Human and Institutional resources are complementary to each other. This Unit describes House Journals, Newsletters, Annual Reports, Company and Institutional Profiles.

A Newsletter is serial publication issued by an institution or organisation ; commercial, industrial or R & D Organisation. Their main purpose is promotional and to profile on the internal activity of the organization.

The Annual Reports are periodic reports of activities and progress, usually issued annually, by government agencies, corporations, societies and public and private sector

undertakings. There are Web Definitions of Annual Reports: Select Websites and Sources on the Annual Reports.

Many databases on the Web on company profiles provides information on companies all over the world. The Directories of Industries, Business Houses and Organisations are the printed resources which provide Company profiles.

SELF CHECK EXERCISES :

1. What are the Institutional Resources and give their broad categories ?
2. What is an Annual Report ? Give a website definition of an Annual Report and also some web-sources of Annual Reports.
3. Name some important websites Company Profiles and Institutional Sources.

Note:

- i) Write your answers in the space given below.
- ii) Check your answers with the answers given at the end of this Unit.

6.8 ANSWERS TO SELF CHECK EXERCISES

1. Institutional information resources have emerged as one of the very important and authentic sources of information, because the information contained them is provided with a mandate, as a legal responsibility they owe to the society and to the members of the organization. The Institutions are established under the law of the land and it becomes

mandatory to enlighten the member of the society about their activities and the contribution to the welfare of the society as a whole. Some of these are issued at regular intervals and some of them are given in other sources like the directories.

The types of Institutions considered as potential sources of information are:

- i) Professional Associations:
- ii) Learned Institutions, Societies and Academies
- iii) Academic and Technological Institutions:
- iv) Industrial R & D Organisations
- v) Public and Private Sector Organisations
- vi) Chambers of Commerce and Industry, Productivity Councils,
- vii) Government Departments
- viii) Institutional Referral Resources

2. These are periodic reports of activities and progress, usually issued annually, by government agencies, corporations, societies and public and private sector undertakings. They are considered as important documents for any institution and organization and submitted by the head of the institution to the parent body to justify the existence and activities.

A Web definition of an Annual Report is ; it is a voluntary report published by a foundation or corporation describing its grant activities. A growing number of foundations and corporations use annual reports to inform the community about their contributions, activities, policies and guidelines .

- **REPORT GALLERY :**
- **Annual Reports.com:**
- **Annual Reports Service :**
- **Hoovers Online :**
- **PROWESS (CMIE):**
- **IBID (Informatics (India)):**
- **Company Directory Series :**

3 The Directories of Industries, Business Houses and Organisations are the printed resources which provide Company profiles. For example the Thomas' Register of American Manufacturers, New York and the Kothari's Industrial Directory in India are the respective sources in America and India which profile industries. The directories profiling companies are also available on Internet or Web. Web sources are given below.

- Fortune Global 500 : www.pathfinder.com/fortune/global500
- Thomas Register : www.thomasregister.com. www.Best3Websites.com
- www.123india.com/123trade
- www.braintrack.com
- [Forbes 500 Annual Directory : www.forbes.com](http://www.forbes.com)
- <http://www.sit.ac.in>
- <http://www.iisc.ernet.in>

6.9 KEYWORDS

Annual Report : A periodic report of activities and progress, usually issued annually, by government agencies, corporations, societies and public and private sector undertakings.

Company Profile : A synopsis of a company's performance including licensing data, a rating by authority, financial information regarding company's assets and liabilities.

Institutional homepages are referred to the academic and administrative bodies, voluntary organizations and other not for profit organizations and their web pages

Newsletter : is serial publication issued by an institution or organisation ; commercial, industrial or R & D Organisation.

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Unit- 8

USENET & Gateways

8.0 Objectives

8.1 Introduction

8.2 USENET

8.3 Gateways

8.4 Conclusion

8.5 Summary

8.6 Answers to Self-check Exercises

8.7 Keywords

8.8 References

8.0 Objectives

In this Unit we would study different types of Electronic and Internet Resources. We will also profile them in short and wherever necessary provide a list of them so that the students can access them and find out there utility.

- To profile some of the main Internet resources
- Enumerate some Electronic and Internet Resources

8.1 Introduction

Usenet is a distributed Internet discussion system that evolved from a general purpose UUCP network of the same name. Users read and post email-like messages (called "articles") to a number of distributed newsgroups, categories that resemble bulletin board systems in most respects. The medium is distributed among a large number of servers, which store and forward messages to one another. Individual users download and post messages to a single server, usually operated by their Internet Server Provider or university, and the servers exchange the messages between each other.

b) How USENET works?

Usenet is the set of people who exchange articles tagged with one or more universally-recognized labels, called "newsgroups" (or "groups" for short). There is often confusion about the precise set of newsgroups that constitute Usenet; one commonly accepted definition is that it consists of newsgroups listed in the periodic "List of Active Newsgroups" postings which appear regularly in news.lists.misc and other newsgroups. Today, almost all Usenet traffic is carried over the Internet. The current format and transmission of Usenet articles is very similar to that of Internet email messages. However, whereas email is usually used for one-to-one communication, Usenet is a one-to-many medium.

The articles that users post to Usenet are organized into topical categories called newsgroups, which are themselves logically organized into hierarchies of subjects. For

instance, sci.math and sci.physics are within the sci hierarchy, for science. When a user subscribes to a newsgroup, the news client software keeps track of which articles that user has read.

When a user posts an article, it is initially only available on that user's news server. Each news server, however, talks to one or more other servers (its "newsfeeds") and exchanges articles with them. In this fashion, the article is copied from server to server and (if all goes well) eventually reaches every server in the network. The later peer-to-peer networks operate on a similar principle; but for Usenet it is normally the sender, rather than the receiver, who initiates transfers. Some have noted that this seems a monstrously inefficient protocol in the era of abundant high-speed network access. Usenet was designed for a time when networks were much slower, and not always available. Many sites on the original Usenet network would connect only once or twice a day to batch-transfer messages in and out.

Today, Usenet has diminished in importance with respect to mailing lists and weblogs. The difference from mailing lists, though, is that Usenet requires no personal registration with the group concerned (subscription is necessary only to keep track of which articles one has already read, and that information need not be stored on a remote server), that archives are always available, and that reading the messages requires no mail client, but a news client (included in most modern e-mail clients).

c) History

Usenet is one of the oldest computer network communications systems still in widespread use. The first newsgroup experiments occurred in 1979. It was conceived by Duke University graduate students Tom Truscott and Jim Ellis in 1979. They came up with the idea as a replacement for a local announcement program, and established a link with nearby University of North Carolina using Bourne shell scripts written by Steve Bellovin. The public release of news was in the form of conventional compiled software, written by Steve Daniel and Truscott

It was established in 1980 following experiments the previous year, over a decade before the World Wide Web was introduced and the general public was admitted to the Internet. It was originally conceived as a "poor man's ARPANET," employing UUCP to offer mail and file transfers, as well as announcements through the newly developed news software. This system, developed at University of North Carolina at Chapel Hill and Duke University, was called USENET to emphasize its creators' hope that the USENIX organization would take an active role in its operation.

d) Advantages of USENET:

UUCP networks spread quickly due to the lower costs involved, and ability to use existing leased lines, X.25 links or even ARPANET connections. By 1983 the number of

UUCP hosts had grown to 550, nearly doubling to 940 in 1984. As the mesh of UUCP hosts rapidly expanded, it became desirable to distinguish the Usenet subset from the overall network. A vote was taken at the 1982 USENIX conference to choose a new name. The name Usenet was retained, but it was established that it only applied to news.[3] The name UUCPNET became the common name for the overall network. Early versions of Usenet used Duke's A News software. In the early 1990s, InterNetNews by Rich Salz was developed to take advantage of the continuous message flow made possible by NNTP versus the batched store-and-forward design of UUCP. Web-based archiving of Usenet posts began in 1995 at Deja News with a very large, searchable database. In 2001, this database was acquired by Google.

e) Seven major features of USENET:

1. Usenet was the alternative to ARPANET created by those who could not join ARPANET. Usenet was originally proposed as a general service network (news, mail, file transfers) but it didn't really turn out that way. With the ARPANET having long since evolved into the public access Internet, and virtually all Usenet traffic traversing the Internet, the distinction as a separate network is mostly sentimental.

2. Usenet is open to a variety of users. It does not require user registration, institutional affiliation, or a specific fee like other communication systems. Users, with proper

knowledge, can post their own messages as well. The system does not require any identification and accepts pseudonyms.

3. The content is not censored very much. Much of the process of receiving, posting, and circulating messages is automated, and the sheer number of messages makes censorship very difficult, except for categorical banning of potentially problematic newsgroups or the entire Usenet.

4. Creation of new newsgroups is possible for anybody with proper knowledge in certain parts of Usenet, namely within the alt hierarchy. Some point out that some newsgroups are helpful in their own way because of the resources of a variety of participants. Many participants are willing to answer questions on subjects ranging from software troubleshooting, and other technical issues, to such topics as pros and cons of different medical treatments for a rare disease.

5. Virtually all messages posted to the Usenet system are archived and made available in publicly-searchable databases on the World Wide Web. This allows for a great depth of historical records of news, information, and of the behaviour of individuals who choose to attach their real name to messages.

6. The structure of the network is somewhat anti-hierarchical, one might argue. There is no center through which all articles go. Various news servers are connected with each

other and the circulation of the articles is done in a fashion that is very similar to a bucket-relay.

7. There is no essential set of newsgroups that a news server must carry. Some newsgroups are locally maintained. Consequently, it is very hard, if not utterly impossible, to construct a complete list of newsgroups for a given moment, let alone postings from a given week.

f) Comments on USENET

- Communication on Usenet may be perceived by some (critics or users) as not very constructive, or worse yet, undesirable.
- In certain newsgroups it is frequently excessively aggressive, as some people engage in flame wars. The discussion might seem unproductive, with endless disputes. It may contain offensive language and very objectionable opinions on sensitive issues related to racism, gender role, etc.
- The non-offensive messages might be "spam," or unsolicited off-topic postings such as advertisements for pornography sites.

- A group may be flooded with messages by a very limited number of participants, being not very open and friendly to newcomers. In addition, the most active parts of the Usenet include exchange of pornographic files (especially pictures) and music files (especially in MP3 format).
- Newsgroups with more mature audiences, however, tend to avoid nasty exchanges, focussing on discussing more productive things, such as the newsgroup topic.
- In addition, the said freedom in the alt hierarchy is limited in that unless a newly created newsgroup meets certain conditions and goes through certain procedures, it will not be carried by many news servers, potentially resulting in a wasted effort.

In general, the seemingly anarchic system is indeed not without some administrative-level controls. These carriers exert influence on newsgroups' birth and survival as well. Nevertheless, if a critical mass of users requests that their server administrators allow for the creation of a new newsgroup, the creation process is more likely to succeed. It is also noticeable that there is an obvious hierarchy in the way newsgroups are organized. While some of the other interfaces for online communication support much less hierarchical organization of information, such as the World Wide Web, Usenet is not one of them.

The more general criticisms that apply to Usenet and many other kinds of online communication include the statement that Usenet is mostly a text-based medium,

empowering the literate and articulate, while being less accessible to others. The counterpoint to this argument is that being text-based makes Usenet more accessible to visually impaired computer users who use text-reading software to navigate through the Internet. The issue of the digital divide, namely that some people simply do not have access to the Internet, is another reason one might point out that Usenet is not entirely democratic or open.

g) USENET Developments :

AOL announced that it would discontinue its integrated Usenet service in early 2005, citing the growing popularity of weblogs, chat forums and on-line conferencing. Over time, the amount of Usenet traffic has steadily increased. It is important to note, however, that much of this traffic increase reflects not an increase in discrete users or newsgroup discussions, but instead the combination of massive automated spamming and an increase in the use of .binaries newsgroups in which large files (frequently pornography or pirated media) are often posted publicly.

h) Sociological implications

The architecture of Usenet is sometimes characterized as anarchic or as civic/democratic. Some see it as a global community or collection of online communities.

While the views vary, one shared perspective among the users is of Usenet as an alternative medium to institutionalized mass communication, more open to participation from a wider variety of the general public. Usenet can be a tool boosting an individual's ability to communicate, free from governmental and other organizational restraints.

To some, these features are indications of what societies could become, or would likely become, when interactive information networks such as Usenet and the Internet become the dominant means of communication. These analogies of the social aspect of Usenet are not necessarily compatible with each other. Anarchism tends to emphasize individual freedom, community values, mutual ties and cooperation. Democracy usually requires a binding 'majority rules' decision, running counter to anarchic principle, as some would argue. If democracy is not compatible with the anarchistic nature of Usenet or Internet in general, then it is bad for democracy. Usenet is of significant cultural importance in the networked world, having given rise to, or popularized, many widely recognized concepts and terms such as "FAQ" and "spam".

8.2 GATEWAYS :

The technical and dictionary meaning of a gateway refers to a "node on a network that serves as an entrance to another network." The term Gateway is also employed when a "computer system located on earth that switches data signals and voice signals between satellites and terrestrial networks". But here it is used in the

context of searching and creating a database and providing access to frequently used information sources. So here it is used in this latter sense as creating a node in the Library home page for the frequently used information sources.

Internet is a vast volume of global information and access to relevant, specific and quality information is though not impossible but is difficult. It requires to create some special tools to gain access to frequently required information. One of the methods adopted by libraries is to create web catalogues and book mark the web sites to search them regularly. To find desired information on the web search is done through such and other tools as given below:

1. Subject gateways
1. Virtual Libraries
2. Subject Catalogues and directories ; and
3. Search Engines

Search engines automatically compile files and retrieve them, and they are like public libraries. The Gateways are like academic and special libraries and can be used as learning tools for respective subject. Virtual Libraries and Gateways, in particular the subject gateways are internet based services designed to help users locate high quality information that is available on the internet. They are typically databases of detailed metadata (or catalogue) records which describe the internet resources and offer a

hyperlink to the resources. The users choose to either search the database by keyword or browse the resources under subject headings.

The Information to be accessed has a definite purpose and theme. The theme is usually subject oriented, therefore to have access to subject oriented, therefore to have an access to subject oriented quality information one must search through subject gateways. Subject gateways have an input of identified, selected, evaluated and assessed subject oriented information resources. The quality input provide information as per the user requirement. Evaluated/assessed information resources also provide a complete guide to determine the scope, value, purpose, comprehensiveness, up-to-dateness, usefulness and format of information that can be immediately used by the user.

Gateways also give an opportunity to authors/scholars/users to provide an input of information resource through its template though it is further evaluated and assessed by gateway editors keeping in view the audience and context/content for inclusion into the subject gateway. The accepted resource is then classified, catalogued and indexed.

Given below are the web pages of two subject gateways. The first one is the MEDLINE Gateway by the National Library of Medicine, USA on selected databases of MEDLINE. It gives links to 1) Bibliographic Resources like the TOXLINE 2) Consumer Health Resources and 3) Other information resources. www.gateway.nlm.nih.gov.



Example of MEDLINE Gateway by National Library of Medicine

The second example is Social Science Information Gateway (SOSIG). This gateway. The service aims to provide a trusted source of selected, high quality Internet information for researchers and practitioners in the social sciences, business and law. It is a freely available Internet service and is part of the UK Resource Discovery Network.

The SOSIG Internet Catalogue is an online database of high quality Internet resources. It offers users the chance to read descriptions of resources available over the Internet and to access those resources directly. The Catalogue points to thousands of resources, and each one has been selected and described by a librarian or academic. The catalogue is browsable or searchable by subject area. www.sosig.ac.uk

Mores examples of gateways :

ADAM : www.adam.ac.uk . This is a gateway for Art, Architecture and media information gateway, is searchable for more than 3000 internet resources on the subjects.

EEVL: www.eevl.ac.uk . Edinburgh Engineering Virtual Library is a UK gateway to quality engineering information resources on the Internet.

GALAXY : www.galaxy.einet.net Associated with Manufacturing and Design Engineering program and is the oldest browsable searchable web directory.

Vlib : www.vlib.org. The Virtual Library, the oldest catalogue of the web started by Tim Barnes-lee the creator of HTML and the web itself.

The creation of subject gateways is an extended service provided to the users and it can be equated to the project oriented SDI service. It is the best way to exploit vast resources from the internet to subject specialists. Subject gateways provide search facilities for the relevant information resources on the Internet and are created, designed, maintained and reviewed by the Librarians, and Information professionals and also by the subject specialists to provide access to quality information resources from the Internet.

8.3 CONCLUSION :

In this Unit the Electronic resources are discussed. They are result of the impact of information technology on printing technology. The advent of HTML has made the web accessible to all the end users without discretion and the electronic mail has been another web based service which has integrated many facilities like the ListServs and the USENET. In this unit all of them are described with relevant examples.

Self Check Exercises :

1. Give a brief history of USENET and its developments.
2. Define what a gateway is. Give some examples of Subject gateways.

8.4 ANSWER TO SELF CHECK EXERCISES :

5. Usenet is a distributed Internet discussion system that evolved from a general purpose UUCP network of the same name. Usenet is one of the oldest computer network communications systems still in widespread use. The first newsgroup experiments occurred in 1979. It was conceived by Duke University graduate students Tom Truscott and Jim Ellis in 1979. They came up with the idea as a replacement for a local announcement program, and established a link with nearby University of North Carolina using Bourne shell scripts written by Steve Bellovin.

The public release of news was in the form of conventional compiled software, written by Steve Daniel and Truscott It was established in 1980 following experiments

the previous year, over a decade before the World Wide Web was introduced and the general public was admitted to the Internet. It was originally conceived as a "poor man's ARPANET," employing UUCP to offer mail and file transfers, as well as announcements through the newly developed news software. This system, developed at University of North Carolina at Chapel Hill and Duke University, was called USENET to emphasize its creators' hope that the USENIX organization would take an active role in its operation.

6. The meaning of a gateway refers to a "node on a network that serves as an entrance to another network." But here it is used in the context of searching and creating a database and providing access to frequently used information sources. So here it is used in this latter sense as creating a node in the Library home page for the frequently used information sources. It requires creating some special tools to gain access to frequently required information. One of the methods adopted by libraries is to create web catalogues and bookmark the web sites to search them regularly. The Gateways are like academic and special libraries and can be used as learning tools for respective subject. Virtual Libraries and Gateways, in particular the subject gateways are internet based services designed to help users locate high quality information that is available on the internet. They are typically databases of detailed metadata (or catalogue) records which describe the internet resources and offer a hyperlink to the resources.

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gateway editors keeping in view the audience and context/content for inclusion into the subject gateway. The accepted resource is then classified, catalogued and indexed.

8.5 KEYWORDS

Usenet : A network of newsgroups. is a network of discussion groups on the Internet. a worldwide bulletin board system for sharing asynchronous text discussion among a group of sites; there are thousands of such forums.

UUCP : UNIX-to-UNIX Copy Program, a program that lets you copy files between UNIX systems. UUCP protocols are used to transfer news and Email messages through USENET.

Web Browser : A computer software used to view and navigate documents on the Internet. Also known as a Web client program. Examples : Netscape, Mosaic, Lynx, WinWeb, and MacWeb Microsoft Internet Explorer, Mozilla Firefox

Web Page : is a document that is located on the World Wide Web. Web pages are created using HTML that is part of a group of hypertext documents or resources available on the World Wide Web, and which defines the contents of a web page such as images, text, hypertext links, video and audio files.

Web Site : is a related collection of web files that includes a beginning file called a Home Page. A collection of html files, graphic files and any other file types that are supported by the World Wide Web that can be viewed by using a World Wide Web browser. A user accesses the other pages of the site from the home page.

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