APPLICATION OF INFORMATION TECHNOLOGY (IT) IN DISTANCE LEARNING IN HIGHER EDUCATION WITH SPECIAL REFERENCE TO INDIA

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IT AND DISTANCE LEARNING

The information is a dynamic and unending resource that affects all disciplines and all walks of life. It supports education, research and development. Technology in its broad sense is the main factor determining the development of information. Information Technology (IT) is the biggest achievement in the evolution of mankind. IT is any system designed to gather, process, or distribute information or it’s the science and skill of facilitating transfer of electronic data or information from one place to another and one person to another. IT is a key phrase to indicate the dynamism that can be achieved with the convergence of computing and telecommunication. Information is researchers’ lifeblood. IT acts as a catalyst for easy and speedy transfer of information, which is most essential for all types of research. This chapter provides an overview of IT, its developments and its application in the field of distance education.

1. INFORMATION TECHNOLOGY

Information Technology is an imprecise term frequently applied to a broad area of activities and technologies associated with the use of computers and communication, but generally implying the application of computers to storage, retrieval, processing and dissemination of data. But the term is sufficiently amorphous to encompass the activities of those who design or even use any form of device that used to gather, transmit, or process digital information: digital satellite and cable television, DVDs, and digital telephony etc.
According to the Oxford English dictionary the first recorded use of the term Information Technology was in 1958 when Leavitt and Whisler wrote in the Harvard Business review (41/1) “The new technology does not have a single established name. We shall call it Information Technology”.

UNESCO (1973) defined, Information Technology as “Scientific, technological and engineering disciplines and management techniques used in information handling and processing, their applications, computers and their interaction with men and machines and associated social, economic and cultural matters”.

Information Technology represents an assemblage of technologies. These technologies are computer's ability to store and process information, and the communication technology that represents transmitting information to locations where it may be needed (Gopinath 1998). Information Technology is, in fact a convergence of three stands of technologies- computer, microelectronics and communication. Information Technology is a catch all terms used describe products and services and services created by rapid changes in computer and communication technologies and their fusion together (Mittal, 2000).

Information Technology is the new science of collecting, storing, processing and transmitting electronically the information, which is the lifeblood of complex societies, and it is growing in importance. In the growing information society the computer, and communication networks are totally interdependent and inseparable. Computer and communication are playing a key role in the growth of knowledge and information, which in turn are solely responsible for the development of the nations, communities and society in the modern period. Information Technology is the science of information handling, particularly by computers used to support the
communication of knowledge in technical, economic and social fields (Smith and Robinson, 2003).

The definitions emphasizing the significant role of computers appear not to take into its purview of communication system that is communication systems are essential to Information Technology as computers. It encompasses information science, system theory, computing, microelectronics, behavioral sciences organizations and methods techniques. In short Information Technology is a term used to denote all activities connected with computer based processing, storage and transfer of information by using communication techniques. It involves computers, electronic media, satellites, telecommunications and storage devices.

The history of man-made Information Technology is one of the slow evolutions dating back 5000 years. It has followed the mechanical and the later electronic rather than the biomedical path, with primitive signs, hieroglyphics, the alphabetic writing, the book printing, the computer type setting a more or less linear development. More recently, the television, satellite transmission, cable television, Internet, electronic mail, the computer and the microprocessor, digital cellular telephony, represent distinct qualitative changes in the Information Technology, while the fact that, we now have to accept the composite terms Information Technology to include a whole range of new developments (King, 1998)

Information Technology is not just concerned with new pieces of equipment, but with a broader spectrum of information activities. Information Technology has produced new dimensions to the handling of information. The introduction of micro-processor and mini computers have eased the procedure and the precious time of the scientists and research workers can be saved to a great extent by the application of ‘On-line’ system. The developments in Information Technology relate to processors, memory and
input/output channels, micro, mini, and large scale computers, mass storage technology, data communication, networking and distributive processing, data entry display and response technology and software (Kling, 1999).

In short Information Technology is a recent comprehensive term, which describes the whole range of process for the acquisition, storage, transmission, retrieval and processing of information. Such processes may be mechanical in nature, biomedical or chemical, electronic and now microelectronics. They have been at work without human intervention throughout the organic evolution. Information Technology comprising computer technology, current developments in micro, mini and mainframe computers, Artificial intelligence, Expert system, Communication technology, Audio visual technology, Online information retrieval, Internet, E-mail, fax, and various network technologies.

1.1 Emergence of Information Technology

First computer with data storing capability – ENIAC- that was developed in 1945 to the present, the developments in the field of computer technology have been astonishing. Computers are becoming smaller, growing in power as the prices are coming down, now PCs have become more powerful than the mainframe computers. With the development of communication technology like parallel processing and networking, the capability of several computers can be merged. The discovery of new recording media like optical disk and holographic disks, the memory of computers has grown several hundred times. Digitalization of information in 1940s was another milestone. It made the process of communication more transparent. Now any form of communication – textual, numerical, action, graphics and sound can be digitalized and stored in computer memories.
Today Information and Communication Technology have come as a boost to nations which are struggling to either remain in the forefront of or are trying to restructure their economy to create wealth.

1.2 Computer Technology

Computer Technology has attained widespread attention in the last two decades. The effectiveness based information systems are not only limited to transformation, storage and retrieval functions but also include the mechanism for control of other technologically based components of the information systems. At present computer devices are at the core of both the information revolution and the postindustrial society.

Computer acting like a fast giant brain has significant and potential impact of itself. The great potential device in data handling, acquisition, processing, storage, retrieval and dissemination and their consequent role in aiding decision making, planning, problem solving etc. and in development catalyzing activities in government, industry, research and other sectors are well recognized. Along with the above usefulness the decreasing cost and increasing power of the device make it more popular and the main driving force for the new “Information age” (Huges, 1994).

1.2.1 Current developments

The current developments in computer technology include minicomputers, micro computers, personal computers, portable computers, laptop computers, hand held computers, talking computers, computers with IQs, seeing robots microchip technology, artificial intelligence, software developments, CD-ROM, CD-W, DVD, machine readable database etc.
1.2.1.1 Microcomputers

Microcomputer is the smallest general-purpose computer. Microcomputers are self-contained units and usually designed for use by one person at a time. Magnetic tape cassettes, floppies or hard disk can be used as external storage medium with this. (Sharma, 1993)

1.2.1.2 Minicomputers

Minicomputers are general-purpose computers smaller than mainframe and give computing power without adding the prohibitive expenses associated with larger systems. The minicomputer’s size prevents it from being portable, but it can be moved more easily than a mainframe. Minicomputers integrate commercial and technical operations better than the more powerful computers. It is generally easier to use. Minicomputers are well adapted for functions such as accounting, word processing, dBase management, statistical packages for social sciences, Computer Aided Design (CAD) and numerical analysis.

1.2.1.3 Mainframe computers

A Mainframe computer processes data at several million instructions per second (MIPS). A typical mainframe computer can accommodate more than one thousand remote workstations. A technique that allows many people at terminals to access the same computer at one time is called “time sharing”. Mainframe is usually slower, less powerful and less expensive than super computers.

1.2.1.4 Speaking computers

Computers will be able to recognize the speech and change it to the textual matter; similarly they will read printed matter and speak it aloud for
those who cannot read similarly. This will help the blind to write and deaf to listen.

1.2.1.5 Intelligent Robots

Robots are intelligent machines, which act according to a set of programmed instructions. Robot’s mechanical arms do the work, which normally require several pairs of human hands. The new robots are not simple mechanical arms, but intelligent, thinking devices that can ‘see’ what they are doing. The artificial eye can make one million visual measurements per second while human eye can see up to 25 sequences of motion per second.

1.2.2 Software

The word ‘software’ uses for a set of programs that are needed to make computers perform their intended task. The word 'software' can be used in connection with all kinds of programs; it is usually used to denote programs whose use is not limited to one particular job or application.

1.2.3 Storage Technologies

For centuries paper has been considered as the appropriate medium for storing information. But now the new technologies have succeeded in storing information in various media.

1.2.3.1 CD-ROM (Compact Disc-Read only Memory)

CD-ROM was developed in 1985. The CD-ROM, as 12 cm and 1.2 mm thick discs can hold approximately 650-700 million characters equal to about 2,70,000 pages of plain text. The advantages of CD-ROMs are its huge storage capacity, durability, transportability, light weight, easy and fast access to and non-corruptibility of stored information, immunity to magnetic fields
and amenability for parallel searching by multiple users in a LAN or WAN environment.

1.2.3.2 DVD (Digital Video Disc or Digital Versatile Disc)

Digital Video Disc or Digital Versatile Disc is an optical storage medium look like a CD but with high storage capacity. DVD facilitates greater data density by making the pits smaller and the spiral tighter, small recording pits, more closely spaced tracks, and backward compatibility with CD-ROM. High Density CD (HDCD) and Fluorescent Multi-layer (FM) technology is the latest storage technologies. FMD-ROM can store 140 GB of data on a single disc. It is based on 3-D Fluorescence of chemicals in the pits and grooves.

1.3 Communication Technology

The need to communicate more quickly and more efficiently has become a central focus in our technological society. The economy, industry, education and security of industrial nations are going to depend heavily on the use of latest means of communication for a rapid change of information. Both this computers and communication technologies give birth to the Information Technology.

The main purpose of communication technology is to transmit information in the form of signals between remote locations using electrical or electromagnetic media as carriers of signals. Telecommunications has achieved impressive advances in recent years. Channel capacities, reliabilities and error rates have improved dramatically. The major developments in this area are audio-visual technology, teletext, videotext, fax, online services, Internet, e-mail, satellite technology, ISDN, networking, tele-conference, cellular telephones and voice mail etc.
1.3.1 Fiber optics

Fiber optics is very reliable communication channels and they transmit data in digital form. They use light impulses that travel through clear flexible tubing (tiny threads of glass or plastic). A single glass fiber is thinner than the size of a human hair and it can transmit all the characters in dozens of books of the same size of the one across the community in a single second (it would take about 21 hours to send the same information over a copper telephone line.)

Fiber optics can transmit data at very high speed without any errors. Unlike wire cables fiber optic cable are not subject to electrical interference. They do however require repeaters to read and boost the signal strength because light pulses will lose signal strength over long distances. Optical fiber has high frequency and bandwidth. The data rate of optical fiber is dependent upon the fiber composition.

1.3.2 Multimedia telephone technology: ISDN

The department of telecommunications introduced a new range of powerful communication services to both business and residential subscribers with the introduction of Integrated Services Digital Network (ISDN) in India since 1995. This technology was initially introduced through hi-tech imported exchanges set up in six principal cities, namely Delhi, Mumbai, Calcutta, Madras, Bangalore and Ahmedabad. A single telephone connection can be energized for simultaneous transmission of voice, text, data and video images when hooked to ISDN. The network provides attractive multimedia facilities such as video conferencing and high-speed file transfer between personal computers even at international level.
1.4 NETWORKS

The concept or idea of network is not new but it has derived a great deal of support and attention due to the advancement in the field of computer and communication technologies. Interconnected and inter-linked computer systems are meant by computer networks. In other words, a system in which many computer points and terminals stretching over a room or building or city or state or nation or the world are connected with each other for information communication. In a networked environment it is easy to transmit any kind of data to any part of the world almost simultaneously, at a very less cost without any difficulty and that also without parting with the document physically. Initially the extent of networks did not go beyond the walls of a single Institute. Several computers of the same Institute could be linked together to form Local Area Networks (LANs) when the technique of digital switching was invented during the mid 1960s, information could be digitized and transmitted through ordinary telephone lines. This technology permitted computers located at different destinations to be interconnected. Thus Wide Area Networks (WANs) could be created at regional, national and international levels.

In the field of Information Technology the most important breakthrough was the discovery that telecommunication channels could be harnessed for carrying digitized information. This facilitated interconnections of computers globally. Computers all over the world has joined together to form what is called Information Superhighway or Internet.

1.4.1 Wireless LAN

The wireless Local Area Network, support the layer between the end user and the higher orders of information resources of an organization. In few cases traditional desktop personal computers can become wireless devices by
adding a transceiver board in place of wire communication. The more popular use of wireless LAN technology is likely to be in support of new user interface devices that are built for the wireless world, like laptop or network computers, personal digital assistants, wireless resource interfacing. Wireless LAN has various advantages like flexibility, portability, modest cost, movable installation and multiple system interconnectivity. They bring mobile workers into the information world as fulltime partners and allow other workers to migrate to mobile operations in order to improve their performance and productivity within organizations.

1.4.2 THE INTERNET

The Internet is the largest, most powerful computer network in the world. It encompasses 1.3 million computers with Internet addresses that are used by up to 30 million people in more than fifty countries. Internet is worldwide network of computers connected together between almost major countries with the optical fiber, satellite and telephone lines. As more and more colleges, universities, schools, companies, and private citizens connect to the Internet either through affiliations with regional not-for-profit networks or by subscribing to information services provided by for-profit companies, more possibilities are opened for distance educators to overcome time and distance to reach students. Internet in simple words is a network of networks. The term Internet is defined as a system of linked computer networks, world wide in scope that facilitates data communication services such as remote log-in, file transfer, electronic mail and news groups. The Internet is a way of connecting existing computer networks that greatly extends the reach of each participating system. This is a venue of information exchange. Millions of data bases and files available on the net, which one can get at the touch of a finger. To be more technical, Internet is a worldwide network of networks. It is a
conglomeration of smaller networks and other connected machines spanning the entire globe. According to the Internet Society, it consists today to cover 30,000 networks in 96 countries. Around the world, each country has at least one backbone network that operates at very high speed and carries the bulk of the traffic. Other smaller networks connected to that backbone.

The Internet technologies and its suite of tools are ground braking breakthrough inventions achieved by mankind during the past couple of decades. Perhaps no other technology had influenced the society at large world wide, in terms of its degree of penetration and as a primary agent of radical changes in the overall social paradigm shift process, in the shortest period over. Internet technologies are under rapid proliferation, perfection, stabilization and absorption, and it has made tremendous influence in almost every discipline and areas of human activity the world over with the fastest track record. Considering the impact of this technology, the inventor of the World Wide Web, Dr. Tim Berners-Lee was awarded the first-ever Millennium technology Prize (April 15, 2004), given away by the Finnish Nobel Prize Foundation.

Internet has been instrumental in crossing successfully two major barriers in human communication such as ‘time’ and ‘distance’. The ‘24 x 7 x 365’ formula for uninterrupted and instant access to information of one’s choice, anytime from anywhere and by anyone in any desired format, is a dream-cum-true achievement of Ranganathan’s philosophies. Thanks to the robust Internet boost technologies, today, information access has come virtually at the click of a button, 24 hours a day and from anywhere in the world.

The distributed computing philosophy of the Internet is built on the strong footing of client server technologies. One of the unique features of the Internet is that it is not owned by any country, organization (s), institution (s)
or individual (s). Overall it is the result of the voluntary, contributory and selfless efforts of many, and it is world’s democracy. Almost all the countries of the world are partners of this network and the Internet has no borders. The Internet technologies are a multi utility and multifaceted. It concurrently performs the role of a robust communication tool, a vast and ever-growing information repository, an impeccable computing space and amazing publishing medium. As a mass media, it has evolved as the mother media, capable of embracing almost all the existing mass media (radio, TV, Press, Movies, and Telephone etc) and it has absorbed all the prevailing digital multimedia formats. In other words it is pro-convergence of technologies.

The Internet has fairly fast, emerged as a global information infrastructure facilitating the content creation, content publishing, and content delivery on the web across the globe. This has great and far reaching significance and implications over the academic and professional world. Efforts are also fast progressing towards taking this information infrastructure to the grass –root levels of the society by means of e-governance.

The difference between the Internet and other more traditional forms of information is, the Internet offers information on demand. No one filters or decides what information is most important or the most relevant for the user. The user is in charge of tapping the vast resources of the Internet. He decides what questions to ask and how much information he wants and when he needs it. Several online services which include sending e-mails, searching information sources online, chat with people located at far off places, involve in exchange of information among people with identical professional interest are available in the Internet. One can provide new publications in the net through millions of websites. Initially the communication protocols were not very user friendly. More user-friendly communication protocols were developed to make the Internet a popular means of global communication.
1.4.2.1 INTERNET TOOLS AND FACILITIES

Important tools and facilities available from the internet are described in following sections:

1.4.2.1.1 Electronic mail (E-mail)

Electronic mail is a most widely distributed form of electronic communication via computer networking. It is usually defined as a mechanism for one-to-one correspondence, and sometimes one-to-few. It is much faster than the conventional postal services. Messages can reach destination within seconds. The mail is transferred between machines on the Internet, which act as post boxes that store the mail, so that there is no need to leave the computer switched on. Although e-mail software varies such as PINE, Mail X, the basics of using e-mail are the same. Most of the software have the facilities to save, print or reply to a message and some allow programs, videos or graphics, different kinds of networks, each one with its own mix of computers and software work together to exchange mail so quickly and reliably by means of a standard system called S.M.T.P (Simple Mail Transfer Protocol) which is a part of the TCP/IP (Transmission Control Protocol/Internet Protocol).

Electronic mail is usually used to exchange messages and data files. Each user is assigned an electronic mail box. Using appropriate command, the user can scan a list of messages in the mailbox and display the contents of a particular message, send a message to another user and so forth. To send a message it is not necessary for the recipient to be present at the computer. The message resides in the mailbox until it is read. The sender may restrict delivery of the message to authorized reader by using a password. That is, the recipient must ‘sign in’ for the message by typing his or her identifying password. Many other features of standard mail delivery are implemented in
electronic mail systems. An e-mail system can deliver copies of a message to all individuals listed in a certain file. It also allows merging of standard data.

1.4.2.1.2. File Transfer Protocol (FTP)

The placing and retrieving of files over the Internet by File Transfer Protocol is one of the most useful facilities. F.T.P., a File Transfer Protocol which uses TCP/IP, is an application program available through Internet. It is a tool, which allows computers to communicate with one another and consequently allows users to transfer files to one another remotely. These files may contain a variety of information, which could be software, games, and documents. To connect a remote computer one must know the address, have a user ID and a password. Many computers are now set up as anonymous F.T.P. services which allow any user to download files or programs.

1.4.2.1.3. Telnet

Telnet is a utility, which will allow the users to log-on another system and use various services available on that host. It is a version of file transfer protocol, which allows transfer files from the TCP/IP host by simply typing the host name or IP number. Thus one can telnet into huge databases for research or even Telnet into libraries around the world to check if they have a particular book that one looking for.

1.4.2.1.4. Mailing Lists or List Servers

A list server/mail server is a discussion group created to share ideas and knowledge on a subject. If one sends a message to the central address, everyone else on the list receives a copy of what he wrote, and he receives a copy of e-mail that the other subscribers send to the central address as well. This provides an excellent resource for distributing information to group with
a shared interest. Discussion groups are usually created and monitored by someone with an interest in that subject and are open to anyone.

1.4.2.1.5. Usenet Groups

Newsgroups are public forums like mailing lists for the discussion of various subjects. Conversation in Usenet newsgroups find to be organized around broader topics and one usually less focused than discussion on mailing lists. Technically Usenet News is not a part of the Internet but rather uses the Internet as a means of transmission. Under Usenet one reads the articles with the help of a news reader, a special program that lists in choose which newsgroup article to read.

1.4.2.1.6. Archie

Archie is a collection of servers. Each of these servers is responsible for keeping track of file locations in several different anonymous F.T.P. sites. All of the Archie Servers talk to each other and they pool their information into a huge, global database that is periodically updated. An Archie search for a particular file or program, gives a list of Internet address of F.T.P. sites along with the sub directories where the files is located. These files can be down loaded using File Transfer Protocol.

1.4.2.1.7. Gopher

Gopher is the name of a program, which searches out information stored on computers connected to the Internet. It uses a menu-based approach in searching for items or republishing other Internet resources. Gopher’s interconnected menus allow burrowing deeper and deeper until find the information that is looking for.
1.4.2.1.8. World Wide Web (W.W.W)

The word ‘World Wide Web’ has become synonymous with the Internet. In fact, the web is just one Internet application. It is a way of using this vast interconnected network to find and view information around the world. It is non-hierarchical means of browsing the resources of the Internet. It represents an attempt to get away from the often unfriendly and limited terminal based methods of displaying Internet information by presenting the Internet as a series of linked pages, which have hot spots and key words. By just clicking on the keyword one can automatically enter into a new document somewhere else in the world and this new document could even have links to other documents around the world, and so on.

World Wide Web (WWW), the Graphic User Interface (GUI) service from the family of Internet technologies plays the most important and dual role as a gigantic information repository distributed and scattered across the globe, and it is the most used interface for human communication. For the first time in the history of mankind, the static text became ‘hypertext’ and it opened up a wonderful and astounding “hypermedia” world to the humanity. The WWW browser has become the virtually universal client and single most used software tool so familiar to the maximum number of users in the world. The belief that Internet is accessible only through PCs (Personal Computers) and has been addressed proactively with the developments in technology convergence and innovations in communication technologies. Internet is now accessed by Laptops, Tablet PCs, PDA (Personal Digital Assistants), Mobile phones, Palms, TVs, and Simputers etc. With the application of Wireless Application Protocol (WAP) and its integration with TCP/IP, the Internet has become truly mobile. Internet has been successful in breaking the earlier models of economics of information, which postulated that the reach and richness of information are inversely proportional.
1.4.2.9. Netscape Navigator

Netscape is the clear winner of the available browsers. The Netscape Navigator provides the best organized, best performing and most efficient web tool. Netscape provides web browser technology in every way, from online multimedia support to advanced HTML rendering to security. One of the Navigator’s most innovative new features is its ability to view multimedia objects embedded in a page. Through the use of plug-ins, one can view objects and also use audio and video files. Once the Netscape Navigator is running, it provides the most advanced features including many new formatting tags in HTML. It allows bookmark facility so that with Navigator one can automatically check the entire bookmark list to see what pages have changed since one last visited them.

1.4.2.10. Electronic Magazines or E-Journals

The Internet has brought electronic publishing within the reach of virtually anyone with an Internet access or account. The electronic media can offer greater coverage and currency of information with more capacity and flexibility in publishing. There are on-line electronic magazines and journals, which cover a wide range of topics and have varying degree of formality and publishing schedules. Mailing lists are also used to send out information from a central source, without providing a forum for discussion. The lists of electronic magazines are also called e-zines and its names may convey something of their content.

1.4.2.11. Chat

Chat is another form of communication through Internet. Unlike e-mail chat is synchronous which means both the people participate at the same time. Chatting is a form of simultaneous, immediate communication. With a chat program, one can join in conversations, and then whatever type appears on the
screen of everyone else who is participating in or listening in the conversations. It is also possible to direct messages to specific people.

1.4.2.2 Online information services

With the development of Internet in the 1980, people began to depend more on on-line sources to satisfy their current and long range information demands. Internet search tools are becoming increasingly sophisticated. Together with the development of common Internet protocols for the transport and display of multimedia information, they are continuing to increase the percentage of the world’s information output that is available on the Internet. These trends in turn are giving rise to the development of evermore-efficient tools for keeping information seekers aware of current information in their areas of interest.

1.5 Cellular mobile phone technology

Cellular mobile system is basically a radiotelephone system and from the users’ angle, it is just like a cordless telephone instrument. Cellular telephones transmit signals in an imaginary hexagonal geographical area called a ‘cell’. Each cell contains a trans receiver station or BTS. Each BTS is connected to a base station controller through a cable of microwave link. Since the cells are hexagonal in shape, six other cells surround each cell. Thus there could be thousands of cells covering vast geographical area, all collectively using the same handful of radio signals, and still providing a large number of connections. The cellular mobile telephones, which are now very much popular in our country, can be used to communicate with any other telephone in the world.

Mobile technologies provide wide access information from networks. There are several mobile technologies. Some of the most used mobile technologies are:
a) WAP (Wireless Application Protocol)
b) GPRS (General Packet Radio Service)
c) UMTS (Universal Mobile Telecommunications System)

1.6 Developments in Communication Technologies

Communication Technology is concerned with the transfer of data over distance by means of communication links, where communication between large numbers of information sources is desired. For effective transmission of data combination of computer technology and telecommunication links is an important prerequisite. Actually computers are entrusted with the functions of processing information, while telecommunications dedicated to the transmission of information. The major developments in this area are:

1.6.1 Facsimile Transmission (Fax)

Fax is a mean of transmitting a copy of a page of text or graphics to a remote location via telecommunication links. Fax is one possible technology for electronic document delivery. The main advantage of fax is that it transmits text, graphics, diagrams, etc. easily as it treats them all as still pictures.

1.6.2 Video text

Video text, has been defined as a system for the widespread dissemination textual and graphic information by wholly electronic means for display on low cost terminals under the selective control of the recipient using control procedure easily understood by the users. Video text system is useful in disseminating general information.
1.6.3 Teletext

The non interactive form of video text is called teletext. Teletext is the main generic term for transmission of pages of information as digitized signals through the television medium. It is a system designed for the general public and mass communication. The system has the advantage of being relatively easy to use and equally low priced.

1.6.4 Tele conferencing

Telecommunication means connection of several locations by television link to provide continuous interconnection of sound and light. In tele conferencing several people can have communication, without any of them leaving their office. The communication satellite can increase the effectiveness of teleconferencing. It is a mode of group communication. Therefore the willingness of each participant is essentially required.

1.6.5 Video conferencing

Video conferencing is an electronic meeting in which geographically separated groups communicate using interactive audio and video technology. The technological advances in codecs, in cameras and in audio systems and displays, slash reduction in and recent decrease in the cost of telecommunications networking have accelerated the growth of video conferencing. Video conferencing is a time saving and economy device, adopted for long distance education.

1.6.6 Multimedia

The term multimedia is formed by the combination of two words – Multi and Media, Multi refers to many i.e. at least two, and Media is the plural forms of medium. Multimedia as the name suggests, employ more than
one medium for presentation of information, various component of multimedia are text, sound, picture, animation and video.

1.6.7 Hyper media and Hypertext

Hypermedia is a mechanism for improvising access to information. It is a hyper representation of textual and non textual information. The hallmark of hypermedia system is its capability to link together related forms of information, in a flexible and easily adaptable manner.

Hypertext may be defined as an electronic system to manage a collection of information that can be accessed non-sequentially. As a technology it is still developing but it holds great promise as a highly sophisticated, user-friendly knowledge base.

1.6.8 Databases and Database Management Systems

A database is a collection of logically related pieces of electronic information, that have been organized in to categories and grouped in to units. Databases are created so that stored information can be found when needed. It is designed, built, and populated to take in information and information sources acquired for the specific purpose of serving user groups. DBMS (Database Management System) is the software used to manipulate and access data stored in a database. It provides facilities that allow users to deal with data without needing to know how that data is actually stored or retrieved. DBMS acts as an interface between the user and the data.

1.7 Emerging Technologies

Emerging technologies in the field of IT is given in the following sections:
1.7.1 Artificial Intelligence (AI)

Artificial intelligence is the science and engineering of making intelligent machines, especially intelligent computer program. It is concerned with study and creation of computer systems that exhibit some form of intelligence. It is a branch of science, which deals helping machines, find solution to complex problems in a more human like fashion. It can use for information retrieval purposes.

Artificial intelligence (AI) is one of the most interesting and active areas of computer science. Artificial Intelligence can be defined as “the area of computer science that deals with the ways in which computers can be made to perform cognitive functions ascribed to human. Although it gives us a general notion about AI, in fact there are three different views on what the term AI means.

1) AI is the embodiment of human intellectual capabilities within a computer. This view is called strong Artificial Intelligence.

2) AI is a set of computer programs that produce output that would be considered to reflect intelligence if it were generated by humans.

3) AI is the study of mental facilities through the use of mental models implemented on a computer. This view is called weak Artificial Intelligence.

Here intelligence has not yet been completely defined till now. Most experts think that the next break through will be artificial intelligence. The ability of machines to think and predict, will change the way we use computers.
1.7.2 Expert systems

Expert systems are one of the first and the most practical applications derived from the research on artificial intelligence. Expert system is software, based on certain concepts of artificial intelligence that acts as a consultant or an expert, in a specific field or discipline to help solve a problem or help make a decision. Expert systems are also referred to as knowledge based systems. Expert systems attempt to supply both the knowledge and reasoning of human beings. They are expert only in one field, topic or discipline. They can help solve only a narrowly defined problem. The user provides data about a problem through a keyboard and the computer responds with an answer and explanation based on facts and rules that have earlier been extracted from human experts and stored in the computer.

An expert system cannot entirely duplicate a human expert’s judgment or make the final decision. But it can offer opinions, suggest possible diagnosis and suggest various solutions to a problem. These programs are usually used as a supplemental source of advice. Because of their usefulness expert systems are one of the first results of artificial intelligence research to become a viable commercial product. Until recently most expert systems were designed for use only with large computers because programming demanded so much power and memory. Now many expert systems can be sued with microcomputers, however these programs are still very expensive.

An expert system consists of:

1. A knowledge base on a specific topic is a stored collection of facts on a particular subject and the hundreds or thousands of situations by which the facts relate.
2. An inference engine in a set of re-usable programs that allows the computer to intelligently apply the facts and information to a particular problem. It retrieves and manipulates the facts and rules.

1.7.3 Virtual Reality (VR)

Webster's defines 'Virtual' as "being such in essence or effect though not formally recognized or admitted" and 'Reality' as "the quality or state of being real". Yet, there is much being "recognized formally" about this new state of "being real" currently by the techno-elite. This "state" is a computer generated simulation of a real or imagined 3-dimensional environment that is user interactive. The level at which users can interact is dependant upon the available hardware. Currently it is possible for users to immerse themselves in these simulated environments with the use of head gear (HMD's) that feed computer images to screens in front of the eyes and provide surround sound audio, which give the user the added sense of distance and depth in the virtual world. Gloves and full body suits equipped with networks of sensors are capable of transmitting changes in body orientation, thus giving the user the full sense of actually being in the simulated environment and the ability to interact much the same as one does in actual reality. There is not much data available on the effectiveness of this medium on distance education due to the "newness" of the technology. Virtual Reality is the simulation of reality through real time, three dimension modeling, position tracking and stereo, audio and video techniques. VR system brakes away from the convention of the user/screen interface and surround users with a realistic computer generated environment. Users can directly participate in simulation of process at any scale, calling up linked hyper media information and explanation when they need it. Virtual Reality is in itself a relatively new venue for interaction.
1.7.4 Smart Card

Similar in look and size to a credit card, a smart card has an embedded microprocessor or memory chip, or both, instead of magnetic strip commonly found on credit and debit cards. It provides not only memory capacity, but computational capacity as well. The self-containment of smart card makes it resistant to attack, as it does not need to depend upon potentially vulnerable external resources. This technology will have several applications in identification, authentication, access control, healthcare, finance, administration, etc.

ICT have been playing a substantial role in the field of distance education since its inception. The revolution of information and communication technologies is registering significant changes in all types of distance learning institutions in the country. Availability of powerful computers at affordable cost, spread of telecommunication network to remote areas, advent of the Internet, increasing interest in creating digital content are some of the significant forces accelerating the pace of these changes in the field of distance education. On the other hand distance education institutions and Open Universities are faced with increasing number of challenges to cope with new kinds of demands. These challenges are mainly due to explosion of students, increasing cost of the preparation and compilation of study materials and their changing formats, etc. Catching up with the technology dynamics in line with demands from the part of distance learners poses tremendous threats and pressures to those who manage the distance education field in India.

The Internet is arguably the electronic resource that is now having the most significant impact in the field of distance education throughout the world. The strength of the Internet is due to its multifaceted nature since it simultaneously fulfils three important roles in the field of distance education. First, it is a resource that can be consulted and used like any other reference
tool. Second, it is more dynamic and far-reaching than any other resource used in the context of distance education. Finally, it provides a medium of communication that has extended the potential of open institutions for interaction beyond the physical institution (to colleagues, faculties and other officials). The advent of the Internet and its suite of tools have literally revolutionized the distance education process, as it allows access and dissemination of digital documents through its various tools like WWW, FTP, Telnet, Gopher etc. also this medium acts in multiple ways towards the substantially strengthening the digital collection of documents which can be utilized by the distance learners for their various academic purposes.

1.8 Information Technology crisis.

Information Technology offers an unlimited access to the vast depositories of data or information in terms of millions. But nobody can make use of more than 10 percent of such a vast ocean of data or information, for they are fragmented, disorganized, unrelated and inassimilable. Now we can imagine the magnitude of the great wastage of human brainpower and other resources associated with IT for the generation, processing and transfer of such an unusable data and information. Humanity cannot afford such a loss for long. Hence a great fall of IT is inevitable within a short span of time.

Humanity needs filtered, logically organized or structured and meaningful information. That can be assimilated and retained. That alone becomes the part of the knowledge base. Without Knowledge, data or information has no value. IT makes people rich in information and poor in knowledge. Now even ordinary housewife needs knowledge in so many domains in dealing with day-to-day problems. IT has not yet matured enough to handle or process knowledge and meeting the ever-expanding knowledge needs of humanity.
All efforts in Artificial Intelligence, Experts Systems and the recent advance in web technology, HTML, XML and Semantic Web could not make much stride. This is because of a lack of proper understanding of the structure, meaningful organization and representation of knowledge and how knowledge is created, developed and retained in the brain for further use.

When we study the thinking process of the human brain, we can identify well-structured patterns of knowledge processing and communication of thought with a series of well-defined symbols. The existing pattern of the accessibility of knowledge and its processing and its creation or generation of man is very inefficient. Human being still now could use only less than 8 per cent of the actual potentialities of the brain.

For years we have struggled with the need for increased quantity and quality of services and support. There are many issues which characterize the current crisis of Information Technology:

a) Demand for central IT organizations are overwhelming
b) Support quality deteriorating
c) Lack of logical connection among the contents received

For solving the problems resulted from the crisis of IT the following components should be developed:

- Knowledge based products and services in a logical manner
- A strategic economic model
- A support mechanism focused on customer needs
- A reliable baseline information infrastructure

1.8.1 Rise of Knowledge Technology
All the existing knowledge, from the time of Vedas to the latest developments in Information Technology, has a common pattern and it is coded. If we could develop a device or formula for decoding the existing pattern of knowledge by analyzing the symbols used for the representation of their meaning and modify these patterns, then we could attain wonders in understanding the existing knowledge and creating a massive amount of new knowledge or even wisdom within a very short span of time. It is possible to find out a network-like pattern or structure when we put together all the existing knowledge, either scientific or aesthetic or mystical or spiritual. The total knowledge stock acquired or accessed by an individual in his life span is so small and there is no justification for spending so much time, energy and resources to acquire such a small stock of knowledge and to brand oneself as scholar or specialist. Our education system and the learning models are totally inefficient and unsuitable to the modern society, for they originally evolved when the total stock of knowledge was very small. A major shift from information to knowledge has been taking place. That leads to the emergence of a true knowledge society on a global basis (Mathew, 2005).

1.8.2 Knowledge Technology

Knowledge Science and ‘Knowledge Technology’ will determine the future of humanity. They provide the tools for the effective processing and application of knowledge so as to develop Knowledge Industry and the Cyber Society. Then it is possible to bring all the knowledge spread across hundreds of domains or disciplines into a single or unified system of conglomerated or embedded system so that an individual with average intellectual caliber can attain expertise in several domains within a short span of time.

Knowledge Science and Technology are to be designed and developed to deal with augmentation of the thinking process by way of deliberate modification of knowledge assimilation and knowledge creation process of
the human brain and restructuring the pattern of knowledge organization with the development so suitable hardware and software that involves a series of complex tasks. Advanced level study and research in this field must be conducted.

Knowledge Technology and Knowledge Industry offer unlimited employment and developmental opportunities to the country. The actual strength of Indian is its traditional knowledge base that stimulates and activated the Indian youth to assimilate new knowledge. If we can tap the superior brainpower of the youth of our country, India can emerge as the most wealthy and powerful nation of the world within ten years. It is high time to develop and implement strategies and policies for the development of Knowledge Industry in India (Mathew, 2005).

1.8.3 Knowmatics

Knowmatics is a scientific, mathematical and engineering study of the structure, organization, representation, preservation, and communication of diverse domains of knowledge so as to formulate algorithms to process and handle knowledge by the combined application of human brain and machines. With the formulations of algorithms, software could be developed for knowledge processing (Mathew, 2005).

Knowmatics provided the methodological and theoretical tools for knowledge technology to process and handle knowledge in diverse domains at different levels by knowledge workers and experts so as to develop knowledge Industry to bring out knowledge based products, packages and services, as tradable commodities, in the global market.

1.8.4 Cybernetics
Cybernetics is the study of communication in human and machine and combines the concepts from information theory, feedback control system (both biological and machine) and electronic computer (Karisiddappa and Padhi, 1989).

Hantula (1998) defined cybernetics as the science of control and communication in the animal and machine. This definition relates to cybernetics closely first of all with the theory of automatic control and with physiology, particularly the physiology of nervous system, subsequently the computers and areas of mathematics related to it. Mathematical logic had a great influence on the developments of cybernetics. The reason is that computer can be used not only for automatic calculation but also for conversions of information including various types of information processing passes in control systems.

1.9 Cyber societies

Information Technology revolution with its converging set of technologies in microelectronics, computing, telecommunications broadcasting, opt electronics and genetic engineering has given birth to the cyber societies. Cyber society is a highly networked knowledge based digital society where the most important resource is knowledge or ‘intellectual capital’. The importance of computer mediated communication and its attendant social structures lies in the sense of mobility – first, an ability to move from place to place without having physically traveled and second, it is also a mobility of status, class, social role and character. As such it would be apt to call modern society as ‘Cyber society’.

2. DISTANCE LEARNING

Education is recognized as a life long process and people of the modern world are more job-oriented. In such a situation distance education is
the only means for attaining the job-oriented education. Information Technology should be applied in distance education for its modernization and for its sustained development. In such a system learners can study at their own time, place and without face to face contact with teacher. It will lead to a cost effective and more efficient learning culture.

Distance learning is a system of learning in which students study in their own homes or at local centers using materials mailed or broadcast from a central unit. Actually distance learning has been around with us since the advent of the written language. In the modern context distance Education is instructional delivery that does not constrain the student to be physically present in the same location as the instructor. Historically, Distance Education meant correspondence study. Today, audio, video, and computer technologies are more common delivery modes. The objectives of such a system was to open up opportunities by covering barriers of geographic isolations, personal or work commitments and conventional course structures which have often limited access to educational and training facilities.

There are various terms used in English language for this field of education like ‘correspondence study, home study, external study, independent learning, teaching at a distance, off-campus study, open learning, tele learning etc.’ In the modern time the distance learning has attained more coverage and communication techniques enable distance-learning courses to give greater educational content to the students and as a result increase its acceptability as a system of education. Information Technology is nowadays used as a supplementary tool in classroom teaching. There are certain communication technologies, which are gradually being accepted over a period of time like radio talks. However there are certain technologies that could not be accepted over a period of time like multimedia techniques. Cost, existing staffs etc. are barriers in this regard.
Distance Education has emerged and got popularized as an alternative stream of education to take educational benefits to the unreached and the marginalized of society. The concept and philosophy as well as the growth and coverage of distance education in the country are examined in this section.

2.1 Philosophy

The philosophy of distance education firmly rests on two important assumptions: education is a life-long process and it should cater to the requirements of all learners. In fact, it marks a paradigm shift from the teacher-centered to the learner-centered education. Distance education has successfully woven out a philosophy of its own, which stands close to human endurance and civilized life. As Bomani (1982) puts it, distance education actually extends the pursuits of the formal system of education to the adult learners. The theoretical perspective of distance education also places its foot on the de-schooling arguments of Ivan Illich (1971) accepting the idea that what, where, when, and how to study are the issues which ought to be decided by the learner and not by anyone else. This idea has given the perspective of learner centricity to distance education. Both the assumptions of distance education appear to have their foundation in democracy.

According to Myrdal (1971), education has been, from the very beginning, driven by undemocratic filthy interests to maintain the public away from it making the whole system rigid. The cleft between the rich educated and the poor illiterate has been sustained providing to it all the required philosophic, ideological, and scientific support. The proponents of the traditional system of education artificially erected several entry barriers. The advent of modern democratic values and egalitarian thoughts hardly permits feudalistic notions of education and advances arguments for declaring education as a fundamental right. Apart from the change in the basic
framework of education, distance education has enabled to revolutionize the role played by the learner in acquiring knowledge and information. In distance education, it is the responsibility of the learner to learn on his own by using the support devices provided by the distance education agency.

### 2.2 Concept

According to Moore (1977) “Distance education is planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as special organizational and administrative arrangements”.

It was Keegan (1990) who has attempted to make a synthesis of most of the definitions of distance education. He finds that distance education has the following important characteristics first, the quasi-permanent separation of teacher and learner throughout the length of the learning process; secondly, the influence of an educational organization, both in planning and preparation of learning materials and in the provision of student-support services; thirdly, the use of technical media, print media, video media or computer, to unite teacher and learner and carry the content of the course. Fourthly, the provision of two-way communication so that the student may benefit from or even initiate a dialogue and finally, the quasi-permanent absence of a learning group throughout the length of the learning process so that people are usually taught as individuals and not in groups, with the possibility of occasional meeting for both didactic and socialization purposes.

Holmberg (1995) defines distance education as that kind of education which covers the various forms of study at all levels which are not under continuous and immediate supervision of tutors present with their students in
lecture rooms on the same premises, but, which nevertheless, benefits from the planning, guidance, and tuition of a tutorial organization.

2.3 Emergence and evolution: International scene

The modern history of correspondence education is traced back to 1840 with Isaac Pitman offering short-term courses through correspondence. The formal correspondence education programs were initiated in Europe and U.S.A. In the later half of the 19th century in Russia, Australia, and New Zealand correspondence education come to be used. The early beginnings of these attempts may be traced in the correspondence courses of U.S.A, Australia, and Great Britain, which sprang up from the inherent desire to learn more on the part of by a few determined individuals.

There has been a general expansion in education in the 1960s all over the world. The global enrolment increased from 419.9 million in 1995. The enrolment in developing countries increased from 207.5 million to 858.2 million during the period (UNESCO, 1998). This has been acclaimed as a colossal human achievement in filling the education cup even half-full. By the late 1960s, it was being argued that it would be difficult to sustain the rate of educational expansion. Factors like quest for social advancement, social status attached to university degree, and lack of employment opportunities have pushed up enormously the demand for higher education. However as Coombs (1985) observed, there was a quantitative mismatch between the social demand for education and the means for meeting it, as the developing countries of the world faced an unprecedented set of demands. Similar efforts could be traced in India to expand the higher education sector. Phenomenal growth has taken place in the various segments of Indian higher education. The number of universities increased from 20 to 273 and number of affiliated colleges from 500 to 11,831 during the period from 1947 to 2001. The student
population increased from 0.2 million to over 7.7 million. However, the spread of higher education has been confined to 7.8 percent of Indian population in the relevant age group of 17-23, whereas the corresponding enrolment ratio in the Organization of Economic Co-operation of Developed Countries OECD) was 50 percent; Middle Income Countries 21 percent. But among the Low Income Countries the proportion was only six percent. In 2000-‘01 academic session, 7.73 million students were enrolled in the universities and affiliated colleges in India. This represents only about nine percent of student population enrolment worldwide, which is insignificant reckoned in terms of India’s current population of over one billion (Tiwari, 2002). Despite quantitative advancement, budgetary constraints are holding back the improvement of the quality of education. Further, there remain a large number of adults who never had gone to school or had dropped out early in their educational career; their life chances are restricted and their potential contribution to their society also is lost. A consensus is prevalent on the view that the existing system of higher education cannot meet these demands, as it is too rigid and expensive. Not only has the shortage of resources kept students out of college, but has restricted the quality of education for those who do get there. Recent accounts of higher education in many developing countries tell the story of teaching without resources, of libraries without journals, of the desperate pursuit of research without equipment. Quality has inevitably suffered as the educational apparatus has been impoverished (Perraton, 2000).

Though the history of distance education can be tracked back to the early 1700s in the form of correspondence education, but technology-based distance education might be best linked to the introduction of audiovisual devices into the schools in the early 1900s. The first catalog of instruction films appeared in 1910 and in 1913 (Reiser, 1987). Thomas Edison proclaimed that, due to the invention of film, "Our school system will be
completely changed in the next ten years" (Saettler, 1968). This dramatic change didn't occur, but instructional media were introduced into many extension programs by 1920 in the form of slides and motion pictures just as they were in the classroom. In tracing the history of distance education, the introduction of television as an instructional medium appears as an important entry point for theorists and practitioners outside of the correspondence education tradition, and marks parallel paths for correspondence study and instructional media.

Although instructional radio failed in the 1930s, instructional television was viewed with new hope. In 1932, seven years before television was introduced at the New York World's Fair, the State University of Iowa began experimenting with transmitting instructional courses. World War II slowed the introduction of television, but military training efforts had demonstrated the potential for using audio-visual media in teaching.

The apparent success of audio-visual generated a renewed interest in using it in the schools and in the decade following the war there were intensive research programs (Reiser, 1987). Most of these studies were directed at understanding and generating theory on how instructional media affected classroom learning.

The 1940s saw great interest in television by educators but little action and by 1948 only five U.S. educational institutions were involved in television with Iowa State being the first on the air. Early studies by educators tended to show that student achievement from classroom television was as successful as from traditional face-to-face instruction. By the late 1950s, 17 programs used television in their instructional materials. The use of educational television tended to grow slowly but by 1961, 53 stations were affiliated with the National Educational Television Network (NET) with the primary goal of sharing films and coordinating scheduling. Although
instructional television would never realize what many thought was its potential, it was having limited success and had, unlike instructional radio, established a foothold in the minds of educators.

In 1956 the Correspondence Study Division of the NUEA conducted a study of the use of television to support correspondence instruction. The survey report recommended research to measure the effectiveness of television as an educational tool and, with a grant from the Ford Foundation, Gayle Childs studied television instruction in combination with correspondence study. In one of the earliest education vs. media studies, Childs concluded that television is not an instructional method, but an instrument for transmitting instruction. He also found no appreciable difference in the achievement level of students taught in regular classrooms by means of television or by a combination of correspondence study and television.

In the early 1960s, the innovative Midwest Program on Airborne Television Instruction (MPATI) launched its "flying classroom" from an airfield near Purdue University in Lafayette, Indiana to broadcast instructional programs to school systems and the general public in Indiana and five surrounding states (Smith, 1961). At its peak, MPATI would transmit educational television programs to nearly 2,000 public schools and universities reaching almost 400,000 students in 6500 classrooms in Indiana and five surrounding states (Gordon, 1990). This experiment in learning was the culmination of an educational vision for some educators and the result of a $7 million grant from the Ford Foundation (Carnegie Commission, 1979), a small part of the $170 million spent by the foundation.

By the mid 1960s, much of the interest in funding instructional television had abated, and the Ford Foundation shifted its support to public television. Much of the blame was placed on the mediocre quality of the
instructional programming, which was often little more than a teacher delivering a lecture (Reiser, 1987). The 1967 Carnegie Commission on Higher Education concluded: "the role played in formal education by instructional television has been on the whole a small one... With minor exceptions, the total disappearance of instructional television would leave the educational system fundamentally unchanged". Reasons given for instructional television not being adopted included teacher resistance to television in the classroom, the expense of the television systems, and the inability of television alone to meet the various conditions for student learning (Reiser, 1987).

In the late 1960s and early 1970s, microwave technology developed, costs went down, and Universities began to set up microwave networks to take advantage of the Instructional Television Fixed Service (ITFS) authorized by the Federal Communications Commission. The Carnegie Commission on Higher Education predicted that, by the year 2000, more than 80 percent of off-campus and 10 to 20 percent of on-campus instruction would take place through telecommunications (Carnegie Commission, 1972).

The improvement of distance education in the 1970s was both quantitative and qualitative. It can be attributed to:

- The development of new communication technology.
- Growing sophistication in use of printed materials.
- Improved design of instructional materials.
- Improved provision of supplying services for students studying at distance.
- The formulation of open universities.
It can be seen that the share of distance education in providing higher education during 1975-1976 was 2.6%. By 1989-90, it can be seen that, it has increased to 11.2%. This is enough evidence that those who are seeking higher education are gradually attracted to Distance education systems. Critical appraisal reveals that Information Technology application in distance education, helps in providing efficiency to the task of teaching and learning, to provide technical guidance and solution to the problems of education, understand the teaching situation, teaching strategies and teaching material and learner’s difficulties to make him to learn effectively.

2.3.1 Mega Open Universities

Some of the Open Universities, which play a major role in the educational history of the countries concerned, were categorized as Mega Open Universities of the world at the 17th World Conference of in the ICDE (1995) in Birmingham, UK. Mega open universities are those institutions, which have a student enrolment of over one lakh. There are ten such mega universities. The Mega Open Universities are: Anadolu University, Turkey; Central National d’Enseignement a Distance (CNED), France; China Central Radio and T.V.University (CCRTVU), China; Indira Gandhi National Open University( IGNOU), India; Korea National Open University (KNOU), United Kingdom Open University (UKOU); Sukhothai Thammathirat Open University (STOU), Thailand; Universidad National de Educacion a Distancia (UNED) Spain; University of South Africa (UNISA) South Africa; and Universitas Terbuka (UT) Indonesia.

2.4 Indian scene

Government of India appointed a Working Group with G. Parthasarathy, the then Vice-Chancellor of Jawaharlal Nehru University, Delhi, in 1971, to examine the feasibility of establishing an Open University
in India. The Working Group in its report stated thus: “In a situation of this type, where the expansion of enrolments in higher education has to continue at a terrific pace and where available resources in terms of men and money are limited, the obvious solution, if proper standards are to be maintained and the demand for higher education from different sections of the people is to be met, is to adopt the open University system with its provision of higher education of part-time or own-time basis. The Group, therefore, recommends that the Government of India should establish, as early as possible, a National Open University by an act of parliament”. However, nothing had happened until 1982, when the Committee to Inquire into the Working of Central Universities with Dr Madhuri R. Sha as its Chairperson re-opened this issue once again by reiterating the Parthasarathi Commission’s recommendations of creating a National Open University without delay. This committee (UGC, 1984) observed: “to satisfy the existing thirst for knowledge as well as degrees, admission to formal courses on the basis of merit requires that opportunities for off-campus studies should be created on a large scale, for a great variety of courses of high quality. Courses in new fields, particularly in science and some in technology could be started, perhaps using college laboratories in off-hours and some of the best teachers could be involved in delivering lectures”. The committee recommended that practical steps for creating a National Open University of distance education be taken up without delay.

While the idea of establishing a National Open University was still taking shape, there were some developments in the States also. In the State of Andhra Pradesh, the Government considered a proposal to start an Open University as early as 1978. The Osmania University made proposals for starting an Open Education College to strengthen Distance Education. However, at about the time when the college was to be established, the State government intervened and initiated steps for establishing a full fledged open
University instead, to provide “access to higher education to the adult population of the state, for upgrading their functional capacities and improving quality of their life in the context of broader social and political objectives of equalization of educational opportunities and the emergence of a new concept of life-long education” (Government of Andhra Pradesh, 1982). To give shape to this policy, the Government appointed a committee, and based on its report, established the Andhra Pradesh Open University in 1982. Similar initiatives took place elsewhere in the country also. The Government of West Bengal announced its intention to start an Open University in early 1982.

The 1980s witnessed a further expansion of this system. The more significant development of that decade was the emergence of open universities in the country. A beginning in this direction was made by the State of Andhra Pradesh which set up an Open University in 1982, the first Open University of the country. (Andhra Pradesh Open University, now renamed as BRAOU, Hyderabad) It was followed by the establishment of the IGNOU at New Delhi in 1985. The emergence of Open Universities, particularly the IGNOU inducted into the system of Distance Education an element of ‘openness’. As aptly pointed out by Agarwal and Ansari (1995) the emergence of IGNOU provided to the distance education “the legitimacy it rightly deserves in the national educational system of the country”. There are 11 Open Universities functioning in India and 66 institutes of correspondence courses. As already mentioned, distance education in India is provided by two types of institutions viz., Open Universities and Institutes/Directorates/Schools of Distance Education. Open Universities are autonomous institutions, set up by the Central and the State Governments exclusively for the cause of distance education. The institutes of distance education are set up by the conventional Universities. Unlike the Open Universities, these institutes are part and parcel of their parent universities and
do not enjoy any autonomy whatsoever. The syllabi and courses of study, the mode of evaluation of the students’ performance, and the degrees/diplomas awarded to distance students are identical with those of the conventional system. This dual mode is favorably comparable to the Deakin Model of Australia, where the University concerned gives instruction to the ‘off-campus’ (distance) students along with the ‘on-campus’ (classroom-based) students.

The national trends in the field of higher education in India show that though distance education was started as an alternative channel for providing higher education, it is likely to develop as a parallel system for providing higher education to Indian population. Both conventional and distance education systems now supplement each other. More and more learners are attracted to distance education every year. The demand for higher education has led to a very fast growth of enrolment in Universities meet rising demand for higher education. Distance education systems were developed as an alternative mode at the University stage. By the end of this decade 30-35% students of higher education will be distance learners.

The last decade has seen a phenomenal growth in distance education and the integration of this method of education into the standard educational provision in a large number of countries to such an extent that it is now no longer possible to think solely in the traditional sense of traditional contract. (Sewart, 1993)

2.4.1 Higher education in India

Education is a powerful and pervasive agent of change. It is the key that unlocks the door to development and modernization. This is particularly true in respect of higher education, for the concentration of knowledge and talent in various institutions of higher learning and research can make for a
penetrating interaction with society, more than is possible at other levels or forms of education. McCauley says about the aim of educating Indians in the colonial period “a class of persons Indian in blood and color but English in taste, in opinion and interest”. After the independence number of institutions increased in the country.

In fact, the universal demand for education, thirst for knowledge and the failure of the mainstream education system in catering to the increasing popular demand for higher education, were the major contributory factors behind the emergence of the ODL system. Appearance of knowledge societies where material and physical capital is gradually replaced with knowledge capital and of knowledge workers consisting of technically qualified people dominating the values in all spheres of life has revolutionized the concept of learning and remoulded it into one that envisions learning out of the four walls of classrooms and learning during the entire life span. This has contributed also to the legitimization of distance education as the right alternative to the conventional system; it has not only proved cost-effective but also has the right potential to reach out to the large segment of the unreached, the marginalized, and the needy. Correspondence education, which developed in the 19th century and remained in the educational margins till the second half of the 20th century, has come to be regarded as a route to social mobility by the socially and educationally disadvantaged. As Makenzie, et al (1975) has remarked “distance education aims to redress social or educational inequality and to offer opportunities not provided by conventional colleges or universities”. The governments all over the world have started investing heavily in ODL. The international agencies like UNESCO, European Commission, World Bank, and Asian Development Bank have begun to provide support to distance education. Expenditure on ODL, its volume of academic literature, and its appearance in legislation, all are markers of a new legitimacy to the ODL system.
In 1948 in his address to the national educational conference Nehru stated that “great changes have taken place in the country and the educational system must be in keeping with them. The entire basis of education must be revolutionized”.

Kothari commission (1966) emphasized the need for a built-inflexibility in the system of education, and for the necessity for education to be science based and in coherence with Indian culture and values. “Indian education needs a drastic reconstruction, almost a revolution. We need to … introduce work experience as an integral element of general education to improve quality of education at all levels”. The commission identified the following goals of higher education.

1) To seek new knowledge, to engage in the pursuit of truth, and to interpret new knowledge in the light of new needs and discoveries.

2) To provide right kind of leadership in all walks of life and cultivating right interests, attention, moral and intellectual values.

3) To provide society with competent men and women trained in agriculture, arts, medicine, science and technology and other professions.

4) To promote equality and social justice.

5) To foster in the teachers and students, the attitudes and values needed for developing life in individual and society.

The commission also recommended for the provision of time and correspondence courses and extension program of various kind, to provide varied educational facilities.

The main defects in the field of higher education in India are:
1) Uneven spread and development of higher education.
2) Variation in quality of teaching and research due to variation in infrastructure facilities.
3) Courses are not related to the job market and environment.
4) Erosion in the credibility of evaluation systems.

2.4.2 Open & Distance education in India

Open education is a system that drifts away from the restriction that characteristic formal education. They may be in terms of age, entry requirement, subject option, study pace, attendance, time, place, duration, etc. Distance education, emerging as a viable mode of education, effects teaching/learning through multimedia instruction packages using print, electronic media and human resources. By implication it suggests that the term ‘distance’ does not postulate its restrictive or literal sense of physical / geographical distance alone, on the contrary it implies distance in terms of academic communication. Table 1 shows the transformation in the organizational structure of distance education.

**Table 1**

**Transformation in the organizational structure of distance education**

<table>
<thead>
<tr>
<th>The old practice</th>
<th>New practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed beuocratic structure</td>
<td>Flexible and dynamic</td>
</tr>
<tr>
<td>Status laden and rigid</td>
<td>Functional and evolutionary</td>
</tr>
<tr>
<td>Powers resides at top</td>
<td>Powers shared by empowerment</td>
</tr>
<tr>
<td>Motivate, manipulate people</td>
<td>Inspire and care for each other</td>
</tr>
<tr>
<td>Compliance is valued</td>
<td>Value creative contribution</td>
</tr>
<tr>
<td>Focus on problem</td>
<td>Focus on creating opportunities</td>
</tr>
<tr>
<td>Blame for failure</td>
<td>Support learning from failure</td>
</tr>
<tr>
<td>Short term focus</td>
<td>Long term perspective</td>
</tr>
<tr>
<td>Progress by increments</td>
<td>Progress by leap</td>
</tr>
</tbody>
</table>
The preamble of the Indian constitution reflects the spirit of article 1 of UN declaration of human rights that all human beings are born free and equal in dignity and rights. The corner stones of the constitution on which the new India was built up were justices, liberty, equality and fraternity as intangible rights of each citizen. These basic values, which underlie the new social order, are not indigenous to Indian society. The traditional worldview, which has been operative for nearly millennia, was one of the rigid hierarchy and extreme inequality. Education was categorically exclusive and denied to lower casts and women. India has the largest university population in the world, which was 5.27 million in 1991-92. The country has 54.8% world’s literate population in the age group of 15-19. There is a need for educational transformation in the country to create trained persons.

The major objectives of distance education in India are:

1) To provide an alternative cost effective non formal channel for higher education

2) To supplement the conventional university system and to reduce the pressure.

3) To provide seasonal chance to those who had to discontinue their formal education or could not join regular colleges or universities.

4) To democratize higher education by providing access to persons even in remote areas.

5) To strengthen and diversify the degree, certificate & diploma courses and build economy of the country on the basis of its natural and human resources.
6) To provide a means for lifelong education.

7) To provide an innovative system of university level education which is flexible and open in terms of method and pace of learning, combination of courses, eligibility for enrolment, with a view to promote learning and encouraging excellence in new fields of knowledge.

2.4.2.1 Growth of distance education in India

In 1961 the expert committee, which was constituted by the ministry of education, with a view to working out the relevant details and preparing a scheme of correspondence education for the country, had listed the major objectives as:

1) To provide less expense education at higher level and

2) To extent the benefits of education facilities to all those who had missed the opportunity to acquire knowledge, skill and training for social and economic reasons.

The University of Delhi introduced the first courses in India through correspondence for the Bachelor degree in 1962. Within a year the courses attracted a large number of students encouraged by its success, education commission (1964-66) recommended fuller exploitation of correspondence education for a wide range of purposes. Consequently UGC introduced correspondence courses in Indian universities. There were institutions of correspondence studies were established in the late 1960s. Accordingly correspondence schools were started at different parts of the country and the enrolment of students increased from year to year.

2.4.2.2 Open Universities in India
At present there are ten state Open Universities and One national Open University in India. All these Universities have a number of study centers. Total enrolment in these centers is increasing in each and every year. It can be seen that the share of distance education in providing higher education during 1975-76 was 2.6 percent. By 1989-90, it can be seen that, it has increased to 11.2 percent. It is estimated that by the end of the 20th century the percentage of distance learners in the field of higher education will cover 40 percent of the total enrolment in the field of higher education. Names of Open Universities in India are given below in the order of their years of establishment:

1) Dr.BR.Ambedkar Open University (Hyderabad, 1982) <braou.htm>
2) Indira Gandhi National Open University (IGNOU) (New Delhi, 1985) <ignou.ac.in>
3) Kota Open University (Kota, Rajasthan, 1987)
4) Nalanda Open University (Patna, Bihar, 1987) <nou.htm>
5) Yashwant Rao Chavan Maharashtra Open University (Nashik, Maharashtra, 1989) <ycmou.htm>
6) Madhya Pradesh Bhoj Open University (Bhopal, Madhya Pradesh, 1991) <mpbou.htm>
7) Dr.Babasahib Ambedkar Open University (Ahmedabad, 1994) <baou.htm>
8) Karnataka State Open University (Mysore, 1996) <ksou.htm>
9) Netaji Subhash Open University (Kolkata, 1997) <nsou.htm>
10) Uttar Pradesh Rajarishi Tandan Open University (Allahabad, 1999) <uprtou.htm>
11) Tamilnadu Open University (Tamilnadu, 2002) <tnou.htm>
2.4.2.3 Management of Open Universities

Management is a bit more difficult in open Universities than conventional. Since normally there are no students on the premises of the Open University instead of lecture rooms, facilities are required for development of course materials and making provision for correspondence, for tutorial service at distance, for registration and for face to face meeting with students. This requires the development of various media, including radio and TV arrangements for reading work and lab activities.

2.5.2.4 Sample Open Universities.

Details of Open Universities selected as the sample for the study is presented in the following sections.

2.4.2.4.1 Indira Gandhi National Open University (IGNOU)
Indira Gandhi National Open University (IGNOU) is a household name today. With its headquarters located in Delhi and a network of regional and study centres spread all over the country, the University has brought higher education within the reach of a vast number of people. IGNOU caters to over one million students and its aspiration to reach the unreached continues. IGNOU, set up in 1985 through an act of parliament has carved a niche for itself among the premier educational institutions both within the country and abroad. The University has been a pioneer in Distance Education and the recipient of the Center of Excellence in Distance Education award conferred by the Commonwealth of Learning in 1993.

IGNOU has about 11,87,100 students with extremely varied profiles, spread throughout the length and breadth of the country. The University has an efficient and effective networking of 48 Regional Centers (22 are IGNOU Regional Centers, 8 are IGNOU North-East Regional Centres, 5 are Army Command Centers, 8 are IAF Command Centers, 4 are Navy Command Centers and 1 is for Assam Rifles Command Center), 5 Sub-Regional Centers and over 1133 Study Centers, all over India. As an Open University, IGNOU has come a long way since 1985, having crossed national boundaries providing higher education as well as assisting other developing countries in this regard. State-of-the-art telecommunication systems have further helped in reaching out to the hitherto unreached sections of the society. Quality and equity have been the guiding principles behind all our endeavors.

2.4.2.4.1.1 Objectives of IGNOU.

1. To advance and disseminate learning and knowledge by a diversity of means

2. To provide opportunities for higher education to a large segment of population
3. To promote the educational well being of the community in general
4. To encourage the Open University and distance education system in the country
5. To coordinate and determine the standards in such systems.

2.4.2.4.1.2 Functions of IGNOU

The university has two major functions:

1. Development and production of courses of delivery through the open learning and distance education system. It offers programs of study learning to degree, diplomas, certificates and like other institutions IGNOU is also engaged in research training and extension education activities, and

2. As an apex body, the University also acts as coordination and monitoring agency for the distance education system in the country. The distance education council of the university has provided academic expertise, course material, training and financial support to state open Universities.

2.4.2.4.1.3 Features of IGNOU

The main features of IGNOU are:

1. National jurisdiction
2. Flexible admission rules.
3. Individualized study; flexibility of place, pace, and time of study.
4. Use of modern educational and communication technologies.
5. Student support services.
6. Cost effective programs.
7. Modular programs.
8. Resource sharing, collaboration and networking with other open universities.
9. Comprehensive evaluation system.
10. Relevant programs.

2.4.2.4.1.4 Multimedia instructional system

A variety of media can be used for instructional purposes in open and distance learning such as audio, video, television, teleconferencing, and computer technologies. Open universities in India adopted the following multimedia approach for educational instruction to increase access to its learners.

• Printed course materials in a self-instructional format sent to students through postal or courier services.
• Contact cum counseling sessions at study centers.
• Winter or summer schools of short duration for intensive coaching.
• Extension lectures and seminars for students of Master level programs
• Curriculum based radio lessons on All India Radio.
• Audio / video programs and provision for their replay at study centres
• Video lessons through Dooradarshan channels
• Live teleconferencing programs through Dooradarshan at various times
• Hands on laboratory practice for students of science and other professional programs.
• Continuous evaluation through assignments.

2.4.2.4.1.5 Teleconferencing

One of the fastest growing technologies is teleconferencing. It provides for interactive education. Realizing the importance of teleconferencing, IGNOU and BRAOU launched tele-conferencing programs through
Dooradarshan Channels. As a beginning the facility of BRAOU was extended to 23 study centers located in district headquarters of Andhra Pradesh. Since this program is organized through Dooradarshan’s network, it is available not only at the study centers but also in houses of those who have a cable connection.

2.4.2.4.1.6 Student Support Services (SSS)

IGNOU provides a wide variety of SSS for the learners. First of all, an induction meeting is organized at the Study Centers for the newly admitted students, before the commencement of the academic session. In such meetings, students are given introduction to the Open University system, instructional system, course delivery, support services, etc. Verification of original certificates is also done during induction meetings. Provision of self-instructional printed material is an important part of IGNOU’s instructional process. It contains information covering 100 percent of the syllabus. The University supplies a program guide/student handbook for each program. It contains details regarding study plans, counseling, examination, evaluation, etc., relating to each program. Program-specific counseling sessions are organized at the Study Centers and Program Study Centers. The Centre Co-coordinator prepares the counseling schedule and sends it to students. Counseling is intended to solve the study problems of students rather than direct teaching. The university has adopted the multi-media approach to instruction. In addition to the SIMs and counseling and practicals at Study Centers, there are a number of additional electronic media components provided to the students to enhance their learning skills. The important among them are Audio and Video Cassettes, Doordarsan (DD1) Telecast, Gyandarshan (Educational TV Channel), Interactive Radio Counseling, and Tele-Conferencing. Tele-Learning Centre (TLC) is a novel experiment in Distance Education. The TLC facility will be provided at the regional centers.
also. The TLC has Internet and e-mail facilities for on-line examinations including practical examinations.

2.4.2.4.1.7 Study centers

IGNOU has a three-tier structure for SSS – the Headquarters, the Regional Centers, and the Study Centers. As far as the learners are concerned, Study Centre is very important because their close contacts are with study centers for a variety of requirements like attending counseling sessions, submission of assignments, using multi-media, referring library and attending examinations. State wise distribution of IGNOU study centres are given in Table 2.
Table 2
State-wise Distribution of IGNOU Study Centers

<table>
<thead>
<tr>
<th>State</th>
<th>Regional Centers</th>
<th>Special Study Centers</th>
<th>Study Centers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>1</td>
<td>1</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>1</td>
<td></td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Assam</td>
<td>1</td>
<td></td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Bihar</td>
<td>1</td>
<td></td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>Chattisgarh</td>
<td>1</td>
<td></td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Delhi</td>
<td>2</td>
<td>3</td>
<td>68</td>
<td>73</td>
</tr>
<tr>
<td>Gujarath</td>
<td>1</td>
<td>1</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>Haryana</td>
<td>1</td>
<td></td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>1</td>
<td></td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>Jammu Kashmir</td>
<td>1</td>
<td>1</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>1</td>
<td></td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Karnataka</td>
<td>1</td>
<td>1</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Kerala</td>
<td>1</td>
<td>2</td>
<td>18</td>
<td>21</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>1</td>
<td></td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>1</td>
<td>3</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Manipur</td>
<td>1</td>
<td></td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>1</td>
<td>1</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Mizoram</td>
<td>1</td>
<td></td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Nagaland</td>
<td>1</td>
<td></td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Orissa</td>
<td>1</td>
<td></td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>Punjab</td>
<td>1</td>
<td></td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>1</td>
<td></td>
<td>22</td>
<td>23</td>
</tr>
<tr>
<td>Sikkim</td>
<td>1</td>
<td></td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Tamilnadu</td>
<td>1</td>
<td></td>
<td>36</td>
<td>37</td>
</tr>
<tr>
<td>Tripura</td>
<td>1</td>
<td></td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>1</td>
<td>1</td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td>Uttaranchal</td>
<td>1</td>
<td></td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>West Bengal</td>
<td>1</td>
<td>1</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>Grand Total</td>
<td><strong>18</strong></td>
<td><strong>3</strong></td>
<td><strong>459</strong></td>
<td><strong>480</strong></td>
</tr>
</tbody>
</table>
The steady growth of enrolment in IGNOU is a testimony to the fact that the learner community in India has recognized the utility of Open University education. Though the university offers 66 academic programs, more than 80 percent of the enrolment is confined to eight programs. While the general courses are showing comparatively low levels of enrolment, professional courses have received good response.

2.4.2.4.1.8 Enrolment of students

IGNOU has been offering various need-based and general courses right since its inception. It has resulted in a high rate of growth of enrolment. Recent data show that the management programs and computer application courses are in high demand. The enrolment in general courses like B.A, B.Com, and B.Sc is not increasing proportionately to total enrolment. Similarly, the enrolment in certificate, diploma and postgraduate diploma courses is also poor. The opening of IGNOU has made an opportunity to acquire new qualifications and upgrade skills to many aspirants. Since its establishment, a wide variety of courses has been on offer through its Study Centers. Though there are 466 Study Centers in India, their distribution is skewed towards the Northern Region. The economically and educationally backward southern region has not received the attention that it deserves.
BR. Ambedkar Open University (BRAOU) formerly known, as Andhra Pradesh Open University is the first Open University in India established by an act of AP. State Legislature on August 26, 1982 with its headquarters at Hyderabad to provide access to higher education to meet the needs and demands of large number of growing population. The University currently offers a total of 22 diploma, degree, certificate and research programs in Arts, commerce, Science and Social Sciences. It has 90 academic staff and around 400 technical and administrative staff assisted by over 3000 part time lecturers / counselors.

The University started with initial students enrolment of 6231 in 1983 and with a wide network of 23 study centers located in various district headquarters of Andhra Pradesh. The increasing access to open education has widened over the years, registering the students’ enrolment of over 100000 in
the academic year 2005-06 with a network of 140 study centers spread over the entire state of Andhra Pradesh. Out of total admissions, around 91% of students were admitted into undergraduate programs. Approximately, 80% of the students of degree programs were studying through the regional language medium of Telugu. About two-thirds of the student strength was from urban areas, and about thirty percent of learners were women.

In the early years of its functioning, the Institute offered Pre-degree courses only. However, in 1988-89, the Institute started offering degree courses in Commerce, Economics, History, and Political Science. Since then, there has been considerable expansion in the activities of the BRAOU. In the year, 1984-‘85, the institute opened its portals to postgraduate studies. At present, the Institute offers 10 postgraduate courses viz., Economics, English, Hindi, History, Mathematics, Politics, Public Administration, and Sociology. Similarly, degree courses are offered in nine subjects viz,. Commerce, Economics, English, History, Mathematics, Politics, Computer Applications (BCA), and Computer Science (BCS).

The BRAOU started offering diversified courses since 2000-‘01. Three Postgraduate diploma courses and some certificate courses were started during this period. The postgraduate diploma courses Human Resource Management (PGHRM), Marketing Management (PGDMM), and Travel and Tourism Management (PGDTM). In the year 2001-‘02, postgraduate diploma course in Computer Applications (PGDCA) and two certificate courses, viz, E-commerce and Communicative English, were started. The University has initiated steps to start one more postgraduate diploma course, namely, Functional Hindi. Specialized courses like B.Com with Computer Applications and B.Com with additional electives of Co-operation and Taxation are also offered.
2.4.2.4.2.1 Administrative set-up

The Institute is recognized as a teaching and research department of the university. The Director supervises the activities of the Institute and is supported by teachers and office staff. At present, there are 38 full-time, permanent academic staff in the institution. A few lecturers also serve the Institute on contract basis.

The BRAOU is the pioneer institution in the country providing DE. Over the years, it has provided opportunities for education to thousands of learners. A wide variety of courses at various levels are offered through it. The enrolment in postgraduate courses has increased more rapidly than in the degree courses. The gender-mix of learners does not show any significant differences between males and females.

2.4.2.4.2.2 Personal Contact Programs (PCPs)

The University has been arranging regular PCPs for students’ right from its inception. As the has a good number of teaching faculty members. This time, two rounds of PCPs were organized in every year. The first round of PCPs for degree courses are arranged in November of each academic year for Saturdays and Sundays. The second round of classes is arranged in January for the same period. The total number of days devoted for PCPs for postgraduate courses range from 14 and 20. In other words, about 84 to 120 hours are set apart for PCPs in postgraduate Programs. Special contact classes other than regular contact programs are also arranged according to the demands of students. Fifty percent attendance at contact classes is made compulsory for all courses. However, exemption is granted to those who cannot attend classes owing to unavoidable difficulties.
2.4.2.4.2.3 Library facilities

The BRAOU has a reference-cum-lending library. It has about 54,000 books and a number of good journal are subscribed by the library. A full-time librarian is in charge of the library and his functions during the office hours. The users of the library are the teaching staff and the students. No students can borrow books from the library, but can use only for reference purposes.

2.4.2.4.2.4 Multi-media

The BRAOU uses mainly print media as the pedagogical device for learner-teacher interactions. University has started Radio programs and Gyan darshan programs in collaboration with IGNOU. Though the students seldom use them in the present situation, the University has a lot of future oriented programs.

2.4.2.4.2.5 Study materials

Printed study materials are the core SSS of the Institute. Course materials are prepared by full-time teachers of the University. In its preparation, the Self Instructional Material (SIM) format is not strictly followed. This is a major constraint for the learners for independent study.
2.4.2.4.3 Karnataka State Open University (KSOU)

Karnataka State Open University (KSOU) was established on June 1, 1996 under the Karnataka State Open University Act of 1992, with the objective of introducing and promoting Open University and distance education systems in the educational pattern of Karnataka and coordinating and determining the standard of such systems. It is the 8th Open University to be started in the country, and has come up as a result of India's long and rich experience in the field of distance education. With over 30,000 students enrolled in a wide range of courses, handled by 60 members of different faculties, and over 50 study centres across the state of Karnataka, today the university commands a prestigious presence in the community of open universities in India. KSOU also have a library of about 68000 documents with about 100 users per day. It also plans to establish a collection of digital resources in the near future.
The organizational structure of KSOU is that of one-tier system in which the headquarters manages every SSS. The main educational function is provision of educational courses. At present, KSOU offers a number academic programs at the degree and postgraduate levels. Most of the programs are general in nature. The programs are B.A and B.Com (Regular and Open Stream), B.B.S, B.LISc, M.A, M.Com etc. Under the B.A Degree program, courses are offered in Economics, History, Politics, and Sociology. Under the M.A degree program courses are offered in Economics, English, and Sociology etc.

2.4.2.4.3.1 Objectives of KSOU

- To provide an alternative non-formal, non-institutional and cost-effective channel for tertiary education in Karnataka state.
- To supplement the conventional university system in Karnataka, and reduce the pressure on it.
- To provide a 'second chance' to those who have had to discontinue their formal education or could not join regular colleges or universities, owing to social, economic and other constraints.
- To democratize higher education by providing the necessary access to the masses-in particular to the disadvantaged groups such as those living in rural areas, working people, women and adults who wish to acquire and upgrade their knowledge and skills-at their doorstep.
- To promote courses that are related to employment, tailored to specific vocational/professional needs, and relevant to local needs.
- To provide continued and life-long education to enable acquisition of new knowledge by the people, and enhance their careers and lives.
- To provide an innovative system of university level education that is flexible and open in methods and pace of learning, combination of courses, eligibility of enrolment, age of entry.
• Conduct of examination and operation of the program, with a view to encouraging learning and excellence in new fields of knowledge.
• To help reduce cultural disparities and social imbalances.
• To promote time-honored values and commitment to quality in both the university and the independent learners.

2.4.2.4.3.2 Student Support Services (SSS)

The KSOU provides only limited number of SSS to its learners. The main SSS are supply of study materials and contact classes. As most of the courses offered by the KSOU are of the general type, the study materials in print constitute a major support system. As the KSOU have a good number of academic faculties, the study materials are developed in the SIM format. The Karnataka State Open University arranges PCPs for its learners through selected centers. For degree programs, classes are held on Saturdays and Sundays. The classes are engaged by full time faculties of the University and other teachers from the Mysore University.

2.4.2.4.3.3 Administrative set-up

The Vice chancellor of KSOU is the administrative head and its day-to-day administration is done by an administration team of 55 persons. In addition, about 140 part-time counselors also serve the University on contract basis.

2.4.2.4.3.4 Enrolment of learners

Since it’s beginning, the enrolment of the KSOU has been steadily on the increase. The total enrolment increased 82 percent during 10-year period since 1996-2006. Among the various programs offered, Postgraduate Programs increased 10-fold during the period. Thanks to the liberal education policy followed by the university, the percentage of students who undergo
degree courses in regular scheme has increased to a great extent. The Karnataka State Open University has attracted the attention of large numbers of students. However, the refusal to give recognition to the degrees awarded for students of the KSOU courses by other institutions pose a great problem. The instructional system of the KSOU is limited to the provision of study materials and PCPs.

2.5 Open learning

Open learning is primarily a goal, or an educational policy. The provision of learning in a flexible manner, built around the geographical, social and time constrains of individual learners, rather than those of an educational system. More educational absorption can be seen in technologically based open learning. Open learning and open universities has become very much popular in India especially in the field of higher education. Although open learning and distance learning can mean different things, one thing they both have in common is an attempt to provide alternative means of high quality education and training for those who either cannot go to conventional campus based institutions, or do not want to.

2.5.1 Problems of Open learning

1) Due to openness
2) Lack of rapport
3) Dependence on study material
4) Obsolescence of information
5) Reaching the underprivileged
6) Feebleness of mass media in developing countries
7) Selecting appropriate media.

Majority of the students in Open University have a job and family and due to these reasons it becomes more difficult to study and get a degree. A
student has to play due to attention to his family and job also. Besides he has to keep abreast with academic and administrative materials, which receives from the university. A student of Open University must plan his course.

A number of educational institutions are offering web-based instructions to reduce costs. They are offering ICT in few courses such as Business Administration, accounting, health care, IT, Information systems, clinical justice, web designing etc. The opportunities made available through e-learning are both significant and numerous when it is combined with mobility its power is multiplied.

The cell phone technology is nowadays used to keep contacts, e-mail, and the Internet may extent its use also for finding a virtual classroom. Handheld computing devices supplement to this scenario through its affordability, portability and versatility. However there are some limitations such as their small sizes, slow processing speed, and maintenance of batteries, limited storage capacities. Moreover it may be misused for non-educational plays or for searching inappropriate websites. Digital cameras and portable scanners are also being used as supplementary to Information Communication Technology.

**IT AND DISTANCE LEARNING**

“It is not the breakthrough in nuclear science or the invention of the versatile tool called computer or the adventures in space or the advances in biology that stands foremost. The most remarkable development of the century is the emergence of knowledge as resource- a resource that is renewable; that can compensate for the absence or any inadequacy of natural resources” (Kulandai Swamy, 1998). In the early part of the past century, the world needed more food, clothing and shelter and therefore, concentrated on efficient use of land and water. The significance of knowledge was not openly
recognized as an input to growth during this period. During the next phase of industrial expansion, the world depended more and more on mineral and oil resources and development depended on science and technology; in the process, education became essential and its economic significance became clearer. During the knowledge era or information age of the present, knowledge has come to occupy the centre stage.

The accomplishment of the above-mentioned objectives requires proper educational policies and implementation. It is true that the formal stream of education cannot meet the ever-growing demand for higher education. The only alternative is the popularization of the open and distance-learning system. This is made clear in the National Policy on Education (1986) as “Life long education is a cherished goal of the educational process. This presupposes universal literacy. Opportunities will be provided to the youth, housewives, agricultural and industrial workers and professionals to continue the education of their choice at the place suited to them. The future thrust will be in the direction of open distance learning.”

Mainly IT application in the field of distance education is concerned as a drastic change from what is known to what should be the future of modern education. The dream about decline of conventional education system and rise of a new educational setup in which the entire setup will be changed and more and more knowledge content will be added with latest developments in technology. The application of Information Technology has resulted drastic changes in the field of distance education. The current developments in the field of distance learning include Educational technology, Tele-learning, Interactive video, Cyber learning, E-learning, On-line learning, Open Universities and Virtual Universities.
3.1 Initiatives in Information Technology

The relatively recent change from the term Information Technology (IT) to Information Communication Technology (ICT) due to the convergence of Information Technology and communication technology has opened up new challenges for education. Our educational institutions cannot afford to ignore the accelerating pace of technological advancement and their role in building an enlightened society of ICT empower citizens.

3.1.1 World initiatives

The credit of having given a concrete shape to the concept of distance education (during the 1970s) goes to the Open University in the UK—the world's model of a new kind of higher education. The system and techniques of learning they designed is primarily for adults who study at their homes. It requires no normal entrance qualification, does not demand their prior knowledge of the subject areas and provides them freedom in selecting the courses and changing the priorities, permitting them to study according to their own choice and convenience. The greatest advantage of this scheme is that it does not insist on the requirement of residential study. The method is flexible, inexpensive and satisfying for the learners who are already motivated and capable of disciplining themselves to learn, without the personal guidance of the teachers. It stipulates only the minimum age limit for admission, and retains the enrolment of the students until they graduate within a reasonable period of time. However, there is no compromise on academic standards at any point.

Any virtual communication tools should have a portal. Portal is a doorway, which enables e-learners to enter into an e-learning setup. An important thing with regard to Virtual Learning Environment (VLE) is web-based tools that facilitate learning through the provision and
integration of on-line teaching and learning materials and tools. These materials and tools usually consist of most of the following. Facilities for electronic communication such as discussion lists, bulletin boards and chat rooms, facilities for group work online, online learning materials, links to remote resources, course time tables and reading lists online assessment tools and an administrative area, including a log in access function.

3.2 E-learning

Learning via multimedia systems such as computers becomes tremendously interesting for pupils. Not only does the child discover the use of computers and a fascinating world, but also, this method of education is more motivating as it deletes the common boredom of studies.

3.3 Tele-learning

One of the simplest, most cost effective distance learning technologies available is the telephone. With user-friendly equipment, one can access distance-learning experiences, interact with experts, receive information updates, and share ideas with almost anyone, anywhere. The telephone often serves as the audio component of other distance learning systems such as audio graphics, and desktop video-conferencing.

Tele-learning is the simplest way to describe a variant of distance learning in which the learning and the teaching activity is mediated through communications and Information Technologies. Tele-learning system requires only a telephone, which is fully interactive. One can ask questions, make comments and participate in the class like any other classroom. The advantages are huge. One can participate in this from his home, work, even a pay phone. Though it is still new for many people tele learning is rapidly becoming quite common. Many western Universities conduct dozens of
classes every week. The courses are supplemented with workshops, referral sources. In such a system costs are minimal and improvement of users are beyond the imagination. The audio component of a distance learning system can be as simple as a telephone and as complex as a system of microphones, cabling, audio mixers, and echo canceling equipment. Audio is among the most critical components of a system to ensure effective interactive communication.

3.4 Tele teaching

Teaching in a tele-learning atmosphere is called tele teaching. Tele teaching is not the same as face-to-face teaching. Therefore courses need to be modified to take advantages of the special qualities the technology offers. Teaching strategies also need to be adapted to the medium high levels of visualizations and interactivity are required in tele learning.

3.5 Audio Conferencing

The devices used for audio conferencing range from individual telephones and speakerphones to specially designed room systems that include speakers, microphones, and equipment to mix the sound. Audio conferences can be used for a variety of applications including meetings, the delivery of courses and training, and for guest lectures in any kind of classroom.

3.6 Callback Devices

One-way video systems like satellite delivered programs can be combined with telephones to allow learners at remote sites to call into the originating location to interact with instructors and other learners.
3.7 Voice Mail

This application can provide an effective vehicle for learner/instructor conferences, parent/teacher communication, and the "homework hotline."

3.8 Video Technology

The ability for instructors and students to see and hear one another brings new levels of interaction to the distance learning experience. Collaborative problem solving, demonstration, behavior modeling, and skills practice are all enhanced by the addition of video. Distance learning applications using video technology fall into two general categories, one-way broadcast and two-way interactive.

3.8.1 One-Way Video

The distinguishing characteristic with this distance learning application is that video signals are transmitted in one direction, from the instructor to the learners. The most common method of delivering the broadcast is by satellite. Components of a satellite broadcast systems include: The production facility for program origination, the satellite uplink for transmission of the program to a satellite orbiting the earth, the satellite transponder that receives the earth signal and retransmits that signal back to earth, satellite downlink equipment, and finally a site for people to view the program on standard television monitors.

The program that originates from one site is transmitted by satellite to a "footprint" that covers a very wide area. Communications from the receiving sites back to the originating studio is accomplished using telephones, so learners can interact with the instructor.
3.8.2 Two-Way Video

Another distance learning system provides video and audio communications in both directions between learners and instructors. This is referred to as interactive video. All locations in an interactive video system are equipped with cameras, monitors, and microphones. Point to point and multipoint connections link learning sites and instructors and learners can see and hear each other. These connections use communications circuits that can deliver either full motion video or compressed video services. In both systems, the learning site is equipped with cameras and microphones.

A full motion, interactive video distance learning system is one that provides picture quality that is comparable, or close to, the quality of commercial television. These systems typically use fiber optic cables and high capacity circuits to network learning sites together. High capacity networks are often built with private, dedicated circuits between locations in a distance learning system.

3.8.3 Compressed Video

These systems offer a different variety of bandwidth services to the user. The audio and video signals go through digital signal processing that reduces the amount of information that is sent from location to location. These compressed signals can be sent over the switched telephone network. Using digital telephone services, the quality of the picture is a function of how many circuits used. This can range from as few as two (112 Kbps) to as many as twenty four (1.5 Mbps). The cost for the connection is based on the bandwidth used.

Learning requirements and cost factors influences the selection of full motion or compressed systems. The technology is changing rapidly, and the trend is toward better quality video and audio on less expensive transport
services. As mentioned earlier, a comprehensive approach to distance learning applications will consider all of the technology options and build systems that include many of the technologies mentioned.

3.8.4 Interactive Videoconferencing

Interactive Video (IV) conferencing is an effective tool that may be used in distance education settings. This system can be integrated into the distance education program with minimal adaptation to the curriculum and course and is designed to support two-way video and audio communication between multiple locations.

Most IV systems utilize compressed digital video for the transmission of motion images over data networks such as high capacity Integrated Services Digital Networks (ISDN). The video compression process decreases the amount of data transmitted over lines by transmitting only the changes in the picture. By minimizing the bandwidth required to transmit the images, video compression also reduces the transmission cost. Interactive video can be effective because:

- It allows “real time” visual contact between students and the instructor at different sites.
- It supports the use of diverse media. Blackboards, handwritten documents, and videos may be incorporated at all sites.
- Enables connection with experts in other geographical locations.
- It can provide access to at-risk or special needs students.
- It provides additional access to students at remote sites.
3.8.5 Instructional Television (ITV)

Instructional television (ITV) is an effective distance education delivery system that can be integrated into the curriculum at three basic levels:

1. Single lesson
2. Selected units
3. Full course

3.9 Educational Radio

Radio Technology was first developed during the late nineteenth century and came into popular usage during the early twentieth century. Though sometimes overshadowed by television, radio represents a medium capable of reaching a wide geographic audience at a low production cost with proven educational results (Couch, 1997). Studies by the U.K. Open University have demonstrated that radio has a greater value for weak students who benefit from radio as a supplementary learning tool (Tripp & Roby, 1996). The Agency for International Development has shown that radio is more cost-effective and results in a greater learning effect size than textbooks or teacher education (Tripp & Roby, 1996). Radio has the advantage of teaching subjects in which classroom teachers are deficient or untrained. An added benefit for multi-grade classrooms is that it provides instruction for one group of students while the teacher works with another group. Radio can also bring new or unavailable resources into the classroom (Muller 1985).

Jaminson and McAnany (1978) reported three main advantages of radio: improving educational quality and relevance; lowering educational costs; and improving access to educational inputs particularly to disadvantaged groups. Some of the limitations of radio for education are that interaction is limited; instructor feedback and clarification is generally
unavailable; the instruction is uninterruptible and not reviewable; the pace of
the lesson is fixed for all students; note-taking is difficult; and that time for
reflection on the content is minimal. To overcome these drawbacks, preparation, supporting materials, and follow-up exercises are recommended
when possible (McIsaac & Gunawardena, 1996).

The popularity, availability, and low cost of radio made it a convenient
and practical medium for use in programs for learning at a distance and is
mostly used in combination with other media, such as with print medium
followed by face-to face teaching etc. Although, educational use of radio
started around 1930, but perhaps U.K.O.U. was first make its utilization
effective.

3.10 Computers in distance education

In recent years, educators have witnessed the rapid development of
computer networks, dramatic improvements in the processing power of
personal computers, and striking advances in magnetic storage technology.
These developments have made the computer a dynamic force in distance
education, providing a new and interactive means of overcoming time and
distance to reach learners.

Computer applications for distance education fall into four broad
categories:

3.10.1 Computer assisted instruction (CAI)

It uses the computer as a self-contained teaching machine to present
discrete lessons to achieve specific but limited educational objectives. There
are several CAI modes, including: drill and practice, tutorial, simulations and
games, and problem solving.
3.10.2 Computer Managed Instruction (CMI)

It uses the computer’s branching, storage, and retrieval capabilities to organize instruction and track student records and progress. The instruction need not to be delivered via computer, although often CAI is combined with CMI.

3.10.3 Computer Mediated Communication (CMC)

It describes computer applications that facilitate communication. Examples include electronic mail, computer conferencing electronic bulletin boards.

3.10.4 Computer Based Multimedia (CBM)

Hyper card, Hyper Media and a still developing generation powerful, sophisticated, and flexible computing tools have gained the attention of distance educators in recent years. The goal of computer-based multimedia is to integrate various voice, video, and computer technologies into a single, easily accessible delivery system.

3.11 Internet and distance learning

The digital landscape and the dynamic information space provided by the Internet offer endless opportunities to distance learning institutions and Open universities for building up and for enriching their information resources and services and for sharing the academic activities in an unprecedented manner. The Internet has been the primary technology and instrumental in bringing about newer perceptions and innovative dimensions in the field of distance learning with the innovative “e-learning”, “Virtual learning” all over the world. These new models are embraced and appreciated worldwide.
It is observed that proper adoption and deployment of Internet technologies and its suite of tools and services could be successfully used for the marketing of resources of distance learning institutions globally. The publicity and visibility by means of these technologies are unprecedented. A meticulously designed website for the university shall go a long way in outreaching to its clientele and in marketing the resources and services possessed by the university. Only through the value added and state-of-art resources and services the distance education institutions can meet the challenges of the knowledge era.

The WWW and web browsers have made the Internet a more user-friendly environment. The ability to integrate graphics, text, and sound into a single tools means that novice users do not have to struggle with such a steep learning curve. In addition, organizations and individuals can create homepages independently and link to other home pages on their own computers or to pages created by others on different computer systems.

For educators, the WWW provides an exciting new opportunity for distance teaching and learning. The WWW can be used by the distance educator to build a classroom homepage. The home page can cover information about the class including syllabus, exercises, and literature references and instructors biography. The instructor can also provide links to information on the WWW that would be useful to students in the class. Other links can access library catalogues of each individual home page. In addition the home page can link students to a discussion list or listserv that set up for student interaction. It is also a relatively simple matter to use the homepage to create forms that students can fill out and that will end up being sent to the instructor through an e-mail message.

Open and distance education is getting closer to students in the country, thanks to the latest advancements in science and technology. From
what began as an alternative mode of education, distance learning has become popular through its cost effectiveness and access

### 3.11.1 Instructional possibilities of the Internet

Distance educators can use the Internet and WWW to help students gain understanding of how to navigate and take full advantage of the networked world into which they will be graduating. Some instructional possibilities of the Internet include:

- Using e-mail for informal one to one correspondence. Feedback from the instructor can be received more quickly than messages sent by mail. Students can read messages at their convenience and easily store them for later reference.

- Establishing a classroom bulletin board. Distant students often work in isolation without the assistance and support of fellow students. Setting up a class bulletin board can encourage student-to-student interaction. With a class computer conference, individual students can post their comments or questions to the class, and every other individual is free to respond. The conference can also be used to post all modifications to the class schedule of curriculum, assignments/tests, and answers to assignments/tests.

- Engaging students in dialogue with other students, faculty, and researchers by encouraging them to join a bulletin board(s) on topic(s) related to the class.

- Developing a classroom homepage. The home page can cover information about the class including the syllabus, exercises, literature references and the instructor’s biography. The instructor can also provide links to information on the WWW that would be useful to students in the class.
Other links could access library catalogues or each student’s individual home page.

3.12 Educational Technology

Educational technology is an area in which old ideas and well established techniques have been repackaged in elusive new terminology. Educational technology is concerned with the problems of education and training context and it is characterized by the disciplined and systematic approach to the organization of resource’s learning.

Entire world of education has experienced four revolutions.

1) From home to school
2) Writing
3) Printing
4) Information and Communication Technology.

Educational technology is concerned with the application of modern skills and techniques to requirements of education and training. This includes the facilitation of learning by manipulation of media and method and control of environment is so as this reflects on learning.

In short educational technology is the application of scientific knowledge about learning, and the conditions of learning, to improve the effectiveness and efficiency of teaching and training. In the absence of scientifically established principles, educational technology implements techniques of empirical testing to improve learning situations.

The difference between educational technology and application of Information Technology in distance learning is that, educational technology deals only with transactional components or the process components. Educational technology is the systematic and hence takes a system view of
instruction. It all encompasses learning goals, curriculum and contents including audio visual aids, media, self-instructional approaches and evaluation. Thus in a professional sense educational technology is a system approach to planning and execution of instruction to optimize human learning. Where as Information Technology is concerned with the computers and communication technologies in the handling of information. Here the emphasis is on ‘information’ and which is on media and methods in educational technology. In other words IT refers to electronic media that may or may not be used for instructional purposes, While Educational Technology is concerned with the total process of instructional design and learning.

3.13 Educational Informatics

In its broadest sense ‘informatics’ is used simply as a synonym for Information Technology. Within computer science, it refers to topics related to the representation, processing and communication of information within computational systems, including topics related to non-semantic aspects of information. However, from the perspective of information science, informatics is always concerned with the semantics of digital information use and communication (that is, with information content and context) and with digital interactions between multiple information sources. From this perspective, research in domain-specific areas such as health informatics, chemo-informatics and social informatics tends to be defined as the study of the application of ICTs and information management (IM) techniques to the domain in question (Kling and Hara, 2002).

Research into the educational possibilities and impact of ICTs is not a new phenomenon. However, educational informatics research is a still emergent domain, given recent impetus by developments in the use of the Internet as both an information environment and an environment for learning. It can be defined as the study of the application of digital technologies and
techniques to the use and communication of information in learning and education. As a domain, its concern is the development and evaluation of concepts, models, theories, techniques and methodologies - including research techniques and methodologies in the field of ICT application in education. It also seeks to contribute to the development of knowledge that is of practical relevance to diverse forms of ICT-supported learning.

Educational informatics is situated at the intersection of three broad disciplines: information science, education and computer science, each of which encompasses a range of sub-disciplines and domains. These include information systems, information management, information literacy, educational psychology, learning technology, computer-supported collaborative learning and instructional design. Educational informatics researchers, being concerned with relationships between people, information, ICTs, learning and professional practice, may share theoretical perspectives and research approaches and techniques with researchers in any of these areas.

3.14 Virtual Universities

“Virtual University” is a University in effect providing graduate, postgraduate and professional courses, having the authority to confer degrees in various fields of study. Though it does not have large infrastructure like great buildings, furniture, etc. it can provide all the activities as it is in the traditional campus based Universities. Such a University will have global classrooms. The courses are taught through on-line methods such as tele-learning, interactive video conferences etc. by different subject specialists from around the globe, available for discussion and questioning by learners; the course, by using different sources could ensure that the gender, multicultural ethnic issues are not impediments before the global flow of knowledge and information. Learners would also be drawn from a wide
geographical area. They would be encouraged to define more precisely their own learning needs to work in small groups, to seek out sources of information they need, and to communicate their learning to other groups on the course by using communication and on-line methods of the ‘cyber society’ (Bates 1994).

3.15 Current status of application of IT in distance learning in India

Till the last decade, in all the distance learning institutions in the country, including open Universities, teaching-learning is carried out by through self-instructional printed course materials. Radio, TV tutoring/counseling are optional and supplementary to the printed materials.

Vikram Sarabhai, the founder of Indian space program in 1967-68, first conceived Satellite television as a powerful medium for education. IGNOU is the only national Open University, which could succeed in getting time slots for the national telecast of its programs. The telecast of television programs for distance education started on the national network of Dooradarshan on May 1991 for three days in a week. The programs are exclusively syllabus bound and are both in telecast and video format. Since they are on the national network, only anybody interested can view the programs. The University owns a production center with all the modern and sophisticated electronic equipments for its indigenous production.

A study conducted at BR. Ambedkar Open University reveals that the facilities of Information technologies are not mostly used by students, and such facilities are even not accessible to the students for various reasons, like lack of physical facilities, and lack of favorable attitude and appropriate skills of the functionaries of study centers.

Modern two way communication technologies enable conventional campus based institutions to position themselves better, since they can offer
not only highly interactive education at a distance, but can provide the on-campuses facilities, such as laboratory and occasional opportunities for personal interaction, that are so difficult and costly for single mode distance teaching institutions to provide.

This does not mean that the large autonomous single mode Open Universities will disappear quickly. They are still the most cost effective means of providing standard mass education for large numbers. For countries like India, China etc., where most people does not yet have access to the telephone or computers, single mode institutions that rely on the way mass media of point, TV and radio will still have great value.

National Informatics Center has developed an Internet based counseling system for the all India Engineering entrance examination and introduced it in the Malaviya National institute of Technology (MNIT). The successful candidates of engineering entrance test will be able to select the college of their choice and the branch of study through Internet.

The Radio Club of Bombay broadcast the first radio program in India in June 1923 (Sharma, 2002). Afterwards a Broadcasting Service was set up (that began broadcasting in India in July 1927) on an experimental basis at Bombay and Calcutta simultaneously. This was done under an agreement between Government of India and a private company called the Indian Broadcasting Company Ltd. In the year 1947 (when India became independent), the AIR network had only six Stations located at Delhi, Bombay, Calcutta, Madras, Lucknow and Tiruchirapalli with a total complement of 18 transmitters - six on the medium wave and the remaining on short wave. Radio listening on medium wave was confined to urban limits of these cities. As against a mere 2,75,000 receiving sets at the time of Independence, now there are about 111 million estimated radio sets in about
105 million household in the country. Presently the broadcast scenario has drastically changed with 198 broadcasting centers, including 74 local Radio Stations, covering nearly cent-per-cent country's population. As of today AIR network broadcasts nearly 2000 program hours every day in 24 languages and 146 dialects. It reaches 97.1 per cent of the population, which includes substantial population in rural area, and covers 89.7 percent of the geographical area of the country (IGNOU, 2000).

3.15.1 Gyan Darshan

Television constitutes an important medium widely used to disseminate information to its viewers. It has the unique feature of combining audio and visual technology, and thus considered to be more effective than audio media. It serves multiple purposes of entertainment, information and education. Besides performing motivational function it helps in providing discovery learning and cognitive development of its viewers. Because of its better accessibility, it can bring learning materials to the masses in more direct, effective and personal way than other educational media. Although every media have some strengths and weaknesses, much more depends on how the media is used.

Ministry of Human Resource Development, Information & Broadcasting, the Prasar Bharti and IGNOU launched Gyan Darshan (GD) jointly on 26th January 2000 as the exclusive Educational TV Channel of India. IGNOU was given the responsibility to be the nodal agency for up linking/transmission. It started out as a two-hour daily test transmission channel for students of open and conventional Universities. This duration was increased in February to nine hours a day. The time slot transmission was further increased due to good response up to 16-hours by 1st June and by 1st November it turned out to be 19-hours channel. Within one year of its launching, 26th January 2001, it became non-stop daily 24 hours transmission
channel for educational programs. “The programming constitutes 23 hrs of indigenous programs sourced from partner institutions and one hour of foreign programs. Transmission of 12 hrs each for curriculum based and enrichment programs is being made. The programs of IGNOU CIET-NCERT including NOS are telecast for four hours each, IIT programs for three hours, CEC-UGC programs for two and a half hours and one hour each for TTTI and Adult Education.” (IGNOU Profile –2002) The signal for Gyan Darshan transmission are up linked from the Earth Station (augmented as one plus one system for redundancy) set up at IGNOU Head Quarters New Delhi, and down linked all over the country through INSAT 3C on C Band Transponder. Although Gyan Darshan has made its presence felt in all Open Universities and most of the prominent conventional Universities /schools, it still has the potential to reach to the door steps of learners through cable TV network. At present Gyan Darshan through the cable transmission covers about 70% in India, most parts of Tamil Nadu, a few pockets in the North East, Nashik, Ahmedabad and Pune.

In the bouquet of Gyan Darshan channels, Gyan Darshan 2 is devoted entirely for the interactive distance education which is unique feature of the channel. Gyan Darshan 2 is a one-way video and two way audio satellites based interactive system operating on the c band of INSAT 3B. The footprint of the satellite being nation wide, the signals can be received anywhere across the country with the help of downlinks.

3.15.2 GD 3. Eklavya: the technology channel.

Ministry of Human Resources Development (MHRD) has established exclusive television channel devoted only to the technology education (Eklavya Channel) where the educational content would be provided by the IITs and IIMs. It is the third channel in the bouquet of Gyan Darshan channels; Eklavya brings quality education to the students pursuing
engineering education throughout the country. Eklavya features lectures of the courses taught at the IITs situated at Kharakpur, Mumbai, Kanpur, Delhi, Guwahati, Roorkee, and Chennai. Eklavya, the technology channel transmits 24 hours daily with eight courses running in parallel. These are repeated once for the benefit of those who may have missed viewing the first time. This pattern continues from Monday to Saturday. Sundays are reserved for special interest programs on Technology and science.

3.15.3 GD 4. Vyas: higher education channel

The fourth channel in the bouquet of Gyan Darshan channels, Vyas brings quality education to the students pursuing higher education throughout the country. The aim of the channel is to bridge the knowledge and information gap in the area of higher education and provide information to all those who need it.

3.15.4 IGNOU Interactive radio counseling on AIR

IGNOU conduct collaborative sessions with All India Radio for focusing on different academic themes that are broadcast/relayed from the 189 AIR stations situated in different parts of the country.

3.15.4.1 Gyan Vani

The Gyan Vani educational FM radio network, which was launched in 2001, will eventually comprise of 40 Stations linking various cities and towns across India. Gyan Vani will broadcast approximately 43,800 Km/hours of educational programming per year. Currently, six FM radio stations are now operating at Allahabad, Bangalore, Coimbatore, Lucknow, Vishakhapatnam, and Bhopal. Gyan Vani’s radio network provides educational reach to all parts of the country.
Gyan Vani FM radio uses 10 Kw stereophonic FM transmitters capable of emitting a broadcast footprint with a radius of about 60 Kms, enough to cover an entire city or town plus its surrounding suburbs. In terms of technology, FM radio stations are usually fully digital and operated by professionals. Representatives of educational organizations, colleges, training institutions, universities, professional institutions, NGOs, government, and quasi-governmental organizations are expected to contribute to the programming content of public radio, primarily in the form of pre-recorded programs, or through participation in interactive radio sessions. Thus Gyan Vani radio FM is positioned as an ideal medium for fulfilling local educational, developmental, and socio-cultural aspirations and needs. Gyan Vani’s central office assumes responsibility for policy planning, monitoring, budget, and administrative support. A Gyan Vani FM station broadcasts over a radius of 70 Kms and therefore has the capacity to be specific, catering to the educational and developmental needs of the locality. The broadcasts are in English, Hindi, and the language dialects of the region and are conducted by local resource persons.

3.16 EDUSAT

On the 21st September, 2004 the Indian Space Research Organization (ISRO) successfully launched a rocket in to space carrying a 1950 kg satellite dedicated to the cause of education, 'Edusat'. The rocket was launched from the country's only spaceport at Sriharikota and placed its payload on a designated orbit, 5000 km away minutes later.

EDUSAT is the first Indian satellite built exclusively for serving the educational sector. It is mainly intended to meet the demand for an interactive satellite based distance education system for the country. It strongly reflects India's commitment to use space technology for national development, especially for the development of the population in remote and rural locations.
It is a collaborative project of Ministry of Human Resource Development (MHRD), Indira Gandhi National Open University (IGNOU), and Indian Space Research Organization (ISRO).

The present EDUSAT Project allows key elements of interactivity, access, cost-effectiveness and consistency of information to students. One subject expert can simultaneously teach hundreds of students in multiple locations across a vast geographical area. The students of the remote or ‘un-reached’ colleges can get the live lecture sessions of the best teacher. This initiative, therefore, addresses the major issue of paucity of faculty members in higher education.

EDUSAT provides satellite linkage to one thousand classrooms in the next phase in different regions across the country. It will be able to support about 5,000 terminals in the third phase. The connection will help institutions have access to quality resource persons and new technologies. Distant education efforts would also get strengthened. Educational institutions in Karnataka, Madhya Pradesh and Maharashtra have already availed themselves of the utility.

The satellite is expected to relay high-quality programs that will augment the teaching at all levels of education, from primary school to professional courses. EDUSAT is one of its kinds where the satellite is totally dedicated for providing educational services.

EDUSAT will be very beneficial considering the shortage of teachers, especially in frontier areas of technology. Apart from technical programs, the university can use the satellite system to run programs for "soft skills" such as leadership training, techno-entrepreneurship and career planning, where too the students need to compete with their peers. With reception terminals in 100 colleges, a single lecturer is able to reach 10,000 students across the State at
The same time. The talk can be stored as a computer file that students can access any time and it can be made available on a CD if required. We can identify good teachers in the colleges and use their services to make the programs. VTU is trying to involve major IT companies so that students are introduced to the latest technical topics. Companies can also use the network for their pre-placement talks and campus recruitment. The pilot phase was very useful in sorting out various technical issues and practical problems.

The benefits of EDUSAT could even reach beyond India's borders. As EDUSAT covers other South Asian countries partially or fully, it should be possible to extend support to those countries too. The EDUSAT, which will provide a fillip to distance education in the entire country, has specially been configured for the audio-visual medium, employing digital interactive classroom and multi-media, multi-centric system. EDUSAT is primarily meant for providing connectivity to school, college and higher levels of education and also to support non-formal education, including developmental communication.

In addition to supporting formal education ranging from grade school through graduate education, the satellite will be used to disseminate health information to patients and professionals as well as train teachers in the use of educational technology. There will also be a science channel called Jigyasa, or inquisitiveness.

4. Student support services

Student support services refer to any service which is extended by the distance learning institutions to meet the varied needs of the learners to motivate and guide learners for self study; to provide answers to administrative queries, to make individualized study a reality; to promote
effective study skills and provide access to resources. Student support services are provided at different levels:

1. Theoretical (to mitigate the feelings of the student isolation)
2. Practical (to concentrate on retention)
3. Moral (help them to make their decision)
4. Administrative
5. Academic
6. Information collection
7. Socialization tasks, which includes:

   a. Library facility
   b. Development of files or data bases and student records
   c. Evaluation of assignments.
   d. Motivation to continue education.
   e. Pre admission counseling.
   f. Information about programs on offer.
   g. Infra structure facilities.
   h. Time schedule on delivery of materials
   i. Dispatch of text books and study materials
   j. Face to face contact.
   k. Response to student queries.
   l. Feedback from students.

The importance of distance education in India in terms of increasing student enrolment indicates that the country is poised to a new leap during the next two decades. India will expand substantially to meet the challenges of its ever-increasing population. The development of technologies and in particular telecommunication technology will bring a paradigm shift in program delivery. The artificial coverage between formal and distance education will reduce steadily. Though the way to knowledge driven economic progress
through DE appears to be more promising than ever before. The concern for quality of distance education programs has to be maintained uniformly to avail maximum advantage of multiplier effect.

4.1 Libraries in Distance Education

Libraries are considered to be the heart of educational institutions. These play a very important role in teaching and learning environment of the information society. The information needs and urgency in acquiring the needed information has made libraries to change rapidly. In order to achieve this end Information Communication Technological (ICT) tools have been employed. The ICT have considerable impact on the traditional libraries and information centres. In fact the technology is changing the very nature of libraries and the librarians have a major impact on the strategic direction of libraries in the society wherein the users want instant access to information or knowledge. This has resulted in digitization of documents and their storage in multimedia management systems accessible through the browsers. Digital and virtual libraries play an important role in e-learning as a result of integration of varied technologies like hardware technology, software technology, networks, web technology etc. the Internet has significantly transformed the concept of libraries. The availability of massive amounts of information on the Internet require expertise for improving the quality of searches and for constructing and maintaining databases and www based information services meant for end-users so as to satisfy their educational and information needs. With the growing importance of rich media content in higher education in higher learning libraries throughout the world are facing significant challenges in offering increasing demands of users to access these learning resources. The electronic media offers enormous opportunities for libraries to integrate their resources and provide enhanced services and facilities according to the needs and conveniences of distance learners. The Internet
and multimedia CD-ROM disks provide immense sources of information and have made the process of information access and self-learning much easier. Efforts are on to tap this media for improving facilities for distance learning and access to library and information services.

The library of an open university has to serve two types of clientele. It has to cater to the needs of the resource persons as well as to the learners who are geographically scattered. The National Open University and other state open universities in India have a network of libraries comprising two distinct categories.

1. Central library as the apex at the university headquarters
2. Libraries at the regional and study centres as the branch libraries.

Distance education students require to frequently use the library facility because of their self study mode of learning. They also require collecting the information and consulting the library to complete their computer marked and tutor marked assignments and projects. Distance education students of IGNOU have somewhat different characteristics and information use patterns and needs from full-time on-campus students. They belong to different geographical areas including the far-flung rural and isolated hilly areas. They have varied educational levels, different linguistic backgrounds and a variation in socio-economic and cultural backgrounds. A typical distance education learner in India is mostly an adult and many of them have work and family obligations in addition to the part-time study they are pursuing in order to complete a course from IGNOU. The IGNOU keeps them completely busy throughout the year and provide them schedules in advance for completion of various assignments and attending the counseling sessions, pursuing practical courses and appearing in examinations. It however offers a most flexible system of education to the students in a given period of time so that students are able to freely plan their own-learning and
prepare for their examinations within the stipulated period of time allowed by the IGNOU. The IGNOU offers the best possible educational support services by providing counseling, requisite infra-structure in various geographical locations to which the students belong and also making available information through modern means such as radio counseling and Gyan Darshan television channel besides providing the quality study material. In spite of such facilities, the IGNOU students require to frequently use the library services for writing their assignments and properly preparing for examinations conducted by the IGNOU.

For realizing excellence in education, what we need is quality faculty, infrastructure facility, national and international high bandwidth connectivity and available knowledge source. In addition we need a good learning environment, collaborative environment, exposure to the international best practices and practices and constant promotion of innovation and creativity. High quality student support services will improve the performance of the system. The higher the research intensity in a university environment better will be teaching quality. Today science and technologists are directly linked to the nations’ economic development and their sustainability is related to the applicability and relevance of education system in uplifting the 260 million people living below the poverty line and those who live in the rural and urban areas. Knowledge gets multiplied when connected and circulated.
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