

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

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DECLARATION

I hereby declare that the work presented in this thesis entitled **“APPLICATION OF INFORMATION TECHNOLOGY IN DISTANCE LEARNING IN HIGHER EDUCATION WITH SPECIAL REFERENCE TO INDIA”** is original and has not been submitted earlier in part or in full, for any degree or diploma of any University.

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LIST OF ABBREVIATIONS

AI	-	Artificial Intelligence
AIR	-	All India Radio
AIU	-	Association of Indian Universities
BRAOU	-	BR. Ambedkar Open University
CAD	-	Computer Aided Design
CAI	-	Computer Aided Instruction
CBM	-	Computer Based Multimedia
CD	-	Compact Disk
CMC	-	Computer Mediated Communication
CMI	-	Computer Managed Instruction
DE	-	Distance Education
DL	-	Distance Learners
DLI	-	Distance Learning Institutes
DVD	-	Digital Versatile Disk
ETV	-	Educational Television
GD	-	Gyan Darshan
GPRS	-	General Packet Radio Service
GUI	-	Graphical User Interface
HTML	-	Hyper Text markup Language
ICT	-	Information Communication Technology
IGNOU	-	Indira Gandhi National Open University
ISDN	-	Integrated Service Digital Network
IT	-	Information Technology
ITV	-	Instructional Television
KSOU	-	Karnataka State Open University
LAN	-	Local Area Network
MHRD	-	Ministry of Human Resources Development

NPE	-	National Policy on Education
ODL	-	Open Distance Learning
OU	-	Open University
PC	-	Personal Computer
PCP	-	Personal Contact Programs
PG	-	Post Graduate
SIM	-	Self instructional Materials
SITE	-	Satellite Instructional Television Experiment
SSS	-	Student Support Services
TCP/ IP	-	Transmission Control protocol / Internet Protocol
UG	-	Under Graduate
UGC	-	University Grants Commission
UMTS	-	Universal Mobile Telecommunications System
UN	-	United Nations
UNESCO	-	United Nations Educational, Scientific and Cultural Organization
VR	-	Virtual Reality
VU	-	Virtual Universities
WAP	-	Wireless Application Protocol
WAP	-	Wireless Application Protocol
WWW	-	World Wide Web

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Chapter 1

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INTRODUCTION

Knowledge acquired by the humanity over 1000 years in the past is being overtaken completely by the knowledge acquired during the past few decades in the present century, thanks to the increasing division of labor, sophisticated technology and specializations with a futuristic vision. A nation may suddenly find itself left far behind on the ever-lightening path of progress simply because of its primitive and outdated educational system.

1. Background

Information Technology has a wide social application in almost all domains and activities of modern society. Information Technology, spreading throughout the world in a lightening speed has revolutionized each and every sphere of human activity. Information Technology is meant for storing, processing, and manipulating data, knowledge and information. Ultimately all these are meant for the benefit of society. The fundamental characteristic of such a society is its dynamism and unending progress. Life long learning is essential for the unending progress of society. Traditional classroom learning is not possible and not at all desirable for the life long learning. Moreover traditional methods of teaching and learning fail to provide efficient and effective learning. So there must be sufficient distance learning centers and Open Universities as an alternative system of education. Application of Information Technology application is the only possible way to improve the quality of higher education through distance mode, for its modernization.

Due to the explosive growth of knowledge and its interdisciplinary nature, the information handling has become extremely difficult. The advent of digital computers, advances in telecommunication technology, wide spread use of networking, explosive growth of internet, mass storage media, virtual reality and databases have opened up new possibilities in dealing with the collection, organization, and dissemination of information. Now information can not only be stored, retrieved, communicated, and broadcasted electronically, in enormous quantities at greater speed, but can also be re arranged, selected and transformed.

A proper and systematic study of the social application of Information Technology is generally known as Modern Informatics, quite distinct from computer science, Information science and Communication technology. An information system is the organization what nervous system is to body. Timely information is required at every level of any organization to take the important decisions. Sometime lack of information in time can seriously affect the working of organization. Because of so much importance of information in the decision making process, organizations are willing to spend large sums to acquire information. For this purpose organizations can either have their in house processing system or avail the services of vendors providing such services. Whatever is the source of information, every information possesses a value. However Informatics, as a branch of study is in its early stages of development, despite initiatives taken by UNESCO, UNIDO, ITU and International Federation for Information Processing (IFIP).

Economic growth of India is fundamentally tied to societal transformation in the knowledge products and service sector. Of course this in turn strengthens all the areas like education, agriculture, and manufacturing through innovation and value addition. The development of India is only possible through exploiting knowledge intensive products and services.

Information, knowledge and communication technology have to be widely deployed in our transformation strategy along with newer technologies like biotechnology, nano technology etc.

Education is the key aspect to human resource development. National policy on education (1986) rightly pointed out that education is a unique investment in the present and future. In providing education, formal system has its own limitations. The formal system is unable to meet the needs of all learners. Thus open learning system has been initiated in the country in order to augment opportunities for those who have either been dropped out or remained deprived of formal education system. Further open and distance education system also act as an instrument of democratizing education and to make it a lifelong process.

Unlike conventional system a heterogeneous group of learners enroll to various open and distance learning institutions. The successful completion of the course / program is depends upon their characteristics. Distance education has earned the credibility of a viable and effective alternative channel for imparting education at all levels all over the world and India is no exception to it. However the academic performance of distance learners is usually looked down on account of its low quality or for some other reasons. Information Technology is applied and started to apply in most of the Open Universities and distance education institutions in the country. It is a matter of curiosity and concern for the educational policy makers and experts.

The constitution of India provides for equal educational opportunities for all. However, the goals envisaged in terms of overall coverage, equitable distribution and quality of education are still very distance in all stages of education. The disparities among male-female, rural-urban and region-to-region are especially higher and significant in higher education. The Govt. of India has expressed its commitment to promote education in a planned

manner. The task however is daunting. Almost half of our population does not enjoy access to even basic education. The situation is really pathetic. Formal system of education has, in general, has two constrains. One is spatial and other is temporal. Education takes place within the campus and in classrooms and laboratories. It is confined to the earlier period of one's life generally from 6 to 25 years of one's age. To quote Honry "any one who stops learning is old, whether at twenty or eighty; any one who keeps learning stays young" (Kulandai Swamy, 2002). In the era of continuing and life long learning a new class of learners has emerged and for them education does not terminate at the end of formal schooling. It is a life long process, which covers the entire life span of an individual. So we need today a system that helps transcend these limits of formal system and satisfy the learners' immediate and long terms needs. Distance education provides the answer to such situations. It has a prominent role to play for education of the people with focus on the human resource development.

The policies and practices of the Government try to reflect the present demands and needs of the society. Undoubtedly, the new policy on education provided due emphasis on strengthening the distance and open learning systems in the country. National policy on education states that '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 pace suited to them. The future thrust will be in direction of open and distance learning.

Kulandai Swamy went ahead to say that distance education is no longer a matter of choice, but a compulsion of time. There are 11 to 20 percent students of the age in territory education system in many of the developing countries like Egypt, Mexico, and Brazil etc. Among the

remaining 94 percent who are outside the system, there are many who are highly motivated, academically talented, but could not go for higher education due mainly to social, economic and geographic constraints. The distance education system, besides other objectives meets the aspirations of these persons (Kulandai Swamy, 1998). By establishing various directories of distance education at the conventional Universities and state and national level Open Universities distance mode of education has earned its credibility as an effective alternative and parallel system of imparting education to the large number of the learners in the country.

The National Policy on Education (NPE 1986) state that “in our national perception education is essentially for all”. The program of action of NPE further states that “ the open learning system augment opportunities for higher education, ensures access, is cost effective and promotes a relevant, flexible and innovative system of education”. Thus one could very well see that, trusting on the potentialities of distance education, it should become a part of the Government’s policy to educate the masses at all levels of education.

1.1 Information society

Information has become the most vital commodity for consumption and production in almost all aspects of the society. “Information society” has become a reality thanks to recent technological advances in electronics and telecommunication. The emergence of a new electronic communication system characterized by its global reach, its interaction of all communication media and its practical interactivity is changing and will change forever our education, culture etc. creating a new area of ‘cyber societies’ or ‘virtual communities’ (Jones, 1998). These technological advances resulted great changes in the field of education and learning.

About \$11 Billion is earning in India through exploring IT. It is a clear evidence for the establishment of an 'Information society'. Arun shourie in the world summit on the information society suggested four elements for the construction of an information society.

- Use of ICT to establish literacy.
- Develop the universal networking language, with which a person in Iran can read an article in any Indian language in Persian.
- Develop voice to text and text to voice software
- Complete research on reaching wireless signals to go to multiple 50/60 Kilometers.

1.2 Informatics

The study of social application of Information Technology for speedy development in the context of the third world is an entirely new branch of study. This new branch of study is generally known as Developmental or Third World Informatics. This third world or Developmental Informatics got international recognition mainly due to the theoretical, strategic and policy studies conducted by Mathew. (Mathew, 1987, 1992, 1998). Development Informatics mainly concerned with the study of social application of Information Technology in the modernization and speedy development of education, government administration, developmental activities, health care, culture and entertainment etc. in the context of third world countries.

1.3 Knowmatics

Research and development in the field of informatics has resulted in the formation of a new discipline called 'Knowmatics'. Knowmatics is a new scientific and engineering discipline to study the structure, properties, behavior, representation and communication of knowledge so as to develop algorithms to process knowledge. All the achievements in Information

Technology are confined to data or information processing. No technology has been developed so far to process and organize knowledge. Though terms like knowledge management, knowledge organization and data mining etc have been used widely; they are limited to one form or another form of data processing. Knowmatics is interdisciplinary in nature. It is the result of integration of several disciplines like Epistemology, Cognitive sciences, Informatics, Brain research, Mathematics, Computer science, Library science and Networking. Knowmatics provide theoretical basis and methodological tools for developing algorithms for knowledge processing and Knowledge handling and thereby developing knowledge technology (Mathew, 2005).

1.4 Educational Informatics

Education and learning has become a life long process. Since it is impossible for the society to depend on formal educational methods for their life long learning, they began to depend more on distance learning methods. To live is to learn. No individual or society can survive without constantly leaning new things. Thus life long learning can be considered as a process inherent and natural to human existence. However the pace and mode of leaning changes according to the manner and mode in which the society is organized and the way individuals are positioned in it. Learning need of the modern information society has naturally to be different from those of primitive or medieval societies. Education is the vehicle of knowledge and information. Society needs life long learning to keep them paces with the trends in modern world. Distance learning is the only possible way for life long learning. For the effective and systematic life long learning Information Technology should be applied in all fields of education especially in the field of distance education. The application of Information Technology, in the specific context of education and training can be generally named as "Educational Informatics".

Information Technology has brought many benefits in the field of education, especially distance education. The application of computers and communication technologies have began to apply in almost all the fields of distance education such as student enrolment, staffing, instructional delivery, online classes and evaluation and assessment. Virtual Universities began to start in almost all the developed countries. Even in India steps are going on for the establishment of Virtual Universities and virtual learning. Due to the launch of 'Edusat' more possibilities of using communication technological tools are going to be exploited. A wide variety of advantages can be derived by the appropriate use Information Technology. Following are some of the benefits of using ICT in distance education.

- Help the learners to free from attending uninteresting classes and contact sessions.
- Communication with many students at one time.
- Flexible and convenient.
- Participants respond quickly.
- Classes are more interesting.
- Learning from the top-level experts in the field.
- Classes can be recorded, saved and reformatted for future study purposes.
- Easy and wider access to all kinds of information resources.
- Help to increase efficiency and effectiveness of teaching and learning.
- Improves the cost effectiveness of distance education.
- Provide remote access to the learners.
- Economic and time saving.

Though IT has the potential for modernizing the distance education system in the country, there is a wide gap between what is told and what has

been achieved. It is estimated that a large amount of learners are not aware of various tools and techniques applied in the field of distance education. The reasons in the application of Information Technology in the field of distance education or for its slow progress are many. The following may be considered important among them.

1. Technological backwardness of the society as a whole.
2. Existing infrastructure of the Universities.
3. Use of IT as supplementary to the conventional system of distance education.
4. Existence of study materials in the tabulated format.
5. Lack of importance for further study and research.
6. Limited student support services.
7. Inadequately trained teachers.
8. Lack of IT awareness among the learners.
9. Inadequate publicity for IT based resources and services.
10. Lack of a wide network among Open Universities in the country regarding exchange of information resources and services.

The application of Information and Communication Technologies in the field of distance education in India has gained much momentum. New and emerging technologies such as wireless networking, multimedia technology and satellite technology have immense possibilities in the field of distance education. Although the use of Information Technology in the field of distance education is low, it is expected to go up in the coming years with continued reduction in the prices of hardware and software. The extent of use of IT in distance education institutes will increase substantially. Open Universities and distance education institutes will use expert systems and virtual learning techniques using artificial intelligence in the near future. Use of mass storage devices such CD-ROM and DVD-ROM and flash memories

will increase further. The World Wide Web is going to be more interactive and multidimensional incorporating more virtual reality techniques.

1.5 Open / Distance learning

The Open and Distance Learning (ODL) has become an integral part of higher education globally. It is an effective tool for the provision of education to a heterogeneous group of learners as well as an alternative channel to democratize education all over the world. The origin and growth of distance education has its roots in the familiar circle to be squared. The development imperative of providing health and education facilities to the people in the poor countries, which they can hardly afford and without which they cannot develop such economic resources. This fact underlines the need for a proper educational policy. The goal of such a policy is to arrive at a balance between the demand for and the supply of education to secure the most beneficial form of educational development. This fact has been reiterated by the education Commission (1966) while observing that the growth of education should go together with the manpower requirements of an expanding economy.

ICT has made it possible for any learner to pursue education from any place and from any institution. Yet the learners' geographical mobility from place to place, be it within a country or across the countries has been causing problems to the learners in pursuing the program of study, depending upon the nature, duration etc. of the program. To address all these problems, there is a need for effective network of distance and open education institutions with provision for transfer of students along with their credits, records and so on between and / or among all the institutions offering same programs in same media with same or equivalent syllabus or curriculum. Such a network calls for a well-coordinated mechanism to smoothen and facilitate the relevant opportunities. If this kind of transfer is made possible through different media, including the virtual mode that will be the best way for the distance learners at large. This perhaps is possible by promoting multiple consortia at

different levels, national, regional and international levels and through multiple media.

There are about 40 Open Universities in the world out of which 11 (27%) are located in India alone. Out of 1200 institutions in this field in the world in the world 72 (6%) are in India alone. As a sequel to this magnitude of growth, many associations of open and distance learning such as Indian Distance Education association (IDEA), Australian Association for Open and Distance Learning (AAODL), Asian Association of Open Universities (AAOU), International Council for Distance and Open Education (ICDOE) and so on.

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 re moulded 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. The very philosophy of distance education envisages complete freedom from any restraint on account of jurisdiction from which the conventional Indian

Universities suffer. There is no geographic restriction. Students in distance education system are free to learn at their own pace and convenience while being away from the institution.

A variety of media such as radio, television, computer and Internet etc are being used as a part of learning material by many Open and Distance Learning (ODL) institutions. As a result, course delivery in such institutions is multi-channel; multi-media mix (Kulandai Swamy, 2002). The requirements of the distance education for developing the course material using the multi-media approach has necessitated, apart from print material, embracing of technologies such as radio, television, audio and video cassettes. Last decade has witnessed a virtual explosion in the advancements made in several areas of technology especially those relating to computer, networking and communications, which have a direct bearing on the distance education system.

There are some positive educational implications associated with using technologies in Distance Education, like the availability of greater variety of learning resources; improved opportunities for individualities learning; the possibilities of greater control for students over their learning; more extensive coverage via technologies and therefore greater access to them; greater flexibility offered by the wide range of technologies; characteristic fall in the cost of new technologies as they become established; and there is a higher degree of interactivity as convergence occurs between old and new technologies (Khan, 1989).

Because of their qualities, such as greater delivery capabilities, contributing to specific learning activities, promoting participatory learning, motivating the learners to get involved with learning activities, accommodating individual needs and extending the role of teacher etc electronic media such as radio, television, computer and Internet etc have

been embraced as a part of learning material by many ODL institutions. However, in practice, the veracity of technologies use among institutions across the world is varied, and is commonly influenced by non-pedagogical factors, such as cost, access and availability as much as by pedagogical factors. The ways in which different institutions employ any one particular technology are also subject to great variation (Harry and Khan, 2000).

1.6 Educational Technology

Educational technology has been interpreted in two ways:

- 1) Technology in Education
- 2) Technology of Education

The former is the means, while the later refers to the core of what the ends should be learning, how it occurs and how technology may be developed to enhance learning. One of the principal distinctive features of the new IT enabled education system will be the opportunity provided for individualized self-paced learning, which caters to the individual abilities and aptitudes of the individual learners, and the possibility of one to one interaction with the teachers. This will also offer better opportunities to provide feedback and permit effective assessment of learning. IT application is only means. The ultimate goal is to improve the quality of education and to make it reach to large masses in flexible way. Educational technology deals only with transactional component or the process component. Educational technology is the systematic and hence takes a system view instruction. It 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.

Conventional production factors such as land, capital and machinery are no longer sufficient to gain and sustain a competitive edge in the global markets. The bases for competition has shifted to how well and fast intangible assets such as knowledge, information, ideas and organizational capacity can be developed to reduce cost, increase quality and generate innovation to meet customer needs quickly and effectively (Bates, 1994).

There comes the importance of conducting a very detailed and systematic study of the social application of the Information Technology in the specific area of distance learning of the third world especially of India, so as to modernize them and withstand the challenges of time. In other words Educational informatics is the most important and relevant area of study as a developing alternative method to the system of higher education in India.

It is evident that the current approach of adding technology to existing institutional structures not only fails to exploit fully the educational potential of technology, but also actually increases the cost of education. In short we need to examine very carefully the purpose and function of educational institutions in the 21st century and use electronic technologies to build new institutional models to meet new educational needs (Bates, 1994). For the modernization of these method adopted in the filed of distance learning Information Technology should be applied in its various aspects. The present study is an attempt to explore the possibilities and to understand the level application of Information Technology in Distance Learning in higher education with special reference to India.

2. STATEMENT OF THE PROBLEM

The present problem under investigation is entitled “**APPLICATION OF INFORMATION TECHNOLOGY (IT) IN DISTANCE LEARNING IN HIGHER EDUCATION WITH SPECIAL REFERENCE TO INDIA**”.

2.1 DEFINITION OF THE KEY TERMS

2.1.1 Application

The word “application”, according to Oxford English dictionary, is 'putting of anything to use or purpose; specific use' (Oxford English Dictionary, VII, 1970). According to Chamber's 20th century dictionary application means 'the act of applying, administrating or using: a thing applied' (Chambers 20th century thesaurus, new edition, 1983).

In the present study the term application is used for the way in which something can be used for a particular purpose.

2.1.2 Information Technology:

UNESCO (1973) defines, 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 can be defined as the acquisition, processing, storage and dissemination of vocal, pictorial, numerical or textual information by a microelectronics based combination of computing and telecommunication. In short we can say that Information Technology means Application of computer and communication technologies in the handling of information.

2.1.3 Distance Learning

Distance Learning is a system of teaching and learning in which students study in their own homes or at local centers using materials mailed or broadcast from a central unit. Tutorial work may handle by correspondence or

by electronic media with the central unit or a regional basis. The objective is to open up opportunities by overcoming all types of barriers in learning process like economic, geographic, work commitments, and conventional course structures, which have often limited access to educational and training facilities (Sewart, 1993). The last decade has seen a phenomenal growth in distance education and the integration of this method of education with the standard Information Technology applications in a large number of countries to such an extent that it is now no longer possible to think solely about the traditional education using traditional methods.

In the present study distance learning is used as a method in which students study from their places of convenience after registering for a formal course in any Universities.

2.1.4 Reference

The word “reference” means the act of referring or the state of being referred; that to which something refers (Reader’s Digest Universal Dictionary, London, 1993).

2.1.5 Higher education

According to Encyclopaedic Dictionary of Education higher education is “Education beyond secondary school that is viewed as intellectually more rigorous and sophisticated than that of the secondary level, and that either leads to academic degrees or is on a comprehensive intellectual level”

In the present study higher education is used for any of various types of education given in post-secondary institutions of learning and usually affording, at the end of a course study, a named degree, diploma, or certificate of higher studies. Higher educational institutions include not only Universities and colleges but also various professional schools that provide preparation in

such fields as law, theology, medicine, business, etc. The basic entrance requirement for higher educational institutions is the completion of secondary education, and the usual entrance age is about 18 years.

2.1.6 India

Republic of India is a federal republic that occupies the greater part of South Asia. India is a sovereign socialist secular democratic republic consisting of 25 states, each with a substantial area of control over its own affairs, and 7 less fully empowered union territories. The capital is New Delhi. With more than one sixth of the world's total population, India ranks as the 7th largest country in the world, covering 3,166,414,S.Km. just slightly more than 2% of the earth's total surface. The provision of free and compulsory education for all children up to age 14 is among the directive principles of Indian constitution. In absolute terms the output of well-educated individual is substantial.

3. NEED AND SIGNIFICANCE OF THE STUDY

The present study is mainly concerned with societal application of IT rather than its engineering or technological or even scientific aspects. IT has great potentialities for speeding up the process of development and it has multiplier effect or impact. Because of its application the whole society is going to realize its wide range impact within a short span of time. The society and its activities are very complex. Some of the well-known social activities can be identified as economic, political, social, cultural, educational and scientific activities. Information Technology must be given top most priority in the sustained development of any country. Then only modern society can be rightly called as 'Cyber society'.

Modern computer and communication infrastructure must be built up, extending even the remotest places for the development of a country like

India. Especially in a situation where traditional Universities and higher education centers fail to fulfill their objectives and Virtual Universities and Tele-teaching methods are going to handle the control of higher education systems. In such a situation there is an urgent need for conducting a study about the application of IT in distance learning in the country, where there are many Open Universities and number of distance learners increasing day by day. The present study is an attempt to study about the present level of application of Information Technology and to explore the possibilities of application of IT in distance learning in higher education in India.

4. OBJECTIVES OF THE STUDY

The major objectives of the present study are stated below:

- 1) To assess the background characteristics of distance learners in the field of higher education in India.
- 2) To assess the attitude of distance learners and faculty members towards the distance education and conventional education and to examine the relevance of distance education as an alternate system of education.
- 3) To assess the present status and quality of distance education conducted by Open Universities in the country, and to suggest certain methods for improvement.
- 4) To assess the Information Technology awareness of distance learners and faculty members of the Open Universities in the country.
- 5) To review the availability and use of Information Technology tools at different Open Universities in the country.
- 6) To study about the present status of IT application in the field of distance education in the country and to examine the changes occurred

in the curriculum of Open Universities due to the application of Information Technology.

- 7) To find out the areas in which IT can be effectively applied and to identify certain prerequisites for the same.
- 8) To examine the information needs and problems and to assess the library use and library services provided by the Open Universities in the country.
- 9) To examine the feasibility of the establishment of 'Virtual Universities' and web based learning in India and to examine the delivery models, which are preferred in the web based learning environment.
- 10) To explore the possibility of modernization of distance learning through the application of Information Technology and to formulate certain policies and plans for the same.
- 11) To understand whether there exist any significant difference between large/ medium and small Open Universities in the application of Information Technology in distance learning.

5. HYPOTHESES

The main hypotheses of the present study are given below:

1. The learners in the field of distance education in India come from different academic and social background.
2. Distance learning is a highly relevant alternate system of education in the modern times.
3. The academic community in the field of distance education is not satisfied with present methods and practices adopted in the field of distance education in India.

4. The learners and faculty members in the field of distance education in India are well aware and equipped with Information Technology tools.
5. The Distance learning and teaching methods practiced in the country is under the verge of extinction due to the recent developments in the field of Information and Communication Technology.
6. Various distance learning institutions and Open Universities are in different levels in the case of application of Information and Communication Technology.
7. In order to apply IT in distance learning, building up of infra structure (Hardware), designing and developing software, existences of human ware (overall social development) sector are necessary.
8. Open Universities and distance learning institutions have a sound library system and provide efficient and competent library services.
9. Establishment of Virtual Universities are highly feasible in a country like India and it is very much essential for the modernization of distance education in the country.
10. Application of Information Technology is the effective way to improve the quality of distance education and for the very survival of the system in the emerging socio-technological context.
11. There exists significant difference among different groups of faculty members in the use of Information Technology in their practice.

6. METHODOLOGY IN BRIEF

A brief description of the methodology used for the study is given below.

The present study will be focused on faculty members and learners of the important Open Universities in India like Indira Gandhi National Open University, New Delhi (National Open University), and two Open Universities in south India such as Karnataka State Open University, Mysore and Dr. BR. Ambedkar Open University, Hyderabad. The sample is selected out of eleven Open Universities in India. The sampling technique adopted is simple random sampling. The investigator has selected 250 students each from all the sample Universities. Out of 915 questionnaires distributed a total of 750 questionnaires were selected for the final analysis. From the faculty investigator has distributed the questionnaire to all the faculties in the headquarters of the sample Open Universities and collected data from them. A total 154 questionnaires, (92 from IGNOU, 38 from BRAOU and 24 from KSOU), received from the faculties are used for final analysis.

7. Presentation of the report

The report is presented in six chapters.

Chapter. 1 introduces the problem and explains the importance and significance of the study. It also presents the objectives, and elaborates on the scope, methodology, tools and techniques.

In Chapter 2, a detailed description about application of Information Technology in the field of Distance education has done. After giving a brief outline of the definition, evolution and need of distance education, the growth and development of distance education at the global level are attempted. A detailed description about various IT tools used in the field of distance education also reviewed in this chapter.

In chapter 3, the status of distance education is reviewed. Various studies in the field of technology-based education has discussed with a view to provide a strong basis for the study being conducted.

In Chapter 4, the methodology adopted for the study is discussed in detail.

In chapter 5, the data collected from the students and faculties of sample Open Universities are analyzed with the help of statistical techniques.

In chapter 6, findings and conclusions are summarized.

The presentation of the report, including the citation style of the study, has been made according to the 6th edition of the Modern Language Association- 'MLA Handbook for writers of Research Papers', 2004.

8. SCOPE AND LIMITATIONS OF THE STUDY

One of the prominent limitations of the study is its reach itself. IGNOU, BRAOU and KSOU are institutions having their presence even in the international education level. The vastness of the land and its diverse population may make degree by which the findings may vary, but the findings are not likely to be different from what has been observed here, if much wider sample had been studied.

Though this study has attempted to cover the entire spectrum of distance education, it needs to be noted that this study does not include all the courses and programs of offered by Distance Education Institutes (DEI) in the country. It is not feasible to conduct a study by covering all the Open Universities in the country, thus the investigator has selected three sample Open Universities such as Indira Gandhi National Open University, BR. Ambedkar Open University, and Karnataka State Open University for conducting the study. Though the investigator has distributed questionnaires among the entire fulltime faculty members from the sample Open Universities in the country, a large number of counselors from the regular streams teaching in the field of distance education are avoided.

Not many literatures on student support services from the perspective of learners were known to exist. There were not any previous studies, which gives a comprehensive coverage to the overall IT, tools used in the field of distance education either. Therefore in a way, this attempt may be termed as pioneer. Such lack of any previous attempts carries with it the disadvantage of lack of opportunity to compare and notice any deficiencies. However almost all of the instruments / assets employed in distance learning and their various attributes / features have been targeted for probe in this study.

The present study is a policy-oriented study. It is an applied study for formulating correct policies and strategies for the society or government to improve the system of distance learning in higher education in India. The purview of the study is India. There are many Open Universities in the country and, number of distance learners is increasing day by day. The present study concentrates on distance learners and faculties of three major Open Universities of the country. This study is intended to provide a basic methodological and theoretical framework for giving an explanation for the process of application of Information Technology in distance learning. The approach of the study is multidisciplinary one as it integrates the basic theories of education, information science, Information Technology, Library science and educational informatics. The basic approach of the investigator of the present study is mainly that of an information scientist rather than that of an educationist.

The findings of the study may be useful to administrators and higher education planners at national level and state level for formulating correct policies and strategies with regard to the modernization and application of Information Technology to meet the rising educational needs through the alternative system of education. This will be useful for library and information systems, network experts and managers in designing and

implementing highly efficient library and information systems in the field. The study provides a theoretical and practical explanation for the complex process of modernization and application of Information Technology in the field of distance education. The importance of such a study is very relevant, especially in a country like India where most of the people live in poverty and backwardness.

The present study indicates that through lot of efforts are being taken in the field of distance education for the application of Information Technology; the students still follow the conventional techniques of by hearing study materials and attending occasional counseling/ contact classes. Majority of the students are not utilizing the multimedia instruction system introduced in the field of distance education. There are lots of problems relating to the use of Information Technology tools. In order to solve them the entire dependence on the study materials should be minimized and the potential of Information Technology should be utilized to the fullest extent. Moreover the attitude of learners about distance education as a liberal and flexible way of education should be changed. Student support services in the field of distance education should be strengthened. The possibilities in the field of network and satellite technologies should be exploited to the fullest extent. In such a situation only distance education can be developed as an alternative method in the field of higher education in India. The present situation of teaching and learning should be changed so that it can be accessible even to the laymen of the country.

REFERENCES

- Bates, A. W. (1994). *Distance education and educational technology*. In T. Husen and T. N. Postlethwaite (Eds.). *The International Encyclopedia of Education*, (2nd Ed). Oxford: Elsevier Science, 1573-1580.
- Chamber's 20th century dictionary*. (1983). Edinburgh: Chambers, 37.
- Ford, M E (1992). *Motivating Humans: Goals, Emotions and Personal Agency Beliefs*. Newbury Park, CA: Sage Publications.
- Government of India. (1986). *National Policy on Education*. 1986 - New Delhi: MHRD.
- Government of India. (1966) *Report of the Education Commission (1964-'66.)* New Delhi: Education and National Development.
- Harry K. and Khan A. (2000). *The use of technologies in basic education*. In Yates, C. and Bradley, J. (Eds.) *Basic Education at a Distance: World review of distance education and open learning*, 2 (2), 3-21
- Jones, Steven G.(1998). *Cyber society: revisiting computer mediated communication and community*. London: Sage, 12-46.
- Khan, I. (1989) *Teaching at a Distance*. Delhi: Amar Prakasan.
- Kulandai Swamy, V.C. (2002). *Education for Knowledge Era: Open and Flexible Learning*, New Delhi: Kogan, 25-49.
- Long, T. (1984). Broadcasting for rural development. *Media in Education and Development* 17(1), 17 – 19.
- Kulandai Swamy.V.C. (1998) *Keynote Address In Seminar on Distance Education*, MIT.

- Mathew, Raju M. (1998). Role of Information Technology for the sustained development of Kerala: strategies and policies. *Kelpro bulletin*, 2 (1), 3-8.
- Mathew, Raju. M (2005). Technological foundations of Knowmatics and Knowledge Technology. In *National Seminar on Knowledge Technology and Knowledge Industry: Kerala's development potentialities*, 27-28 May, Calicut University.
- Mathew, Raju. M. (1987). The third world factor. *Transactional data and communication Report*,10.
- Mathew, Raju. M. & Santhamma Raju (1992). strategies and policies for developing tele-teaching for science and technology Education at University level in India and the third world, (*Contributed paper for the second World conference on tele- teaching held at Norway, Organized by the international Federation for information processing in collaboration with the Council of distance Education, UNESCO and ITU*).
- Mehndiratta, Mamta (1997). *Encyclopaedic dictionary of education*. Vol.2 New Delhi: Sarup and Sons, 475.
- Reader's digest Universal Dictionary*. (1993). New York: Reader's Digest, 1210.
- Sewart, David. (1993) *Individualising support services*. In Daniel, John. S, et al (Eds.) *Learning at a Distance: A World Perspective*. Edmonton: Athabasca University.

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. Inter connected 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 break through was the discovery that telecommunication channels could be harnessed for carrying digitized information. This facilitated inter connections 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.

1.4.2.1.9. 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.

1.4.2.1.10. 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.

1.4.2.1.11. 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 tele communication 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 used 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 Education 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 re construction, 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

The old practice	New practice
Fixed beurocratic structure	Flexible and dynamic
Status laden and rigid	Functional and evolutionary
Powers resides at top	Powers shared by empowerment
Motivate, manipulate people	Inspire and care for each other
Compliance is valued	Value creative contribution
Focus on problem	Focus on creating opportunities
Blame for failure	Support learning from failure
Short term focus	Long term perspective
Progress by increments	Progress by leap

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 expensive 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)

The screenshot displays the official website of Indira Gandhi National Open University (IGNOU). The browser window title is "Welcome::Indira Gandhi National Open University - Microsoft Internet Explorer". The address bar shows "http://www.ignou.ac.in/". The website header includes the IGNOU logo and the text "इन्दिरा गांधी राष्ट्रीय मुक्त विश्वविद्यालय" and "INDIRA GANDHI NATIONAL OPEN UNIVERSITY". Below the header is a navigation menu with links like Home, Hindi website, Route Map, Search, Contact Us, Telephone Directory, Faculty Use, etc. The main content area is divided into several sections: "Admission Details" (July 2008, January 2008, B.A Int. Hosp. Admin., B.Sc. Naut. Science, Hall Ticket, TEE June 08, BCA/MCA T.E. Pract. Exam., BIT/ADIT T.E. Pract. Exam., Search Online TEE Form June 08, Term End Exam Result, Revaluation, Final Result, Interactive Radio Counselling), "Academic Programmes" (Doctoral Programmes, Master's Degree Programmes, Bachelor's Degree Programmes, PG Diploma Programmes, Diploma Programmes, Certificate Programmes, Area Specific Programmes, Academic Programmes on Offer), "Quick Links" (eGyanKosh, IGNOU Online, Education Broadcast, Convergence Scheme, (SWISS) Single Window Information & Student Support, PROFILE 2008, MailService, Mail Service), and "News & Events" (Management Programmes, Student Bulletin Board). The footer shows the browser's address bar and taskbar.

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-ordinator 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

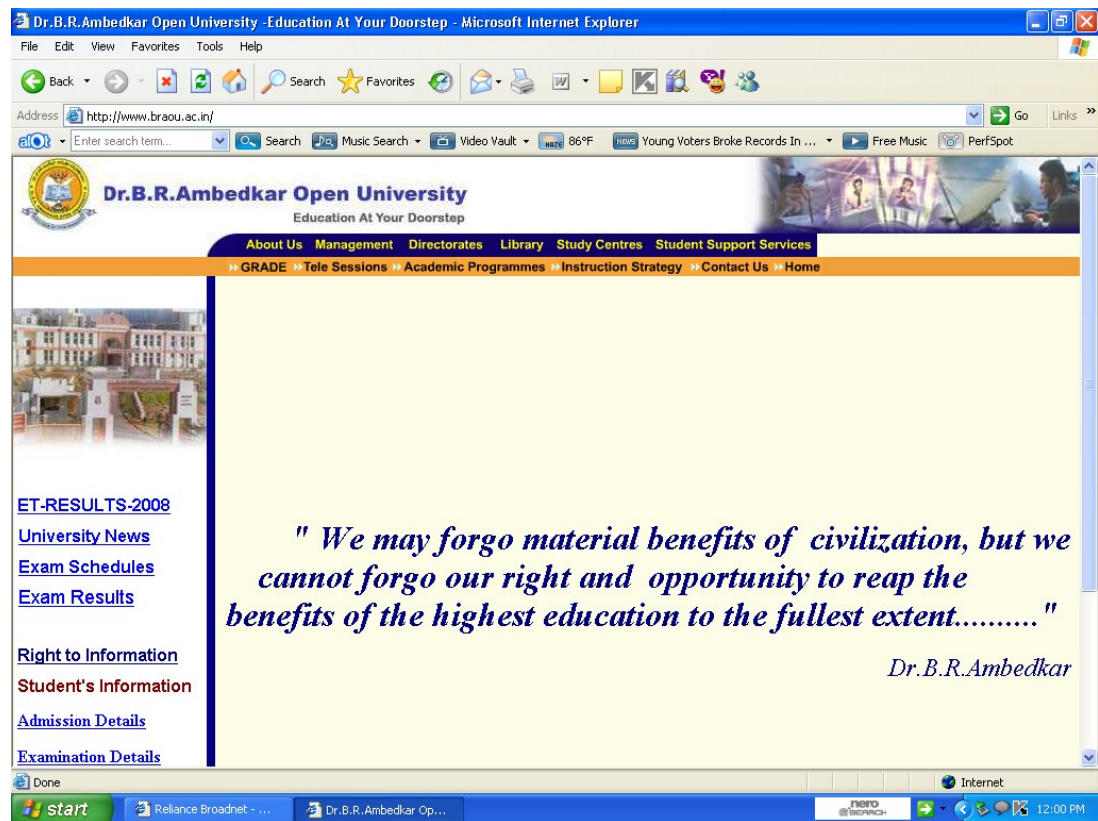
State	Regional Centers	Special Study Centers	Study Centers	Total
Andhra Pradesh	1	1	11	13
Arunachal Pradesh	1		4	5
Assam	1		17	18
Bihar	1		25	26
Chattisgarh	1		6	7
Delhi	2	3	68	73
Gujarath	1	1	22	24
Haryana	1		12	13
Himachal Pradesh	1		15	16
Jammu Kashmir	1	1	12	14
Jharkhand	1		13	14
Karnataka	1	1	18	20
Kerala	1	2	18	21
Madhya Pradesh	1		14	15
Maharashtra	1	3	16	20
Manipur	1		5	6
Meghalaya	1	1	12	14
Mizoram	1		9	10
Nagaland	1		5	6
Orissa	1		26	27
Punjab	1		7	8
Rajasthan	1		22	23
Sikkim	1		4	5
Tamilnadu	1		36	37
Tripura	1		4	5
Uttar Pradesh	1	1	23	25
Uttaranchal	1		16	17
West Bengal	1	1	19	21
Grand Total	18	3	459	480

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.

2.4.2.4.2 BR. Ambedkar Open University (BRAOU)



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.

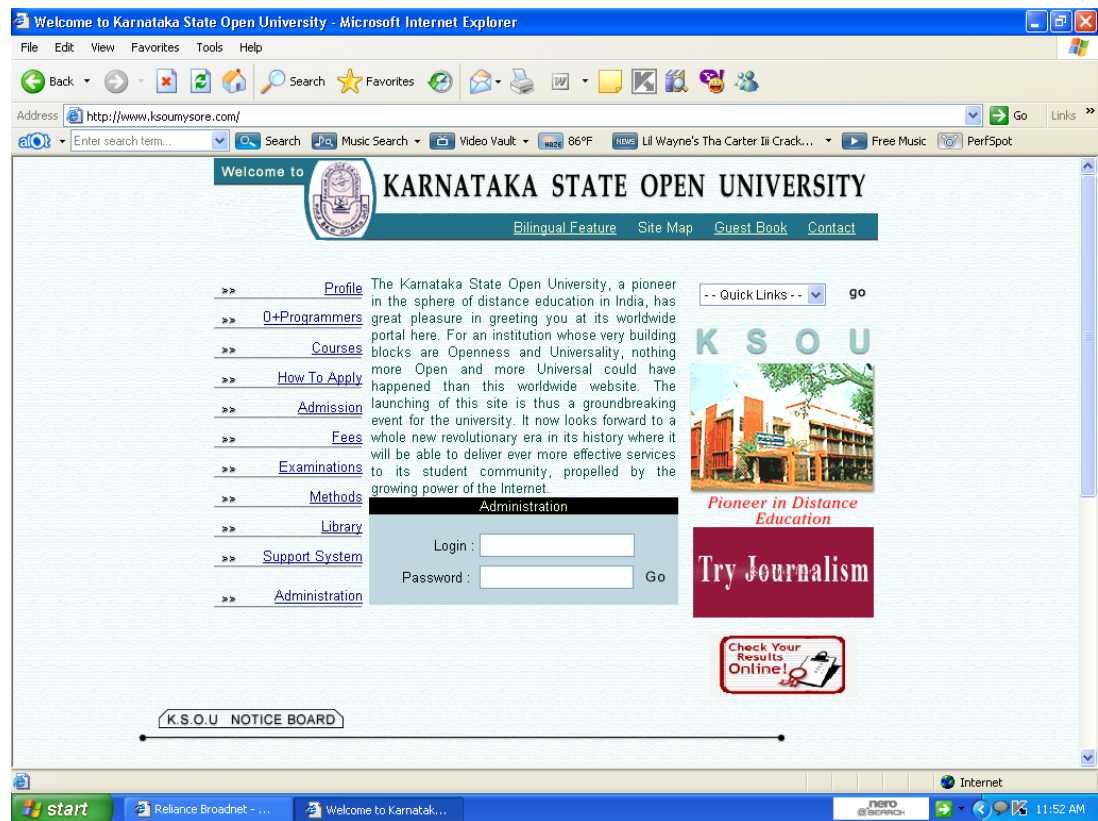
2.4.2.4.2.4 Multi-media

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 constraints 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 tools 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 uninterrupted 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, post-graduate 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, multi-cultural 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-campus 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, T.V 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.

REFERENCES

- Agarwal.S. K, Ansari. M. M. (Eds.). (1995). *Directory of Distance Education Institutes-Part-1 (India)*, New Delhi: Association of Indian Universities.
- Ansari. M. M. (1994). *Economics of Distance Education in India*. In G. Dhanarajan. S.Yuen and C.Swales (Ed.) *Economics of Distance Education - Recent Experiences*, Hong Kong: Open Learning Institute Press.
- Bates, A. W. (1994). *Distance education, educational technology*. In. T. Husen and T. N. Postlethwaite (Eds.), *The International Encyclopedia of Education*, (2nd ed). Oxford: Elsevier Science, 1573-1580.
- Bomani, Giapolo. (1982). *Correspondence Teaching: Second chance or second class*. In Daniel, John. Et.al, (Ed.), *Learning at a Distance: A World Perspective*, Edmond Athabasca University.
- Coombs, P. H. (1985). *The World Crisis in Education: The view from the eighties*. New York: Oxford University Press.
- Couch, L. (1997). *Digital and Analog Communication Systems*, Upper Saddle River, NJ: Prentice-Hall.
- Daniel, John. (Ed.) (1982). *Learning at a Distance: A World Perspective*. Edmond: Athabasca University.
- Dodds, T, H Perraton, and M Young. (1972). *One Year's work: The International Extension College 1971-'72*, Cambridge: International Extension College.

- Drucker. P. F.(1993). *Post Capitalist Society*, Oxford: Butterworth Heinemann.
- Egan, M.Winston et al. (1992). Learners' Perceptions of Instructional Delivery Systems: Conventional and Television. *The American Journal of Distance Education*, 6(2), 28-32.
- Gordon, Thompson,.(1990). How Can Correspondence-based distance education be improved? A Survey of attitudes of Students who were not well disposed towards correspondence Study. *Journal of Distance Education*, 5(1), 16-19.
- Government of Andhra Pradesh. (1982). Towards an Open Learning System, *Report of the Committee on the Establishment of an Open University*, Hyderabad: Prakashan.
- Government of India.(1986). *National Policy on Education* 1986. New Delhi: MHRD.
- Government of India. (1966). *Report of the Education Commission* (1964-'66). Education and National Development, New Delhi.
- Hantula, D H (1998). The Virtual Industrial/ Organisational Psychology Class: Learning and Teaching in Cyberspace in Three Iterations. *Behaviour Research Methods, Instruments and Computers*, 30 (2), 205-216.
- Hara, N. and R. Kling. (2000). *Students' Frustrations with a Web-Based Distance Education Course: A Taboo Topic In the Discourse*. Indiana University: Center for Social Informatics, http://www.slis.indiana.edu/CSI/wp99_01.html (December 2005).

- Holmberg, B.(1995). The Evolution of the Character and practice of distance education, *Open learning*, 10 (2), 35-39.
- Huges,K (1994). *Entering the World Wide Web: a guide to cyberspace*. London: Enterprise Integration Technologies.
- IGNOU (2000). Course ES-318: *Communication Technology for Distance Education*, Post Graduate Diploma in Distance Education program, New Delhi: IGNOU.
- Illich, Ivan.(1971). *Deschooling Society*, London: Penguin Books.
- Jaminson, D. and McAnany, E. (1978). *Radio for Education and Development*, Beverley Hills CA: Sage
- Karisiddappa, CR and Padhi, P. (1989). From Information explosion to Information Technology. *Information, Library and society*, 2 (2), 141-168.
- Keegan, D. (1990). *Foundations of Distance Education*, (2nd ed.), London: Rout ledge.
- King, B. (1998). Possible Directions for the support of Distance Students in Australian Higher Education. *Paper presented at the Workshop Towards A Student Support system for Distance Education*. Canberra: Australian Committee of Directors and Principals working on External Studies and the Australian Distance Education consortium, University House.
- Kling, R. (1999). What is Social Informatics and Why Does it Matter?. *D-Lib Magazine*, 5 (1), 18-24. Online: <http://www.dlib.org/dlib/january99/kling/01kling.html> (November 2003).

- Kulandai Swamy.V.C. (1998). Keynote Address In *Seminar on Distance Education*, MIT.
- Mathew, Raju. M (2005). Technological foundations of Knowmatics and Knowledge Technology. In *National Seminar on Knowledge Technology and Knowledge Industry: Kerala's development potentialities*, 27-28 May, Calicut University.
- McIsaac, M. S. and Gunawardena, C. N. (1996). *Distance education*. In D. Johnassen (Ed.), *Handbook of research for educational communications and technology*. New York: Macmillan, 403-437.
- Mittal, Chanchal. (2000). *Foundations of IT*. Meerat: Pragati Prakashan, 36-44.
- Moore, M.G. (1977). *On a Theory of Independent Study*, Hagen: Fern Universitat.
- Muller, J. (1985). *Radio for Literacy. A Reader on the Use of Radio in Literacy Programs*. Bonn, Germany: German Foundation for International Development.
- Myrdal, Gunnar. (1971). *The Challenge of World Poverty*, London: Penguin Series.
- Oxford advanced learners dictionary. (2001). Oxford: Oxford University press, 641.
- Perraton, Hilary. (2000). *Open and Distance Learning in the Developing World*, London: Routledge.
- Reiser, VK (1987). The Virtual Industrial/Organisational Psychology Class: Learning and Teaching in Cyberspace in Three Iterations. *Behaviour Research Methods, Instruments and Computers*, 30 (2), 205-216.

- Saettler, P. (1990). *The evolution of American educational technology*.
Online: <http://www.Distance Education.com>. (March 2003)
- Satyanarayana.P and C Sesharatnam. (1997). Distance Higher Education in India: Promise and Performance. *New Frontiers in Education*, 27 (4), 12-27.
- Schultz, T.W. (1961). *Investment in Human Capital* In M.Blaug (Ed.) *Economics of Education*, London, Penguin.
- Sewart, David. (1993). *Individualizing support services* In Daniel, John. S, et al. (Eds.) *Learning at a Distance: A World Perspective*. Edmonton: Athabasca University.
- Sharma, R. C. (2002). *Interactive Radio Counselling in Distance Education*, *University News*, 40 (10), 8 -11.
- Smith, SJ and Robinson, S (2003). Technology integration through collaborative cohorts: preparing future teachers to use technology. *University news* 24 (3), 154-160.
- Tiwari, M. D. (2002). Education to Home. *University News*, 40 (7), 43-46.
- Tripp, S. and Roby, W. (1996). Auditory presentations in language laboratories. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* New York: Simon & Schuster Macmillan, 821- 850.
- University Grants Commission. (1984). *Report of the Committee to enquire into the Working of the Central Universities*, New Delhi: UGC.
- White, R. (1976). *An alternative pattern of basic education: Radio Santa Maria*. Paris: UNESCO.

REVIEW OF RELATED LITERATURE

In the most cases review selection forms an integral part in the body of a research report, even though it is an optional one. For worthwhile study in any field of knowledge the research workers need an adequate familiarity with the works, which have been done in the area of interest. The process of review involves identifying, locating and evaluating report of relevant researches, study of published articles, going through related portions of encyclopedias, pertinent pages of the subjects, manuscripts, if any and even non-book materials. Survey of related studies also helps the researchers in formulating a sound design and tools for the successful completion of the study.

The present chapter aims at giving a brief review of the researches done in the area related to the present investigation. The purpose of reviewing the earlier researches is not only to economize the historical perspective of the present work but also to take cognizance of related studies, which have employed one or more variables included in the study. As such these studies have helped the researcher to design his study in avoiding pitfalls. Alternatively, their findings have been utilized to substantiate and support, wherever necessary, the interpolation of the results of the present study. The noted researcher and writer in distance education, Moore (1985) had aptly stated “ I believe the convention of reporting previous research is too neglected today and many of the projects which are reported would have been benefited if more efforts had been put into grounding them in that way”

Information technology is a forceful instrument of the overall social advancement of the society. Though genesis of application of IT in distance education can be traced back to the 1910s in the world it has reached in India after 1960s. Though the literature available on the technology based distance education is very extensive, the actual case studies in this line are very few.

Here an attempt has been made to review various studies pertaining to the Information Technology and distance learning and related topics with a view to justify the need and relevance of the present study by referring to a large number of journals, books and other national and international level publications. The researcher came to a conclusion that Indian researches focusing on the learners characteristics and its relation to the academic performance of distance learners. It might be due to the reason that organized research work in distance education started only very recently and many of them look upon the institutional characteristics. However quite a few studies have been attempted in the area relating multimedia instructional system and their use pattern by the distance learners. Therefore the researcher tried to collect as much studies, which have direct relevance with the present study. Due to the vastness of the literatures published the articles pertaining to Information technology and distance education separately are excluded from the chapter. Similarly the studies appeared before 1990 are also excluded from this chapter.

Bates (1991)¹ developed an ACTIONS model for selecting and applying technology to open and distance learning. This enables costs to be analyzed in terms of numbers of learners served, volume of activity, and costs for a particular technology, but the cost structures, enabling decision makers to assess appropriate technologies for particular target numbers of learners. On the out put side, variable to be measured will be accessibility factors, teaching and learning performance, levels and quality of

interaction, user friendliness and speed/adaptability of the tele-learning activity.

Kato (1992)² emphasizes the importance of technology in providing distance education. Having discussed the experiments undertaken in the University of AIR, Japan, the author concluded that interaction between instructors and students is very important in distance education.

Joseph and Raja Muthirulandi (1994)³ question the assumption about distance education as a pedagogic device and present their views on the strengths and limitations of the role of technology in education. They point out that though with the help of multimedia, there has been considerable increase in the dissemination of information to people outside the place of formal education, this cannot be taken as education as in the technologically aided distance education since the competence of the individual recipient of information is more important than the technology employed, in determining the effect of dissemination.

Sahoo (1994)⁴ focused on the assessment of the tele-conferencing experiment made by IGNOU on postgraduate diploma in the higher education program. All the participants and the resource persons made positive remarks about the role of teleconferencing as one of the components of extended contact program.

Takwale (1994)⁵ analyses the need, possibilities, developments and limitations of the use of technology in DE in India. While suggesting various useful models of technology and their uses at different levels, the author keeps in mind Indian realities. Thus, he warns that one should not be obsessed with the use of technology in distance education.

Kyle (1996)⁶ has assessed the attitudes of distance education students in various units of the college of Rural Alaska, University of Alaska.

Emphasis was given to media preferences, conveniences of various media, and the overall attitude towards distance education. The analysis revealed that the respondents were generally satisfied with most aspects of their distance education experience.

The objective of the study by **Sisir Basu** (1996)⁷ was to get a feedback from IGNOU students on the telecasts. The author found that there are quite a few weaknesses at the study centres, in the audio and video programs and in the channels adopted by IGNOU to communicate with the students.

Anandan (1997)⁸ explained that multimedia computer in education and training has enhanced the ability of quality education in various educational organizations and training institutions. Education felt that multimedia is the most valuable tool to overcome the problem of literacy. It developed skills like self-learning, search for information among trainees etc. and be adaptive to accept interactive multimedia and be responsible to the changing technology.

According to **Gopalan** (1997)⁹, while educational technology in India has been trying to make use of modern development in communication technologies and the media, the fact remains that we have a long way to go to reach the levels attained by advanced countries. The rapid developments now taking place in IT call for revolutionary changes not only in our methodologies and concepts relating to education, but also in our policies regarding teaching, research and educational administration.

Mukhopadhyay and Parhas (1997)¹⁰ attempted to highlight the applications of educational technology in higher education. They have taken educational technology as system approach to planning and execution of instruction to optimize human being; and it encompasses learning goals, curriculum and contents including audio visual aids, media, self-instructional

approaches and evaluation with regard to the aspect of educational technology in higher education. They have emphasized that computer can support colleges. As to the application of television in higher education, launching of countrywide classroom (CWCR), the project of UGC –INSAT television project, has been dealt in detail.

Murthy (1997)¹¹ made a study on use of IT in Library and Information science education, in which he states that like other disciplines Library and Information science education is also imparted on two modes.

- a) Traditional classroom teaching, and
- b) Distance education.

The author states that use of IT techniques such as instructional television, interactive video etc. are highly useful to impart knowledge and information especially in a distance mode. In addition to these E-mail and Internet are highly useful for this mode of education. WWW home page can provide details of the course including its purpose, methodology, grading standards, syllabus, background materials, interactive discussions etc. As an example he gives New York virtual college, pioneering supplier of multimedia courseware directly to students' homes.

Rao (1997)¹² studied the use of media among women distance learners and emphasized the usefulness of media in the pursuance of their studies. According to the author, the inadequacy of audio and video cassettes and improper timings of broadcasting pose major hurdles in the way of media use.

Vashisht (1997)¹³ made a study on research aspects with regard to the educational applications of Information technology. According to the author the different components of learning should not be separated, but linked and integrated. How these new technologies help for an integrated learning, how

can new technologies help to take into account the learners approach, how can new technologies help in individualizing teaching and learning are the major issues to be studied.

Kumar (1998)¹⁴ observes that multimedia applications would generate benefit in the area of education and training in future. It will be possible to link schools and other education facilities by means of a high speed, high bandwidth data communication networks in order to instruct and to learn online with greater facilities for in depth learning. The 21st century desktop multimedia applications will considerably enhance the user's pleasure productivity and knowledge base by providing the capability to access, retrieve, use and exchange information from a variety of domestic and international sources.

According to **Mathew** (1998)¹⁵ a new system of education capable of imbibing new values and outlooks to the younger generation so as to make them competitive, at global level, hardworking and also to attain mastery in one's own field or trade according to the changing world must be designed. In order to improve the quality of our educational system and to make it competitive within a short span of time to meet new social needs, we require massive social applications of modern IT in the entire aspects of education so as to ensure quality education even to the remotest villages at an affordable cost.

Milstein (1998)¹⁶ highlighted that tele-learning electronic University is aimed at people who are already involved in their career and interested in a college degree. The investigator explained that to enroll in the electronic university, a user needs to buy an enrollment package or tele-learning communication software and access to 52 database courses, including reading assignments, periodic on-line evaluations by the instructors and access to tutors for different systems.

Ramadevi and Krisiddappa (1998)¹⁷ have provided a detailed account on the impact of IT on distance education in India. The various means depicted as in the context of dissemination of knowledge by an Open University include television broadcasts, radio broadcasts, audiocassettes, tele-text, computers, tele conferencing and telephone mediated instruction. The advantages and its disadvantages of all these media were also explored.

Subhayamma (1998)¹⁸ conducted an evaluative study of IGNOU's teleconference. The study indicated that many students had apprehensions about their participation in the interaction sessions and the adequacy of time allotted for interaction compared to usual personal contact sessions.

Bansal and Chaudhari (1999)¹⁹ evaluated the effectiveness of interactive radio instruction on the students of Management and Bachelor Preparatory Program (BPP) of IGNOU. The students appreciated interactive radio sessions as effective inputs for accomplishing their course objectives.

Mishra (1999)²⁰ reports the nature of interaction during teleconferencing sessions based on recording of actual interaction and participants' reaction. The study revealed that teleconferencing could be used as an appropriate technology for distance education and that it increases learners' interaction with their instructors as well as peer group.

Nyondo (1999)²¹ discussed how the students' accessibility to other media limits the choice of media to be employed in the delivery of learning materials. It was found that students were satisfied with the print media-based learning materials. The study concluded that until the majority of the students have access to other media, there is no meaning in delivering the courses in multi-media in distance education.

Patnaik (1999)²² traced the wide use of the Internet and the most recent advances in telecommunication technology, which creates an interesting challenge to the traditional educational paradigm where the notion of lecture constitutes the centerpiece of the educational model. In the area of students' accomplishments the author found that the distance education students performed better than their on-campus counterpart.

Another advantage of the system is that students are offered a variety of instructors and instructional styles through the interactive network, which may not be available on a single campus. The author also found that students can gather the exposure to new and advanced communication technology students should experience these technologies as much as possible in the class room to fully understand how they can be integrated into the various work related operations that exist today.

The author also worries about the computer based distance education machines offered a barrage of electronic attributes, such as sounds, lights, animations, and video sequences, the learner becomes enamored of this awesome technology and missed the intended instructional message. Some educators felt that students using electronic technologies frequently were subjected to fast moving entertainment-type experimental experiences possibly at their own expense. The author calls this as "edutainment"

Raghubanshi and Mishra (1999)²³ conducted a survey to assess the reasons for poor attendance in tele-conferencing sessions. They found that only 31 percent of the students were aware about the availability of the facility.

Sreenivasulu (1999)²⁴ conducted a study on various aspects of Information technology. According to him IT plays an important role in electronic message transfer, electronic data interchange, electronic file transfer protocols transfer of voice, text and images through ISDN, remote

electronic information access and retrieval, and the enforcement of research, education and distance learning through virtual global University. In future, these information technologies can engage in interactive television, picture phones etc.

Pawar (2000)²⁵ conducted a study on web-based education in India. In the presence of great social diversity in India, it is difficult to change the social background of students, parents and their economic conditions. Therefore the only option left for us is to provide uniform or standardize teaching learning resources or methods. For high quality education throughout India there must be some nation wide network, which provides equal quality education to all students, including the students from the rural areas and villages. The solution to this is web-based learning. Internet is the ocean of knowledge; therefore it is better to open (introduce) this ocean to all students as early as possible in their life. Introducing or using IT and related tools in education or by using WWW as an education delivery medium can do this. The web allows education to go to the learners rather than the learner to their education. As per as India is concerned there are many problems that one will face to use IT in education like funds, infra structure, etc.

Raymond (2000)²⁶ examined recent developments in technology based distance education. Recent developments in technology have provided educators with an extremely wide variety of electronic tools to assist them in achieving one of their primary objectives – the transmission of knowledge to others. One of the most important uses of these technologies in higher education has been their employment for the delivery of distance education. This study describes the types of technology available for the delivery of distance education (computer-assisted education systems, audio/video-mediated education systems, and computer-mediated education systems), and has documented the effectiveness of these tools. It also discusses the

successful experience of the school that pioneered the use of technology to deliver distance in the discipline of social work.

Jeevan (2001)²⁷ conducted a study about IT enabled library services for distance learning in the country. At present library and information science professional using computer and other information technology tools for various in-house operations in the library. The importance of library services for distance education can be summed up as “when you study physically and geographically alone, any glitch in the supply of reference materials is doubly frustrating”. Library services for distance learning have to take extra care in information organization, services and dissemination to supplement the contact classes and self-learning modes to achieve the necessary progress. It is not only the off campus location of distance learners that libraries have to face as a challenge, but also the wide variation in their intellectual level as they come from a more varied spectrum in comparison to campus learners, comparatively lesser time and resources than regular learners etc. Since electronic and IT tools are being applied for information services in the country too, some of these barriers must be broken to some extent.

IT enabled library environment could be better applied for distance education as we have to service clients’ located off-campus and electronic access must be better attuned than print access in this environment. Apart from seamless access of contents, electronic contents can be shared easily over many users, as their access will not be restrictive like printed sources. Another advantage with electronic contents is the multi-channel access through internet/ intranet/ modem/video/broadcast rather than personally visiting a library to issue a printed book. It may be difficult to highlight the IT application for distance library services since library services for distance learning itself may be seen as a luxury than as a necessity. There may be cases

where the library attached to the distance learning university or its regional centers may be computerized or offering electronic databases locally. But equitable access to all students when they are stationed in their places of domicile/work is a matter of distant propensity. The author also examines various information sources required for the IT enabled library services, services which can be provided, and threats before the implementation of the idea.

Killedar (2001)²⁸ conducted a study about the distance education through Internet based e learning. Effective and low cost communication system has the same importance to an Open University as blood has to life. In this regard, rapid growth of reliable Internet access at low cost, from almost all parts of India, has opened up innovative avenues for education through Open and Distance Education System (ODES). This paper aims to examine a web based engineering education model for the ODES of India. It also presents practical experiences gained since 1992, during the implementation of “Electronics Engineering Diploma Programs (EEDP)” at Yashwantrao Chavan Maharashtra Open University, Nashik, India and examines how internet with its present technology limitations and costs, can be effectively used to simplify all stages of academic program design and implementation. Huge number of learners preferring various kinds of education, and learners belong to economically weaker sections of society, and high geographic distances along with poor communication infrastructure, which results in low retention rates are the major problems faced in India in the field of distance education.

The article by **Ravichandran and Sasikala** (2001)²⁹ discuss the need and the changes occurring due to the developments in computer based technology in our educational systems. The historical and moderns developments in this direction along with their salient features and

achievements have been presented. It also discusses the issues challenges and the opportunities that arise with the introduction of computer based technologies in Indian educational scenario.

Sukumar (2001)³⁰ conducted a study about the effectiveness of interactive radio counseling in the case of IGNOU. The student support services play a major role in teaching-learning process. Recently, Indira Gandhi National Open University introduced the interactive radio counseling to strengthen its students support service system. There has been a long felt need of the students to interact with the eminent speakers, professors and guest faculty members at the time of teaching –learning process. The interactive radio counseling system provides an excellent opportunity to interact with the eminent scholars and upgrade their knowledge and sharpen their skills. In order to ascertain whether the program is effective among the learners for their independent, autonomous learning, this study was carried out. The study reveals that the interactive radio is received well, but needs more attention to be effective. The study also observes that in E-learning , the heavy emphasis on print media will be reduced but not totally eliminated in the delivery of learning material. Role for other media like audio, video, multimedia, etc. is substantially increased but is still only supportive. In e-learning academic information will be provided in three major forms:

- Self instructional texts
- Virtual class room
- Web resource

The study concluded on the opinion that online counseling cannot replace regular face to face counseling at study center, but can act like backup for it, as email and discussion forums offer only text based communication.

Berge (2002)³¹ narrated certain barriers in the use of educational technology in primary and secondary education. An emphasis was placed on the diffusion of computers in the schools, since the focus of this study is to determine what should be expected as computer-mediated communication (CMC) is used in schools to teach in online environments. The nine categories of barriers are: academic, fiscal, geographic, governance, labor-management, legal, student support, technical, and cultural. Barriers to the use of educational technology in K-12 using this framework suggested the primary areas of concern are academic, cultural, and technical.

Mestiri and Gowder (2002)³² examine the characteristics of e-learning and its importance in our education system. Authors explain in a networked environment how library and information centers provide their service to users. E learning refers to learning and other supporting resources that are available through a computer. E learning is useful to modernize the various the various services of the libraries such as creation of databases communication and interaction, reference and information services resource sharing etc. are effective and easy through e-learning. It is useful in the improvement of user's interaction over library services.

Mukhopadhyay (2002)³³ conducted a study on various aspects of application of technology in education in India. He states that educational technology has been given a specific place in the national policy on education in 1986 by the provision of a separate section entitled "Media and educational technology". Education faces various problems like 'low involvement, high dropout, poor performance, low level of cognition and lack of problem solving skills. Educational technology tries to solve some of these problems. He enumerates certain criteria for the choice of technology such as :

- 1) Availability
- 2) Accessibility

- 3) Acceptability
- 4) Economy
- 5) Validity

Mukhopadhyay (2002)³⁴ states that IT is essential for the quality education of a learning society. The modern cybernetic society also demands necessary capacities to spread information in every corner of the society without any discrimination or differentialities. He puts forth certain strategies for building a learning society such as:

- 1) Education for all.
- 2) Training of teachers and other workforces.
- 3) Assessing and processing knowledge.
- 4) IT and communication.

The author concludes by saying that India is far away from using the facilities of IT in different social sectors at the ground level operation.

Suryanath singh and Gargh (2002)³⁵ made a study on impact of information technology on biomedical information centers and libraries in India. The study revealed that the technological revolution in the last four decades has made tremendous impact on the way information is processed, stored, retrieved and disseminated. The growth and development of information technology is one of the most significant achievements in the present century. Information technology is a combination of computers, telecommunication, reprography and microforms including CD_ROM, online networking database technology. Easy availability of accurate and appropriate information is recognized as a powerful and marketable commodity, an economic resource as well as social wealth. Information could be considered as a principal strategic resource of an information society. Developments in computers and

communication technologies have created more possibilities in making an increasing amount of information more accessible to a greater number of people. It is now possible to access and retrieve information from sources across the globe through international networks, databases and mass media etc.

Evans and Sabry (2003)³⁶ evaluated the interactivity in web based learning systems. One of the potential advantages of web based learning system is their provision for interactivity. The paper under concern considers the process of evaluating the interactivity of such systems. The method adapts a heuristic approach usually employed for usability evaluation. A three way model interactivity is proposed. On the basis of this a provisional set of interactivity heuristics is developed. The advances in computer and communication technology has revolutionized the educational system. They have changed the style of learning, teaching, communicating, and gaining access to information. The advantages have compelled us to change our present style of schooling.

Considering the relentless pace at which IT is shaping the global environments, the study by **Fatt and Teng** (2003)³⁷ aims to determine the impact of IT on University students on their attitudes towards IT. The areas examined in this study are the impact educational, personal and social aspects of the students towards the impact of IT. A survey was conducted on 201 undergraduates from two local Universities, Nanyay technological University and National University of Singapore; with almost equal numbers of engineering undergraduates. The result shows that all the respondents felt the impact of IT, their attitude towards IT were varying with respect to the three areas of study. Contrary to the common belief non engineering undergraduates were found to have a more positive disposition towards the impact of Information Technology.

The success of any open and distance learning course depends on how well it is designed, executed, and evaluated. Evaluation of course not only demonstrates its strength, but also points out any inherent shortcomings in the course. This is why course evaluation constitutes an important function in an open learning system. This paper aims to evaluate a Distance Education course 'Instruction in higher education' from the Post Graduate Diploma in Higher Education (PGDHE) offered by IGNOU. Feedback on this course was obtained from 230 respondents with the help of a structured questionnaire. The data collected from students were analyzed using percentages. The study provides an understanding of the operation of the different components of the course while the majority of the respondents were satisfied with self instructional materials, assignments and extended contact programs and delivery mechanisms, a sizeable number of respondents were dissatisfied with academic counseling and the use of audio-video programs.

The study also revealed that the majority of respondents (68%) did not benefit from audio / video programs because of lack of availability of the basic infrastructure at their respective regional centers, lack of awareness of the time schedule and unsuitable timings of the audio / video programs. They also suggested that audio / videocassettes should be made available and issued to students. However those who should watch video programs and listen to audio programs found them good. The findings of the study provide certain insights into the operation of distance courses in the context of developing countries like India.

Nasirudheen and Bavakkutty (2003)³⁸ suggested certain measures for effective distance education in the country in a situation where the conventional distance education centres are satisfied with the delivery of print materials that also not in self-instructional pattern reached just before the commencement of terminal examinations. This is to be noted that learners pay heavily for the delivery of the programs to these universities. All the educational commissions have laid stress on the provision of proper and

adequate library and information services in higher education this indispensable component becomes more relevant in distance education where support is missing with no regular classroom teaching and teacher being absent in person. The entire responsibility of the student support services rest o the library.

The following suggestions have been recommended by the authors:

- 1) To setup a national network of distance education libraries.
- 2) To explore how distance education institutions can better utilize the existing university and other academic libraries in the country.
- 3) To derive a mechanism for this purpose in consultation with UGC, NCTE, AICTE, MCI, INFLIBNET etc.
- 4) To initiate joint efforts in collaboration with RRRLF and National libraries for utilization of public libraries.
- 5) To provide finance and expertise to public libraries

Natarajan (2003)³⁹ examined the implications of Information communication Technologies on distance learning. Technological developments (WWW, digital satellite technology, and innovative applications of virtual reality) are having dramatic effects on learning environments at all levels. New teaching and learning styles are being developed; learning based on prepared electronic materials; ongoing interaction between partners in the learning process, learning by doing, and collaborative learning. There is a shift from lecturing and telling to facilitating guiding. The generations of distance learning technologies according to five characteristics are:

- 1) The media and the technology.
- 2) Communication features
- 3) Student characteristics and goals.
- 4) Educational philosophy.

5) Infrastructure.

Patalong (2003)⁴⁰ describes the use of the virtual learning environment Web CT to respond to a number of challenges in user education work at the University of Convent. The effectiveness of web based method of delivering information skills training was evaluated over two years. Certain problems were ironed out between year one and year two of the implementation of the information skills course. This led to a seeming decline in reputed achievement levels between the two years. However such diminishing of learning outcomes was more apparent than real and masked the importance of putting in place a more reliable teaching method on which students become responsible for their own learning. The study concluded that this method of carrying out user education did succeed in effectively enabling larger number of students than before to learn information skills and at a variety of times in the academic year that are suitable to them. The goal of getting recognition for information skills in the university at large and having these skills integrated into the curriculum is also moving nearer as a result of this work.

Segrave and Holt (2003)⁴¹ narrated certain ways for designing e-learning courses for professionals. Designing e-learning environments for quality professional education is a challenge for education designers as the continuing practice of simply moving courses online can be surprisingly disabling. The authors argue that as Universities strive to educate for excellence in professional practice, design approaches for the e-learning components must be conceptualized in a broader view of a contemporary learning environment involving integrated virtual and physical dimension. These are comprehensively considered in an integrated way to facilitate learning experiences providing an emphasis on grounded practice. In providing a more flexible, immediate and evolving virtual experiences, e-learning as a feature must take account of a range of education design

consideration model in a framework of elements. There are outlined and broader issues are illuminated through a comparable case analysis of educational technology developments at Derkin University in two professional fields of teaching and Journalism. Implications for the selection and use of various e-learning resources and corporate e-learning systems become evident and the paper highlight the dangers of a returning 'instructional industrialism' as the risk of allowing courses to move online rather than moving towards proposed features of contemporary learning environments.

Smith and Robinson (2003)⁴² conducted a study about how teachers can be prepared for adopting recent advances in technology for the future. Although technology is increasingly being considered as instructional tool for students with disabilities, effective integration of technology into the classroom for students has been limited. The author provides an overview of a technology cohort model that seeks to enhance teacher use of technology through a collaborative learning model.

Amjad Ali (2004)⁴³ makes an effort to bring together a selected set of future oriented technologies, which are making inroads into the present day educational system. The intention is to make aware of the opportunities that can be grabbed for educational developments since the gap between information rich and information poor has almost been eliminated with the advent of the new information and communication technologies.

The study also reveals that education will need to change from being a process of conditioning to one of the empowerment. Learning will need to change from being homogenous commodity to a customized experience tailored to the needs and characteristics of the individual learning will no longer end in the teens or in the early twenties instead it will continue

throughout life as individuals need to continuously update knowledge and skills to keep pace with ever-changing technical and social conditions.

In order to meet the learning requirements of the information age learning opportunity providers should adopt a more constructivist approach towards learning, creating conditions in which learners may learn by actively engaging with realistic scenarios and exchanging views and experiences with peers and mentors. The technology is taken as being a prerequisite to learning in the information society. Clearly the shift to a society based on massively mediated communication must take steps to minimize the understandable social repercussions.

Dikshit (2004)⁴⁴ narrated certain ways for the sustainable development of distance education in the country. The caution must be taken against an emerging trend where technology is perceived to play a dominating role in education in an affluent society, which can afford easy access to computer networks. Screengogy or surfagogy is being sometimes erroneously conceived as an alternative to pedagogy. We have to develop Technology enabled education and not technology driven or technology based education. Content development will continue to play the central role.

Gangappa and Chandraiah (2004)⁴⁵ studied about the responses of learners to technology based learning in Open Distance Learning on the basis of the study conducted in BR. Ambedkar Open University Hyderabad. The study revealed that though BR. Ambedkar Open University is providing educational instruction through print and audio visual technology, TV lessons and teleconferencing programs were more useful as compared to audio, radio and video lessons. The television interactive programs were likely to replace the face to face classroom teaching as the interactivity between subject expert and learner was live and more interesting. Recognizing the importance of the new technology in open education system, BRAOU has been taking initiative

to establish its own earth stations in the premises of the university to uplink to insat-3B-KU Band transponder.

Martey (2004)⁴⁶ in his article describes the ICT scene in Ghana from 1996 to 2004. The emphasis is on the benefits that distance learners in Ghana will derive from an ICT-enhanced distance education. The article also draws attention to the efforts made by various governments of Ghana and some agencies to solve the major problems facing ICT-driven distance education in Ghana. The attention of Distance education providers are made aware of the minor but disruptive operational hindrances to the use of ICT. Some suggestions are made as to how academic libraries in Ghana can assist distance learners now.

Vernal and Paily (2004)⁴⁷ conducted a study on the application of ICT in teacher education. As a model the authors selected GVM, College of teacher education Goa. The authors examined the initiatives taken by international, national and state of Goa towards the application of IT. World links and Intel Corporation have enough programs for promoting latest trends in the field of computer and communication technology in the field of education. IT application in the field of education will be only occurred with making the academic counselors and teachers experts in imparting education through multimedia techniques. For the same purpose Government of India has setup a national taskforce in IT and software development. There are enough contribution from the part of state government of Goa for making teachers aware of IT and related fields. For this purpose they recommend to reschedule and widen the in service programs conducted by various agencies for application of IT in the field of education in the country.

Jane (2005)⁴⁸ in his article examines a project to integrate digital libraries and virtual environments focusing on requirements for online reaching list system. Findings provide a technical specification for an online

reading list system, subsequent work to develop a right management system and a library era within the virtual learning environment where electronic resources can be placed. The author discusses other relevant developments towards the integration of digital libraries and virtual learning environments, including the IMS specification for resource list interoperability. Research results could be compared to findings from other institutions. The evaluation work could be brought up to date with recent developments in the two commercial reading list systems. Practical implications provide an evaluation of three reading list management systems. The study reveals the importance of presenting library resources in the virtual learning environments in a systematic way. The major advantage of this system is that it extends educational opportunities to those who cannot gain a specialist qualification in a traditional manner. Those who suffer from early school dropout in conventional system due to social, economic, gender, access problems can be solved with distance education. New education policy has mentioned, "Open universities have been fully strengthened as an instrument of democratizing education".

Muilenberge and Berge (2005)⁴⁹ conducted a study about the barriers which students face in online learning. The study focuses on the four major barriers such as : a) social interaction, b) administrative / instructor issues, c) learner motivation, and d) time/ support for students. The focus is limited to five independent variables such as: 1) ability and confidence with online learning technology, 2) effectiveness of online learning, 3) Online learning enjoyment, 4) online courses completed, 5) the likelihood of taking a future online course.

Findings of the study indicates that social interaction is strongly related to online learning enjoyment, effectiveness of learning online, and the likelihood of taking another online class. Therefore it seems logical that

improving social interaction in online learning would lead to a more effective and enjoyable educational experience-one which students want to repeat. The study also implies that the students who take online classes are those who perceive lower barriers before taking any online classes. Or it may be that after experiencing just one online class most students either overcome many barriers or find out that they had overestimated the barriers before taking any online courses.

Williams .et. al (2005)⁵⁰ discusses different electronic systems and their exploitation for distance education, and cross-references these with several aspects evaluated in the literature: achievement, attitude, barriers to take-up or success, to provide a holistic picture hitherto missing from the literature. The literature shows little difference in achievement between distance and traditional learners, although using a variety of media, both to deliver pedagogic material and to facilitate communication, does seem to enhance learning. Similarly, attitudinal studies appear to show that the greater number of channels offered, the more positive students are about their experiences. With regard to barriers to completing courses, the main problems appear to be family or work obligations. Current research being carried out by the authors should enhance the findings accrued by the literature, by exploring the impact of “on-demand” video material, delivered by DiTV – something no previous research appears to have examined. The research work this review seeks to consider is examining “on-demand” showing of filmed lectures via a DiTV system. The literature on DiTV applications research, however, is dominated by studies of simultaneous viewing by on-site and remote students, rather than “on-demand”.

Guha (2006)⁵¹ conducted a study about the role of Information Communication Technology in the field of distance education. According to him educational technology calls for an extension of the stereotypical

classroom situation, leading to peer group interaction and emphasizes on interactivity between teacher and taught; rather than on one way pedagogy and the teacher centered lay out of education. Educational Technology means to reflect practices that teachers retrospect and introspect on their pedagogical skills. Training, education and the workplace have become significant matrixes of the educational 'scenario' in today's corporate world where learners are stakeholders. On line learning provides for teaching/ learning which is dialogic. It creates an ambience for effecting space for dialogue and the enhancement of a dynamic learning community.

Sherman and Beaty (2007)⁵² conducted a research about use of distance technology in educational leadership programs. As the number of internet users has increased, universities have begun to rely more heavily on technology in the delivery of course content and instruction. The use of distance technology has been purported to have the potential to lead the way in developing more competent technology leaders in schools as well as reforming leadership preparation and reaching a more inclusive population of administrator aspirants. This research defines areas in which programs can meet today's global standards, allow for the greatest flexibility in meeting student needs, and yet continue to increase leadership and educational opportunities for all student groups. Findings are grouped according to the following themes: overall program structures; types of distance technology; goals for the use of distance technology; problems experienced with the use of distance technology; and factors that affect the expansion of the use of distance technology.

Research gaps

A bulk of research studies conducted in open and distance education both at national as well as international level have been reviewed in the preceding pages. Even though learner characteristics Information Technology

application, virtual Universities and Open University libraries are the issues for the present research, a number of diversified studies have been reviewed here, keeping in view the fact that each study has some direct or indirect bearing to the present work. Yet the investigator has given special attention to incorporate the studies which are related with the application various technological tools in the field of education, especially distance education. An overview about the studies is given below:

Some of the studies reviewed here are descriptive research studies focusing the concept, growth and development of distance education. Some researchers were interested in evaluating the distance education programs/ courses or institutions as a whole. The aspect of learners and their characteristics were a part of several studies. Researches are also being conducted to explore the role of libraries in distance education system. Use of a particular technology by a particular institution was the stress of the majority of the authors.

On the basis of the above discussion it may be stated safely that researches showing learners characteristics and their relations and reactions to the application of information technology in the field of distance education have been conducted only at a micro level particularly in Indian context. There are certain areas which have not drawn research interest in adequate measure. One such area is assessment of the level of IT application in the field of distance education system by its main stakeholders, themselves, namely, the learners and faculties. Further the study of various technological tools was only a part many researches, and in almost in all researches these were examined in respect of the existing correspondence education. Similarly, some articles have analyzed the effectiveness of specific instructional processes. But no attempt has done in a comprehensive form for finding the level of application of information technology in the field of distance

education. Again, hardly any study exists which focuses exclusively on the functioning of the distance education system in India. Hardly any studies available to show the relationship between Information Technology and distance learning in the modern context from the field of information science or informatics. The present piece of research is therefore an attempt towards filling up this lacuna.

REFERENCES

1. Bates, A. (1991). *Diversity or Chaos in Canadian Distance? A view from overseas*. In R. Sweet (Ed.) *Post Secondary Education in Canada: Policies, Practices and Priorities*. Athabasca: Athabasca University and Canadian Society for Studies in Education.
2. Kato, Hidetoshi. (1992). *Technology and Distance Education - Keynote Address. Seminar on Open Learning and New Communication Technologies*. New Delhi: IGNOU and UGC.
3. Joseph, A, and Raja Muthirulandy. (1994). *Distance Education in India; The Dangers of relying on Expediency and Measures to maximize the role of distance education in human resource development*. *Indian Journal of Open Learning*, 3(1), 14-18.
4. Sahoo, P. K.(1994). *Tele conferencing in Distance Education: The IGNOU Experiment* *Indian Journal of Open Learning*, 3(1), 15-22.
5. Takwale, Ram. G. (1994). *Application of New Technologies in Distance Education*. In *Distance Education: An Interface*. New Delhi: Penguin.
6. Kyle, Franks. (1996). *Attitudes of Alaskan Distance Education Students towards media and Instruction*. *The American Journal of Distance Education*, 10 (3), 23-32.
7. Sisir, Basu. (1996). *Regular Telecast by IGNOU: Feedback from Students*. *Indian Journal of Open Learning*, 5(1), 45-50.
8. Anandan, K (1997). *Multimedia computer in education*. *New Frontiers in Education*. 18 (1), 216-220.

9. Gopalan, K (1997). Educational technology new horizons. *University news* 10 (1),14.
10. Mukhopadhyay, D and Parhas. (1997). *Educational technology in higher education in India: search of quality*. New Delhi : Association of Indian Universities, 127-129.
11. Murthy, SS. (1997). Use of Information Technology in Library and Information science education. *Desidoc bulletin of IT*, 17 (3), 3-7.
12. Rao, Renga CV. (1997). Women's Education through Distance Mode: Use of Media. *Communication*, 8 (8), 33-36.
13. Vashishth, SR (1997). *Research in educational technology*. Jaipur: Book enclave, 209-220.
14. Kumar, Prasanna, V. (1998). Education for Social Change: Role of Distance Education in Tribal Upliftment. *Indian Journal of Open Learning*, 3(2), 56-59.
15. Mathew, Raju M. (1998). Role of information technology for the sustained development of Kerala: strategies and policies. *Kelpro bulletin*, 2 (1) 3-8.
16. Milstein, Mark H. (1998). *Attending University by computer: the HINDU speaks on Information Technology*. Comp. by N Ravi. Madras : Kasturi and sons, 216-218.
17. Ramadevi V and Karasiddappa, CR (1998). Impact of IT on Distance education: Indian scene. *IT: issues and trends*, 1 (1), 216-229.
18. Subhayamma, G. (1998). Effectiveness of Teleconferencing; A Student's Perspective. *New Frontiers in Distance Education* 28 (1), 43-56.

19. Bansal, Kiron, and Choudhary, Sohanvir S. (1999) Interactive radio for supporting distance education: an evaluative study. *Indian Journal of Open Learning*, 8(1), 61 – 71.
20. Mishra, Sanjaya.(1999). An Empirical analysis of Interactivity in Teleconference,” *Indian Journal of Open Learning*, 8 (3), 23-27.
21. Nyonda, Andrew Chola. (1999). Educational Media in Open and Distance Learning: The Papua New Guinea Experience. *Indian Journal of Open Learning*, Vol.8 (1), 18-19.
22. Patnaik, MS. (1999). *Interactive distance learning over Internet*. New Delhi: Rajat Publications, 87-96.
23. Raghubanshi, A.S and Mishra S (1999) Satellite Technology and Student Support Services *Paper presented in the 10th Asian Association of Open University Conference*, Tehran, Iran.
24. Sreenivasulu, V. (1999). Role of Information Technology in electronic information transfer and in providing value added information services. *Desidoc bulletin of Information technology*. 19 (4&5), 35-38.
25. Pawar, KB. (2000) Web based school education in India: problems, consideration, approaches and important features of web based learning environment” *Library progress International*, 20 (2), 23-29.
26. Raymond, Frank B. (2000). Delivering distance education through technology: a pioneer’s experience. *Campus –Wide Information Systems*. 17 (2), 49-55.
27. Jeevan, VK. (2001) IT enabled library services for distance learning: threats and opportunities. *The Journal of Electronic Publishing*, 5 (1), 12-19.

28. Killedar, Manoj (2001). Distance education through internet based e-learning. *Indian Journal of Open Learning* 10, (1), 68-79.
29. Ravichandran, R and Sasikala, P. (2001). Computer based advanced technologies in education: developments, challenges and opportunities. *Journal of Indian education*. 27 (1) 25-30.
30. Sukumar, B. (2001). IGNOU interactive radio counselling: a study. *Indian Journal of Open Learning*, 10(1), 80 – 92.
31. Berge, Z.L. (2002). Barriers to online teaching in post-secondary institutions. *Online Journal of Distance Education Administration*. 1(2), 56-59.
32. Mestiri, Matha and Gowder, Kumar. (2002). E-learning and its applications in library and information services. *University news*, 40 (1) 13-18.
33. Mukhopadhyay, D (2002). IT for quality education of learning society. *University news*, 40 (44), 27-31.
34. Mukhopadhyay, D. (2002). Educational technology: challenging issues. New Delhi: Sterling, 1-26.
35. Surya Nath Singh and Gargh, BS. (2002). Impact of IT on bio-medical information centres and libraries in India: a critical evaluation. *Annals of library and Information studies*, 49 (2) 51-56.
36. Evans, C and Sabry, K (2003). Evaluation of interactivity in web based learning systems: principles and processes. *Innovations in education and teaching international* 40 (1), 89-99.
37. Fatt, Poon and Teng J. (2003). Perception of IT in higher education. *Journal of educational technology system*. 31 (2), 115-142.

38. Nasirudheen,TPO and Bavakutty.M (2003). *Measures for effective information services for the promotion of distance mode of learning in Information Access, Management and exchange in the technological age*. New Delhi: Ess Ess publications.,349-375.
39. Natarajan, M. (2003). *Implications of information communication technology on distance education*. In Information access, management, and exchange in the technological age. *Ed. By Bavakkutty, M and others*. New Delhi: Ess Ess, 376-390.
40. Patalong, S. (2003). Using the virtual learning environment Web CT to enhance information skills teaching at Conventy University. *Library Review* 52 (3-4), 103-110.
41. Segrave, Stephens and Holt, Dale (2003). Contemporary learning environments: designing e learning for education in the professionals. *Distance education* 24 (1), 7-23.
42. Smith, SJ and Robinson, S (2003). Technology integration through collaborative cohorts. *Preparing future teachers to use technology*. 24 (3), 154-160.
43. Amjad Ali. (2004). *Learning in the information age*. New Delhi : Ess Ess Publications, 187-212.
44. Dikshit, H. P. (2004). *Radio Vision In Sreedher Multimedia through Digital Radio*. New Delhi: UNESCO and IGNOU.
45. Gangappa,K and Chandraiah,E (2004) Responses of learners to technology based learning in ODL: a case study of Dr.BR. Ambedkar open University. *Indian Journal of Open learning*. 10 (1), 87-96.

- Martey, Alfred (2004). ICT in Distance Education in Ghana. *Library Hi Tech News* 21 (5), 16-18.
46. Vernal, Louis and Paily, MU. (2004). ICT in teacher education: a case study. *New frontiers in education*. 34 (3), 215-219.
47. Jane, Seeker (2005). Delivering library resources to the virtual learning environment. *Electronic library and information systems*. 39 (1),39-49.
48. Muilenberg, Lin.Y and Berge, Zan.L (2005). Student barriers to online learning : A factor analytistic study. *Distance Education* 26 (1), 29-48.
49. Williams, Pete et.al (2005) E-learning: what the literature tells us about distance education: An overview. *Aslib Proceedings* 57 (2),109-122.
50. Guha, Ananya S (2006). ICT and Distance Education : Critiquing Modes And Limitations. *Social Responsibility Journal* 2 (1), 14-16.
51. Sherman, Whitney H. and Beaty, Danna M. (2007). The use of distance technology in educational leadership preparation programs. *Journal of Educational Administration*. 45 (5), 605 – 620.

METHODOLOGY

Research is simply the process of arriving dependable solutions to problems through planned and systematic collection analysis and interpretation of data. The data will be collected through various methods like observation, literature search, interview with schedule and questionnaires.

Methodology refers to the sum total of the procedures followed by the investigator to make the study scientific and valid. The quality of any research depends on the methods adopted and the tools and techniques used for data collection and analysis. The nature of the problem and kind of data needed for its solution determine the method of the study. Data collection is an essential part of every research study.

The present study though conducted in the field of information science it is an attempt to study about the application of information technology in the field of higher education that is conducted through the distance mode of education in India. The basic research method applied to carry out the study is survey method. The methodology followed for the study is described under the following headings.

1. Variables
2. Tools used for data collection.
3. Samples used for the study.
4. Sampling techniques used.
5. Sample size
6. Data collection procedure.
7. Analysis of data.

8. Statistical techniques used.

1. VARIABLES

The variables of the study are discussed below:

1.1 Variables for the distance learners

The major variable under study is the application of Information Technology in distance learning process in various Open Universities in the country. Investigator has conducted a detailed survey among the distance learners and faculties of the three sample open Universities, viz. Indira Gandhi National Open University (IGNOU), BR. Ambedkar Open University (BRAOU) and Karnataka State Open University (KSOU).

The following are the classificatory variables used in the case of distance learners.

- 1) University
- 2) Gender
- 3) Level of study
- 4) Subject of study

1.2 Variables of faculty members in Open Universities

The major variable under study is the application of Information Technology in teaching by distance in the open universities in the country.

The size of the open universities is taken also as classificatory variable. The investigator has selected one university each from three categories such as large, medium and small. The selected Open Universities are Indira Gandhi National Open University, example for large, BR. Ambedkar Open University, for medium size and Karnataka State Open University, for small size Open Universities in the country. Selection of the three Open Universities

can also be justifiable on the ground of the regional distribution of Open Universities i.e. IGNOU situates at North side and Karnataka State Open University situates at south. In the case of BR. Ambedkar Open University though it is situated in South India, it covers a major portion of the intake of the central region of the country.

2. TOOLS USED FOR DATA COLLECTION

The required data were collected using the following tools constructed by the investigator, with the help of the supervising teacher.

2.1 Questionnaire

A questionnaire consists of a number of questions, printed or typed in a definite order on a form. It is either mailed or given to the respondents. The signal advantage of questionnaire method is that it affords great facilities in collecting data from large, diverse and widely scattered groups of people. Here this tool is used to collect data from distance learners and faculty members of various Open Universities in the country.

2.1.1 Questionnaire for distance learners

Investigator has collected the data by directly visiting and distributing questionnaires among the students from the head quarters of sample open universities and from different study centres situated nearby the head quarters. The questionnaire for distance learners is drafted for different Open Universities considering the methods of learning in different open universities and the extent of Information Technology application in them. The questionnaire is prepared by the investigator with the help of the experts in the field of Information science, to study the existing trend and application of Information Technology in the field of distance education.

The questionnaire for the distance learners include the following variables

1. Background characteristics of distance learners
2. Attitude of learners towards distance learning
3. Methods used in learning
4. IT awareness among distance learners
5. Availability of IT tools
6. Current use of IT in learning
7. Distance learning as a global science.
8. Future plan for using Information Technology in practice.
9. Virtual Universities
10. Libraries in distance education

2.1.2 Questionnaire for faculty members

The questionnaire for the full time teaching faculty members at the headquarters of the three sample open universities is drafted considering the level and use of application of Information Technology in the process of teaching in distance mode. Investigator has collected data from the teaching faculty members of sample open universities by directly visiting them and distributing questionnaires by hand. In order to get the national coverage investigator has also mailed questionnaires to the regional directors of all the regional centres of IGNOU. A total of eight questionnaires received through this way are also merged with the questionnaires received from the faculty members of IGNOU.

The questionnaire for the faculty members of the open universities was used to obtain information related to use of Information Technology tools in the open universities in their course curriculum. Items gathering data on the personal and professional background of the respondents were also included.

The impacts of media on various activities were obtained on five point scale i.e. very good, good, neutral, poor and very poor. Besides one open ended question was also used to get the feed back of respondents on how to improve the use of electronic media on distance education.

In addition the investigator has employed literature search in the beginning of the study. This is very much useful to get a thorough understanding about the field. Literature includes journal articles collected from Internet, various printed journals, reports and books in the field of Information Technology and distance learning were examined to get a thorough idea about the field of study and its developments.

3. SAMPLE USED FOR THE STUDY

The present study is based primarily on primary data collected from the direct beneficiaries of the system, i.e., the students and teachers. Secondary data are also used wherever necessary. For collecting primary data, students and faculty members of three major providers of distance education in India have been selected:

1. Indira Gandhi National Open University, New Delhi.
2. BR. Ambedkar Open University, Hyderabad.
3. Karnataka State Open University, Mysore.

Students who underwent courses of study in the above institutions during the period of data collection have been included in the survey. Students of both graduate and postgraduate levels were selected.

It is not practical to study the whole population to arrive at generalization through the results of the research for universal application. The process of sampling makes it possible to draw valid inferences or generalization on the basis of careful observation of variables within a

relatively small proportion of population. A sample is small proportion of a population selected for the study. In the present study the population is the distance learners and faculty members in the field of distance education in India. According to the annual report distance learners in the country is more than 15 lakh in the year 2006. In addition there are a number of distance education institutes under regular universities offering courses under distance stream. Similarly a large number of faculty members are serving the distance education system either directly or indirectly. This population is too large in size to collect data from the entire population. Hence the investigator selected a representative sample of this population to conduct the present study.

4. SAMPLING TECHNIQUES USED

The population consists of distance learners and faculty members in the field of distance education in India. The investigator identified the distance learners and faculty as the first step. They are the learners who came for various purposes to the different open universities taken for the study. In order to setup a representative sample, learners and faculties from the three regions of the country viz north, center and south were taken.

Other sub samples of distance learning were determined as large, medium and small open universities according to their size. The size of the Open University is determined by the number of students registered for different courses at graduate and postgraduate level. The large-scale open universities are those, which have an enrolment of more than one lakh in a year. Medium have an enrolment of more than fifty thousand and small have ten thousand in a year. In order to get representative to all these, the investigator has adopted the stratified random sampling techniques.

5. SAMPLE SIZE

For the present study the investigator decided to take a sample of 750 students from different open universities (250 from IGNOU, 250 from BRAOU and 250 from KSOU) and all the full time teaching faculties in the headquarters of sample open universities in the country. The investigator has fixed the size of the sample students into 250 from each University for the purpose of comparison. The number of the faculty members who responded from different open universities of three regions of the country is 92 from IGNOU, 38 from BRAOU, and 24 from KSOU. Thus the final sample consists of 750 distance learners and 154 faculties from the field of distance education.

The basal sample of distance learners in the country is given in table 3.

Table 3
Breakup of Sample Students

Characteristic of distance learners		No. Of distance learners	Percentage
University	IGNOU	250	33.33
	BRAOU	250	33.33
	KSOU	250	33.33
	Total	750	100.00
Gender	Male	426	56.8
	Female	324	43.2
	Total	750	100.00
Education level	Under graduate	395	52.66
	Post graduate	355	47.33
	Total	750	100.00

Subject of study	Science	80	10.66
	Non Science	670	89.33
	Total	750	100.00

For the selection of students, a stratified random sampling procedure was adopted. First of all, the courses have been stratified as under graduate and post-graduates. Students of Diploma and Certificate programs were excluded from the survey. From IGNOU, learners are selected from Head quarters, New Delhi and from various study centres spread out all over the country such as selected study centres from New Delhi, Bangalore, Hyderabad, and from Kerala. The programs covered are B.Com, B.Sc, B.A, and M.B.A. MCA, MA etc. From BR. Ambedkar Open University, the sample students are selected from the head quarters situated at Hyderabad. The programs covered are: B.A. Economics, BSc, History and B.Com; M.A Economics, English, and Sociology. From Karnataka State Open University, students are selected from the headquarters situated at Manasagangothri, Mysore. From the various programs, the students are drawn from M.A. Economics, English, Sociology and B.A Economics, English, and B.Com and BSc. Secondary data for the study have been collected from the head quarters of the concerned Universities and from the offices of the study centres of the concerned universities. Annual Reports, Annual Budgets, Educational Journals, etc. were also consulted for getting supplementary data. Data were also collected through discussions with the Directors, Administrators, and Teachers of different Open Universities.

Table 4

Breakup of sample of faculty members in the field of distance learning

University	No. of respondents	Percentage
IGNOU	92	59.74
BRAOU	38	24.67
KSOU	24	15.58
Total	154	100

6. DATA COLLECTION PROCEDURE

The investigator first sought permission from different open universities to visit the university by person and as per the permission the investigator visited the institution and distributed questionnaires among students and faculties. After making necessary copies of the tools, the investigator met the students and faculties of sample open universities and distributed questionnaires among them.

Necessary instructions were given for filling the facing sheet of questionnaire. The majority of the students and faculties responded positively by filling up and returned the questionnaires. The responses were encouraging.

For the present research, a descriptive sample survey method was used for collection of data. It was because, the respondents of the study belonged to various open universities. To obtain the relevant data 915 questionnaires were distributed personally by the investigator to the distance learners from various sample open Universities in India. Investigator has fixed the size of the sample into 750 for comparison purposes from the relevant questionnaire collected.

From the faculties of open universities the investigator has collected the questionnaires by visiting them personally and distributing the questionnaire among them with a request to fill the same. Most of the questionnaires were received back by the investigator by hand and some of the faculties send them after filling by post. At the end the investigator received 154 questionnaires (92 from IGNOU, 38 from BRAOU, and 24 from KSOU) from the part of faculty members. In addition the investigator has applied the literature search wherever necessary. Thus the final methods consist of literature search, and questionnaires.

7. ANALYSIS OF DATA

The data collected have been analyzed using mathematical and statistical techniques. Percentages, ratios, and averages are the most common tools applied. The data collected through the questionnaires were divided under major headings such as:

- Distance education – Background Information.
- Profile of distance learners.
- IT awareness of distance learners.
- IT application in distance education.
- Faculty and IT application.
- Virtual Universities and web based learning.
- Student support services including the role of libraries.

The data collected through the questionnaires were consolidated separately. Appropriate variables have used for the analysis of data. The data were then subjected to further statistical treatment.

8. STATISTICAL TOOLS USED

The statistical analysis of data was done with the help of computer with statistical package called SPSS (Statistical Package for Social Science). The statistical techniques used for analysis of data are described below:

1. Percentage analysis.
2. Chi-square test for significance (Devore 2000) to find out whether significant differences exist among students of different open universities in the country according gender, level of education or subject of study, between large, medium and small open universities in the country.

REFERENCES

Devore, Jay L. (2000). *Probability and statistics for engineering and sciences*. (5th Ed.) Chennai : Eswar Press.

Kothari, CR. (1990). *Research Methodology: Methods and techniques*. (2nd Ed.) New Delhi: Wiswa Prakashan.

ANALYSIS AND INTERPRETATIONS

In this chapter an attempt has been made by the investigator to analyze the collected data from various Open Universities selected for the study. Analysis of data means studying the tabulated material in order to determine inherent facts of meaning. It involves breaking down existing complex factors into simpler parts and putting the parts together in new arrangement for the purpose of interpretations. Data analysis and interpretation is considered as the heart of the research report.

The objectives of the study can be attained only through analysis of the collected data using appropriate statistical techniques. Tabular representations and diagrammatical representations are used to make the analysis more meaningful. The present study is intended to find the applications of Information Technology in the field of distance higher education in India.

Two types of analysis are followed in the study. Majority of the questions are analyzed using the variables selected for the study. Second type of analysis is done to assess the opinion of learners and faculty members about various aspects of distance education. It is done using five-point scale such as 'strongly agree, agree, neutral, disagree and strongly disagree'. For the sake of analysis the 5-point scale is reduced in to three by merging strongly agree and agree into a single scale. Similarly strongly disagree and disagree also merged and treated as a single scale. Percentage analysis is used to find out the application of various IT tools in the field of distance education. In order to find out whether there exists any significant difference among Open Universities in application of Information Technology in

distance education and for comparison purposes chi-square test is used with the help of a statistical package called SPSS (Statistical Package for Social Sciences).

1. Variables used

The major variables used for the analysis of student questionnaire are:

1. Open University (IGNOU, BRAOU, KSOU)
2. Gender (Male, Female)
3. Subject (Science, Non-science)
4. Level of education (Under Graduate, Postgraduate)

University is the major variable used for the analysis. It is the only variable used for the analysis of the questionnaire distributed among faculty members. Other classificatory variables have only applied wherever necessary.

2. Sample of the study

Investigator has collected data by distributing questionnaires among the students and faculties of sample Open Universities in the country. Sample selected for the study are represented in Table 5.

Table 5

University wise distribution of distance learners

University	Questionnaires distributed	Questionnaires collected	Questionnaires selected
IGNOU	354	288	250
BRAOU	275	263	250
KSOU	286	259	250
Total	915	810	750

Due to the abundance of students registered in various Open Universities in the country, it is not possible and practical to collect data from all the students registered for various courses in the sample Open Universities. More over physical presence of students in the Universities is comparatively less. So the investigator had to collect data in the seasons when contact programs are going on in these Universities. Investigator has collected data from the head quarters of sample Open Universities. From the Universities where classes are not conducted in head quarters, investigator has collected data from the study centres nearby to the head quarters.

A total of 250 questionnaires were selected from each Open University after avoiding unfilled and incomplete questionnaires. The investigator has fixed the size of the sample selected as 250 for the purpose of comparison.

In the case of faculty the investigator has distributed questionnaires to all the faculty members available in the head quarters of three sample Open Universities. In order to get an overall picture about the distance education in India, investigator has also mailed questionnaires to all the regional directors of IGNOU. Out of 28 questionnaires mailed, a total of 8 questionnaires were received back from the regional directors and those questionnaires also merged with the questionnaires received from the faculty members of IGNOU. Sample selected from the faculty members of Open Universities is represented in Table 6.

Table 6

Sample selected from faculty members of Open Universities

University	Questionnaires distributed	Questionnaires collected	Questionnaires selected
IGNOU	124	92	92
BRAOU	51	38	38
KSOU	29	24	24
Total	204	154	154

Out of 124 questionnaires including questionnaires mailed to the regional directors, a total of 92 questionnaires were collected from the faculty members of IGNOU. From BRAOU out of 51 questionnaires distributed 38 received back. From KSOU out of 29 questionnaires distributed 24 questionnaires received back. Thus the final sample consists of 154 questionnaires from faculty members of Open Universities.

3. Open Universities in India

The establishment of Open Universities in the UK in 1969 has inspired the policy makers in India to explore the possibilities of making similar efforts in the country. The proposal for establishing an Open University in India was initiated in early seventies. The Ministry of Education and Social Welfare, in collaboration with Ministry of Information and Broadcasting and the UGC, organized a seminar in December 1970 as part of a program for the observance of the International Education Year. Consequently steps were taken for an education system which not only cover comparatively limited number of University students, but cover much larger number of students who drop out from the school at various points, the neo-literates and eventually all adults who desire to avail these programs of continuing education.

As a result Andhra Pradesh Open University established in the year 1982. The University Enquiry Commission appointed by the Government of Bihar (1983) suggested that the State Government should start an Open University to promote education in the non-formal sector. The Government of Maharashtra appointed a committee with K. G. Deshmukh, Vice-Chancellor, Amravathi University, as the chairman, to examine the feasibility of establishing Open University in the State in 1985. Similarly, the Government of Madhya Pradesh, showed interest in distance education when, some time ago, it appointed a committee to look into the matter. Realizing the utility and importance of distance education and with a view to strengthening it, the

Government of India decided to set up a National Open University. It was first announced by the then Prime Minister, Rajiv Gandhi, in his broadcast to the Nation in January 1985. Immediately the Ministry of Education initiated action for setting up this University. The University, by the name, Indira Gandhi National Open University (IGNOU) formally came into existence towards the end of September 1985. The University has two important functions to perform:

1. To function as an Open University and
2. To maintain and co ordinate distance education in the country. It is interesting to note that many State Governments, including Kerala are thinking of setting up Open Universities. At present there are ten State Open Universities and one National Open University functioning in India. A brief review of their status and operations is given below.

One of the major problems, which India encounters now, is the extremely low enrolment ratio. In 1994, the World Bank conducted a study of the enrolment ratios between of persons 17 and 23 years of age, worldwide. India has been classified as 'low income country', the enrolment ratio in the world being 7.8 percent. It is true that higher education has witnessed an accelerated and exponential growth since independence. In 1947, India had 20 Universities and 500 affiliated colleges. But, by December 2001, the number of Universities increased to 273 and of affiliated colleges to 11,831. In the 2000-'01 academic session, 7.734 million students were enrolled in the Universities and their affiliated colleges. This represents 9+ per cent of the student population enrolment world wide- an insignificant proportion when compared to India's current population of over one billion, which accounts for more than 15 percent. Subject-wise, 88 per cent of the enrolled were in Under Graduate courses, 9.8 percent in Postgraduate courses; 1.3 percent in diploma courses, and a mere 0.9 percent in Research (Tiwari, 2002). These figures

explain the challenge the Indian education system faces in the 21st century. One solution to the problem is planned expansion of the distance education system as the formal system cannot meet the demand. Thus Open University system in the country should be strengthened. Table 7 gives details of Open Universities in the country.

Table 7
Details of Open Universities in India (as on April 2006)

Open University	Year of Establishment	State	Total Enrolment
BRAOU	1982	Andhra Pradesh	3,18,650
IGNOU	1985	New Delhi	5,61,167
KOU	1987	Rajasthan	8,793
NOU	1987	Bihar	N.A
YCMOU	1989	Maharashtra	3,97,881
MPBOU	1991	Madhya Pradesh	55,912
BAOU	1994	Gujarat	24,700
KSOU	1996	Karnataka	27,231
NSOU	1997	West Bengal	2,126
UPRTOU	1999	Uttar Pradesh	3,307
TNOU	2002	Tamilnadu	NA

Table 7 shows that the Open University system is slowly picking up in our country. Eleven Open Universities were established during the past two decades. The enrolment was the highest in IGNOU, followed by YCMOU and BRAOU. The regional distribution of the 10 Open Universities is given in Table 8. It is clear that the number of Universities and variety of courses offered by them are increasing at a faster rate in the country. Maximum number of courses is offered by IGNOU. All the Open Universities have

study centres and 50 percent of them have regional centres. Most of them have audio and video programs to deliver their courses.

3.1 Regional distribution

In this context, a discussion of the regional distribution of Open Universities in India is worthwhile. It is given in Table 8.

Table 8

Regional Distributions of Open Universities in India

Region	Open Universities
Northern	IGNOU, KOU, UPRTOU
Eastern	NOU, NSOU
Western and Central	YCMOU, BAOU, MPBOU
Southern	BRAOU, KSOU

Regional distribution of Open Universities shows that Open University system has grown as an alternative channel of education in the country. All the regions have equal opportunities for enrolling for various courses in Open Universities in the country. Similarly a large number of conventional Universities are conducting distance education programs through the schools of distance education. Regional distributions of distance education institutes are given in Table 9.

Table 9
Regional Distributions of Distance Education Institutes

Region/State/UT	1990-91	1997-98	2004-2005
SOUTHERN REGION			
Andhra Pradesh	6	11	17
Karnataka	2	2	6
Kerala	3	3	24
Pondichery	-	1	2
Tamilnadu	6	9	18
Sub-Total	17	26	67
NORTHERN REGION			
Chandigarh	1	1	4
Delhi	2	2	11
Haryana	2	3	4
Himachal Pradesh	1	1	3
Jammu and Kashmir	2	2	2
Punjab	2	2	5
Rajasthan	2	3	4
Uttar Pradesh	2	2	3
Sub-Total	13	16	21
CENTRAL & WESTERN REGION			
Madhya Pradesh	1	8	9
Maharashtra	5	4	11
Gujarat	1	1	4
Sub-Total	7	13	24
EASTERN REGION			
Assam	-	1	2
Bihar	2	3	3
Meghalaya	-	1	2
Orissa	2	3	4
West Bengal	-	2	5
Tripura	-	1	4
Sub-Total	4	11	20
Grand Total	41	66	132

Southern Region is the most developed so far as distance education is concerned. Of the total distance education institutions, two-fifths are functioning in this region. In 2004-2005, the Eastern Region covering 22.6 percent of the total population of India had only 16.7 percent of the institutions whereas, in the Southern Region, covering 21.8 percent of the population had 39.4 percent of the institutions. There are about eight States, which do not have even a single distance education institute. Regional imbalances are quite glaring. Most of the States have more than one institute even when enrolment is low. The UGC guidelines had originally stipulated that there should not be more than one distance education institute in a State.

Though there has been a steady growth of distance education, the share of enrolment in higher education has not been commendable. In 1986- '87, the total enrolment in distance education accounted for only 8.9 percent of the total enrolment in higher education. By 1999-2000, this percentage was around 14 (excluding Open University enrolments). It is expected that in 2010 distance education enrolment would be about 50 percent of total higher education enrolment in the country.

3.2 Courses offered by Distance Education Institutes

A wide range of courses has been offered by the distance education institutes. Most of the programs are mere replica of their conventional University courses like B.A, B.Com, and M.A courses. B.Sc programs are so few presumably because of lack of laboratory facilities and the difficulty in giving assignments to distance learners in science. Similarly, the Distance Education Institutes are offering postgraduate programs on a large scale. Under the postgraduate stream, Master of Arts (M.A) courses are offered in Languages, Humanities, and Arts. The major Postgraduate courses offered by Distance Education institutes in Languages are Bengali, English, Hindi,

Sanskrit, Telugu, Tamil, Urdu, Punjabi, Marati, Maithili, Persian, Assamese, Gujarati and Oriya ..etc.

Another major stream at the Postgraduate level is Humanities and Social Sciences. Most of the courses are of the conventional type. The main courses under this stream are M.A in History, Economics, Political Science, Sociology, Public Administration, and Philosophy. A few institutes offer postgraduate courses in Human Rights, Astrology, Fine Arts, Journalism, Women Studies, Jainology, Gandhian Thought, etc. Distance Education Institutes have been expanding their role in the provision of courses in Commerce and Management studies in recent years. Almost all the distance Education Institutes offer Bachelor of Management Courses such as BBA/BBS/BBM and MBA. Many of the Open Universities offer Masters UG in Science (M.Sc). The most favourite discipline in which most of the Distance Education institutes concentrate is M.Sc in Mathematics, which though a pure science, does not involve any laboratory work. Some of the Universities also offer M.Sc in subjects as Psychology. The reason why the Science courses have not struck roots in the Indian Distance Education soil is the inhibition of the conventionalists not to allow these Distance Education Institutes to run laboratory-based courses. Their phobia of the inability of the distance education system to suitably handle these courses does not seem to have been shaken so far, even though a number of these institutes have been managing them so wonderfully well (Bhatnagar, 1997). Library and Information Science (LIS) through the distance mode is of recent origin in India.

Among the various courses, those relating to computers have attracted the attention of many institutes. Some of the Universities consider it as quick-money ventures. In response to the global demand for computer professionals, the Distance Education Institutes in our country have forged ahead with the

introduction of computer-based courses at various levels. A few Distance Education Institutes have also paid attention toward the provision of law-based courses. Among the Distance Education Institutes, four institutes provide degree courses in law (LLB/BGL). However, the duration of the Bachelor degree is limited to two years, instead of three years. The Bar Council of India does not allow these institutions to go in for the third practicing year. Notwithstanding this restriction the degree that these institutes award enable these degree holders' jobs. Moreover, they are considered eligible also to set up their own practice after doing the third year course for which permission is granted by every University. It is to be noted here that most of the courses in which IT tools are employed are courses related to computer sciences.

3.3 Sample Open Universities

The investigator has selected three major Open Universities in the country as a sample for the study. They are Indira Gandhi Open University (IGNOU), BR.Ambedkar Open University (BRAOU), and Karnataka State Open University (KSOU). An overview picture about the Open Universities is given below.

Table 10
Sample Open Universities - An Overview

Details	IGNOU	BRAOU	KSOU
Programs on offer	109	21	18
Courses on Offer	604	307	164
Students Registered	5196650	193570	28141
Students on Rolls	1561167	318650	38793
Regional Centres	28	2	0
Study Centres	504	68	36
Academic Counselors	20000	4010	1000
Students Awarded Degrees	153298	31897	11486
Audio Programs	984	118	42
Video Programs	941	79	11

Among the various Open Universities IGNOU, being the National Open University is far ahead than other Open Universities in respect of programs, students, study centres and faculties.

The higher education sector in India has expanded over the years. There are at present eleven Open Universities in the country. There are 12286 Arts and Science Colleges (excluding unaided colleges) functioning in the country during the year 2004-'05. Despite these developments, India lags behind demand both in qualitative and quantitative terms in the field of higher education. The demand for tertiary enrolment in absolute terms is much higher in India than in other developing countries in the world due to large-scale school- level enrolment. Besides, the existing unemployment rates reduce the opportunity cost for pursuing higher education, which in turn, pushes up the demand for higher education. It is to be noted that the gross enrolment ratio in higher education at the all-India level was reported to be

around six percent during the period. The efficiency of the higher education system is also a matter of serious concern. Dropout rate at the degree level in Arts and Science Colleges is estimated to be around 30 percent by the third year of the course. Hence, the major malady afflicting higher education in India lies mainly in its failure to maintain standards.

4. Distance Learners: A profile

In this section the investigator has made an attempt to break the sample selected on the basis of various background characteristics such as age, gender, level of education, subject of study, residential status, occupational status etc.

4.1 Age profile

Mainly distance education is concerned with the education of adults and it seems fairly obvious that our research plans should be informed by theories and research about learning in adulthood, adult development, program planning, instruction and evaluation in adult education. The definition of adult learner is, however, quite complex. In recognition of the arbitrariness of biological age in determining adult status, the research literature does not provide a formal definition of an adult student. Nevertheless, adult status is frequently operationalised as including persons who are below the age of approximately 30 years. The present study also follows this convention. Table 11 shows the age profile of distance learners included in the sample.

Table 11
Age profile of sample distance learners

Age	IGNOU	BRAOU	KSOU	Total
Below 30	190 (76)	183 (73.2)	216 (86.4)	589 (78.53)
Between 30-40	53 (21.2)	64 (25.6)	34 (13.6)	151 (20.13)
Above 50	7 (0.2)	2 (0.8)	0 (0)	9 (1.2)
Total	250 (100)	250 (100)	250 (100)	750 (100)

(Figures in bracket indicate percentage)

An inspection of Table 11 reveals that in the age wise distribution of learners enrolled in the sample Open Universities in the country, majority of the learners, IGNOU (76%), BRAOU (73.2%) and KSOU (86.4%) were below thirty years old. The rest of them IGNOU (21.2%), BRAOU (25.6%) and KSOU (13.6%) were between the age group of 30-40. only a very small percentage of the distance learners were IGNOU (0.2%), BRAOU (0.8%) and KSOU (0%) belongs to the age group of above 50. The table also reveals that though the system of distance education was primarily intended for the life long learning of the persons who could not continue their education in the regular formal channels due to various reasons, majority comes from the age group of below 30. The students cover a wide range of age, but the largest group are below 30 years (78.53 %).

The number of students over the age group of 25 is increasing in distance education in the developed world. The figure ranges from 36 percent in the USA to over 60 percent in Sweden. In Indonesia, the proportion of distance education students over the age group of 25 was about 78 percent.

4.2 Gender analysis

Distance education has been viewed to be of special significance for women, since, in many cases, it may provide a learning opportunity previously denied either for cultural or financial reasons. The Gender-wise distribution of the sample learners in India is given in Table 12.

Table 12
Gender wise distribution of distance learners

Gender	IGNOU	BRAOU	KSOU	Total
Male	167 (66.8)	142 (56.8)	162 (64.8)	426 (56.8)
Female	83 (33.2)	108 (43.2)	122 (48.8)	324 (43.2)
Total	250 (100)	250 (100)	250 (100)	750 (100)

(Figures in bracket indicate percentage)

It is clear from Table 12 that a high proportion of the sample distance learners in the IGNOU (66.8%) were males. In the case of BRAOU it is 56.8 percent and in KSOU it is 64.8 percent. In IGNOU the percentage of female learners were comparatively low. The percentage of female learners was 43.2 percent in BRAOU and 48.8 percent in the case of KSOU. However the percentage of female is not as low while we compare their percentage with the overall percentage of male students. There is no notable difference among three sample Universities in the country.

Women learners are found to form nearly half of the total number of sample learners selected for the study. At IGNOU women learners constitute only less than one-third of the total. The nature of courses offered by IGNOU may not be suitable for the women aspirants. IGNOU offers courses with

more of a professional and managerial nature, while; the other distance education institutes in the sample offer courses of a general nature and of the conventional type.

4.3 Residential status

Due to the very nature of distance education courses students from various areas including urban and rural regions are attracted to the system. The major advantage of the distance education system is its ability to meet the educational requirements irrespective of area from which students comes. It is estimated that distance education is the most suitable method for the rural learners. Distribution of learners on the basis of their area of residence is given in Table 13.

Table 13

**Distribution of distance learners
on the basis of the area of residence**

Area of residence	IGNOU	BRAOU	KSOU	Total
Urban	169 (67.6)	153 (61.2)	133 (53.2)	455 (60.66)
Rural	81 (32.4)	97 (38.8)	117 (46.8)	295 (39.33)
Total	250 (100)	250 (100)	250 (100)	750 (100)

(Figures in bracket indicate percentage)

Distribution of learners on the basis of area of residence shows a high concentration of learners registered under IGNOU (67.6%), BRAOU (61.2%) were belongs to urban areas in the sample learners registered under three sample Open Universities in the country. But in the case of KSOU the

difference between urban (53.2%) and rural (46.8%) students are comparatively small.

The high concentration of distance learners in urban area may be attributable to some extent to the fact that the samples were drawn from the students at headquarters of IGNOU, BRAOU and KSOU. In addition the investigator has collected data from regional centres of IGNOU situated at Hyderabad, Delhi and Bangalore. However the percentage of rural students registered at IGNOU (32.4%), BRAOU (38.8%) and KSOU (46.8%) is not as low as expected.

4.4 Educational background

Students from various backgrounds pursue distance education courses. Due to the varying nature of distance education students the courses and programs offered by the Universities should be suitable to all of them. Distribution of learners on the basis of the educational background is given in Table 14.

Table 14

**Distribution of distance learners
on the basis of the educational background**

Educational background	IGNOU	BRAOU	KSOU	Total
General	201 (80.4)	171 (68.4)	163 (65.2)	535 (71.33)
Professional	32 (12.8)	45 (18)	56 (22.4)	133 (17.73)
Others	17 (6.8)	34 (13.6)	31 (12.4)	82 (12)
Total	250 (100)	250 (100)	250 (100)	750 (100)

(Figures in bracket indicate percentage)

Distribution of distance learners on the basis of the educational background shows that only 17.73 percent students having professional subject background comes to the distance learning. Students having general academic background (71.33%) are more attracted to the distance education system.

It reflects the attitude of the society towards the distance education. Society prefers distance education as a method of continuing education or its relevance as a life long education is higher than being a serious education system. In addition to this most of the professional courses are practical oriented and the Open Universities are not equipped with lab and laboratory facilities to provide professional training and lab experiments.

4.5 Level of education

Open Universities are conducting courses at higher education level. It includes both Postgraduate (PG) and Under Graduate (UG) learners. In the present study the investigator has given special attention to get the data from both these groups. Table 15 shows the distribution of learners on the basis of their level of education.

Table 15

**Distribution of distance learners
on the basis of Level of education**

Course	IGNOU	BRAOU	KSOU	Total
Under graduate	102 (40.8)	154 (61.6)	139 (55.6)	395 (52.66)
Postgraduate	148 (59.2)	96 (38.4)	111 (44.4)	355 (47.33)
Total	250 (100)	250 (100)	250 (100)	750 (100)

(Figures in bracket indicate percentage)

Table 15 shows that in all the sample Open Universities Under Graduate students are more in number than Postgraduate students. In the case of IGNOU, more questionnaires were made available from the Postgraduate students than under graduate students. It shows that under graduate students are more attracted to the Open Universities. It may be due to the reason that Degree students are more attending contact sessions. Distribution of learners on the basis of course of study is represented in Table 16.

Table 16
Distribution of distance learners
on the basis of course of study

Course	IGNOU	BRAOU	KSOU	Total
Science	52	17	11	80
Non-science	198	233	239	670
Total	250	250	250	750

The sample drawn from three sample Open Universities shows the significant difference between science and non-science courses in all the Open Universities in the country. All the Open Universities are giving preference and importance to non-science subjects. That is why the science courses are very few in all the Open Universities in the country. It may be due to the lack of facilities for arranging lab facilities and practical experiments related with the conventional science subjects such as Physics, Chemistry, and Biology etc.

The major science subject taught in all the Open Universities is BSc computer Science. It is the reason for becoming the size of science sample students few while comparing with arts and humanities students.

4.6 Occupational status

One of the major characteristics of distance learners are reported to be is that generally they are employed persons. The occupational status of the sample learners is given in Table 17.

Table 17
Distribution of distance learners on the basis
employment status

Employment status	IGNOU	BRAOU	KSOU	Total
In govt. sector	17 (6.8)	14 (5.6)	5 (1)	36 (4.8)
In private sector	94 (37.6)	101 (40.4)	80 (32)	275 (36.66)
Self employed	33 (13.2)	21 (8.4)	23 (9.2)	77 (10.26)
Not employed	106 (42.4)	114 (45.6)	84 (33.6)	362 (48.26)
Total	250 (100)	250 (100)	250 (100)	750 (100)

(Figures in bracket indicate percentage)

Table 17 shows that more than fifty percent of the respondents were employed. Most of the respondents were either employed in the private sector or self-employed. Only few respondents were employed in the government sector. Data shows that the Open Universities have not been particularly successful in attracting blue-collar workers or managerial staff either from public or from private industries. This may be mainly due to the absence of technical, managerial, or vocational courses offered by them. In IGNOU, the employed students are mainly engineers, bank officers, lecturers etc. These students prefer IGNOU mainly because of the nature of courses offered.

4.7 Satisfaction of learners about present distance education

It is very important to analyze how distance learners visualize the present method and practices adopted in the field of distance education in the country. Their opinion regarding their satisfaction about present distance education system is presented Table 18.

Table 18

Satisfaction of learners about present distance education system

Universit y	Strongly agree	Agree	Neutra l	Disagree	Strongly disagree	Total
IGNOU	23 (9.2)	74 (29.6)	16 (6.4)	105 (42)	32 (12.8)	250 (100)
BRAOU	39 (15.6)	53 (21.2)	55 (22)	79 (31.6)	24 (9.6)	250 (100)
KSOU	28 (11.2)	52 (20.8)	53 (21.2)	93 (37.2)	24 (9.6)	250 (100)
Total	90 (12)	179 (23.87)	124 (16.53)	277 (36.93)	80 (10.67)	750 (100)

(Figures in bracket indicate percentage)

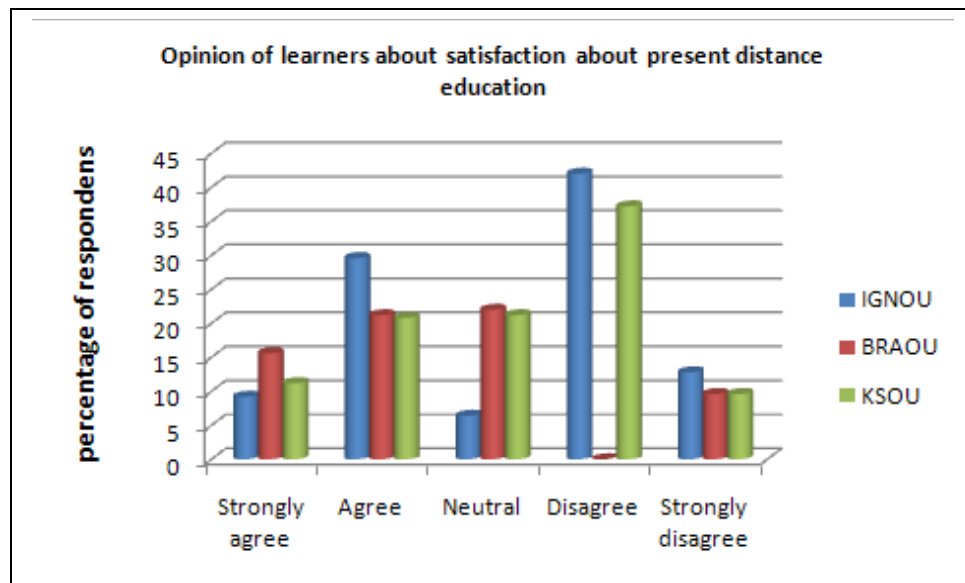
Table 18 shows that majority of the respondents from IGNOU (54.8%) are against present methods and procedures adopted in the field of distance education. Only 38.8 percent students are satisfied about the present distance education system. In the case of BRAOU 37.2 percent students are satisfied and 41.2 percent are not satisfied. In the case KSOU 32 percent students are satisfied and 46.8 percent are not satisfied.

In general it can be said that the percentage of learners who are satisfied about the present methods and procedures is low in comparing with the percentage of students who are not satisfied with the present practices adopted in the field of distance education in India. Opinion of learners about

satisfaction about present methods adopted in the field of distance education is represented in Figure 1.

Figure 1

Satisfaction of learners about present distance education system



4.8 Opinion of learners about change in the mode of learning in the field of higher education

Investigator has collected opinion of distance learners about the change in the mode of learning into distance mode especially in the field of higher education. It is observed that the number of distance learners is increasing day by day. Distance education institutes and courses are started in each and everyday. So the trend in the field of higher education is changing into distance mode from regular mode. Their opinion regarding the change is represented in Table 19.

Table 19**Opinion of learners about change in the mode of learning in the field of higher education**

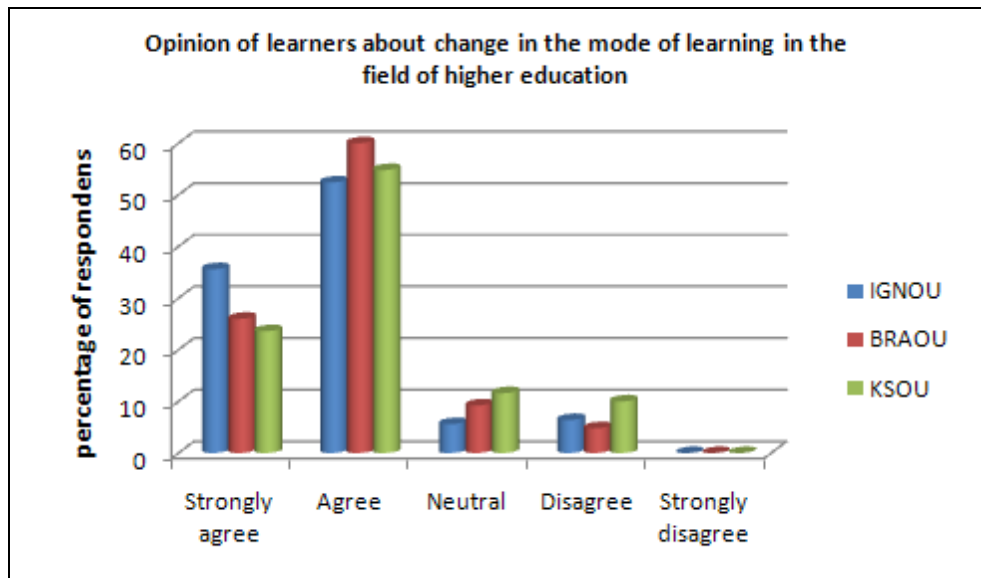
University	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
IGNOU	89 (35.6)	131 (52.4)	14 (5.6)	16 (6.4)	0 (0)	250 (100)
BRAOU	65 (26)	150 (60)	23 (9.2)	12 (4.8)	0 (0)	250 (100)
KSOU	59 (23.6)	137 (54.8)	29 (10.4)	25 (10)	0 (0)	250 (100)
Total	213 (28.4)	418 (55.73)	66 (8.8)	53 (7.07)	0 (0)	750 (100)

(Figures in bracket indicate percentage)

Table 19 clearly shows that 88 percent of students of IGNOU and 86 percent of students of BRAOU and 78.4 percent of students of KSOU believe that the mode of learning is gradually changing into distance mode especially in the field of higher education in the country. Only 7.7 percent of students disagree with this opinion. Opinion of learners about change in the mode of learning in the field of higher education is represented in Figure 2.

Figure 2

**Opinion of learners about change in the
mode of learning in the field of higher education**



4.9 Reasons for change in the mode of learning

It will be interesting to analyze what are the reasons cited by the distance learners for the change in the mode of learning in the field of higher education. Their response rates are represented in Table 20.

Table 20**Opinion of learners about reasons for change in the mode of learning.**

Reasons	IGNOU	BRAOU	KSOU	Total
Quality of DE	5 (2)	13 (5.2)	9 (3.6)	27 (3.6)
Social problems	37 (14.8)	28 (11.2)	29 (11.6)	94 (12.53)
Economic problems	66 (26.4)	60 (24.6)	66 (26.4)	192 (25.6)
Substandard conventional education	25 (10)	15 (6)	22 (8.8)	62 (8.27)
More convenience	96 (38.4)	109 (43.6)	93 (37.2)	298 (39.73)
Political problems	8 (3.2)	10 (4)	11 (4.4)	29 (3.87)
Others	13 (5.2)	15 (6)	20 (8)	48 (6.4)
Total	250 (100)	250 (100)	250 (100)	750 (100)

(Figures in bracket indicate percentage)

Table 20 reveals that a high percent of students (39.73%) believe that this change is due to the convenience, followed by economic problems (25.6%), followed by social problems (12.53%). It is to be noted here that it is not due to the quality of the distance education (only 3.6%) method, which attract the learners to the field of distance education, but the flexibility and convenience are the factors, which bring the learners to the field of distance education. Flexibility of distance education may be interpreted in terms of two aspects viz., flexibility of duration of study and flexibility of the choice of subjects by the learner. Flexibility and openness are the corner stones of the distance education system. The student population catered to by distance education and traditional education are entirely different. In the case of

traditional education, students are generally of a particular age group, unemployed, youngsters being directed by their parents; with or without the full intention to study the subject they are assigned. But, distance education caters to a set of students who are employed and self motivated.

4.10 Defects of distance education in India

Distance education is a system. A system is getting modified and paving way for a better system. In order to replace an existing system it should have certain drawbacks and the replacing system should be a better one. Investigator believes that the present distance education system in the country has lot of defects and drawbacks. That is why an attempt has been made to analyze the defects of distance education from the beneficiaries of the system. The responses of the learners are summarized in Table 21.

Table 21

Opinion of learners about defects of distance education in India

University	IGNOU	BRAOU	KSOU	Total
Lack of staff	29 (11.6)	21 (8.4)	28 (11.2)	78 (10.4)
Limited classes	15 (6)	42 (16.8)	36 (14.4)	93 (12.4)
Lack of Seriousness of students	113 (45.2)	66 (26.4)	57 (22.8)	236 (31.46)
Lack of adequate technological support	61 (24.4)	66 (26.4)	68 (27.2)	195 (26)
Lack of quality study materials	13 (5.2)	36 (14.4)	52 (20.8)	101 (13.46)
Lack of fund	19 (7.6)	19 (7.6)	9 (3.6)	47 (6.26)
Total	250 (100)	250 (100)	250 (100)	750 (100)

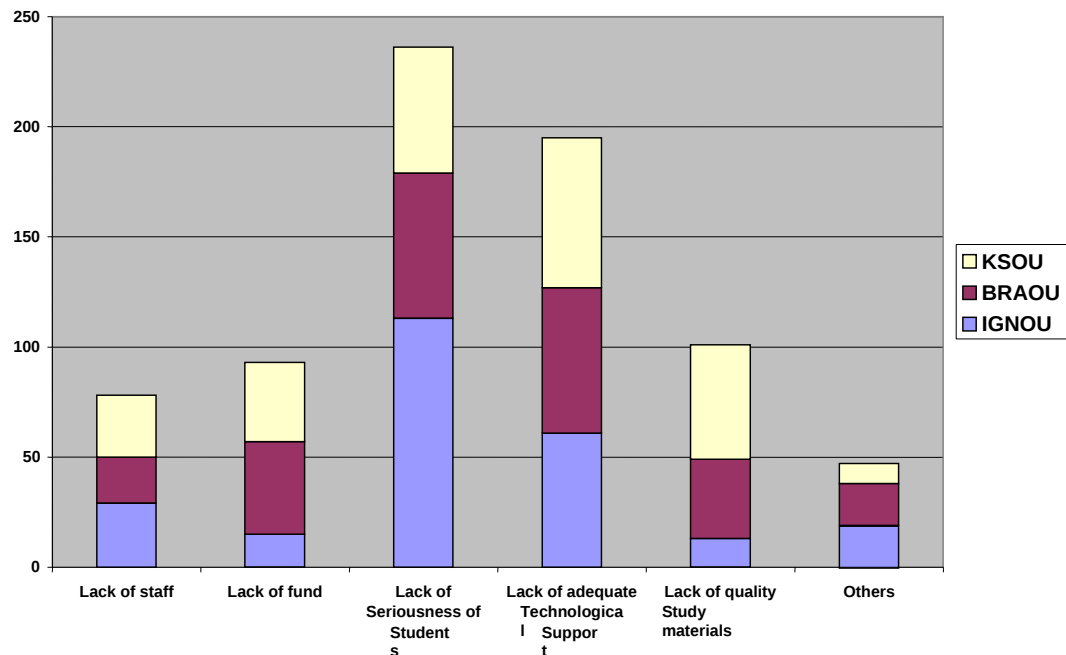
(Figures in bracket indicate percentage)

Table 21 reveals that the glaring problem faced by the distance education system in India is the lack of seriousness (31.46%) from the part of students. Students prefer distance education as a liberal way of getting degrees or post graduations. Most of the students are not regularly attending contact classes and not utilizing the facilities provided by the Universities.

The second problem marked by the learners (26%) is the lack of technological support. It is wonder to note that even IGNOU students feel that technological support is not adequate to them. There is no notable difference among the Universities as it is commonly expected. Another important problem is the lack of quality study material in BRAOU and KSOU where the percentage of IGNOU is small. Most of the IGNOU students are satisfied about their study materials. Another important problem is limited classes (12.4%) and lack of staff (10.4%) has pointed out by a small percent of the students. Because of the liberal attitude of government towards open and distance education in the country, fund is not a major problem in Open Universities in India.

It is also notable that it is not due to the lack of IT application that the students are not using them. But when they are getting intended study materials supplemented by contact classes there is no need for them to depend on IT facilities and tools for learning and communication. All the Universities, not only the sample Universities, are using IT as a supplementary tool to the distance education system. Though the Universities are adopting latest technologies such as video conferencing, tele-teaching facilities the study brings out that these facilities are not reaching to the intended community. So it is high time to use IT not as a supplementary tool but as full-fledged media of distance education. Opinion of learners about drawbacks of distance education system is represented in Figure 3.

Figure 3
Opinion of learners about drawbacks of distance education system.



4.11 Study motives of Distance Learners

Sustainability of DEIs (Distance Education Institutes) depends mainly on the retention of students in the system. In other words, it depends on the motivation of the distance learners to pursue their programs till the successful completion of the course in which they are enrolled. The goals, which the students set for themselves at the time of their registration at the DEIs, are listed here. Attainment of higher qualification and increasing specialized knowledge enable the learner to seek better employment. In the case of the learners who are already employed, improving the chances of promotion motivates them in a big way. Achieving professional recognition and higher income through higher qualification is supplementary to the above motive. Another motive is that of increasing the vistas of knowledge and pursuance of higher studies. This may be also, to some extent, work-related. By continuing education, learners can enter into higher-level education, which in turn empowers them to obtain better occupations. Education is considered an

instrument for achieving social status (instrumental value) for many of the learners. In other words, attaining higher social standing and making up for lack of opportunities, prompt the learners to pursue distance. For many of them education is for ornamental value. 'Getting a Degree' is the sole motive of study to a sizeable percentage of learners. To them, education is neither for career advancement nor for higher learning. It is just to increase their self-esteem. The reason for all these may be the lack of opportunities in the formal channel of education.

So an investigation has been done by the investigator to study about the factors, which motivated the learners to study in the distance mode of learning. This is to identify and understand that to what IT extent IT application can reduce these problems.

Their responses regarding this question are summarized in Table 22.

Table 22
Factors, which motivate the learners
in enrolment in the field of distance mode

Factors	IGNOU	BRAOU	KSOU	Total
Employment/ Promotion	63 (9.6)	53 (13.6)	41 (6.8)	157 (20.93)
Convenience	36 (14.4)	32 (12.8)	21 (8.4)	89 (11.87)
Family problems	18 (7.2)	9 (3.6)	21 (8.4)	50 (6.67)
Economic problems	28 (11.2)	35 (14)	30 (12)	93 (12.4)
Life long learning	29 (11.6)	34 (13.6)	32 (12.8)	95 (12.63)
Motivation from Friends	17 (6.8)	19 (7.6)	15 (6)	51 (6)
Getting a degree	8 (3.2)	8 (3.2)	12 (4.8)	28 (3.73)
Non availability of seats in conventional Universities	51 (20.4)	60 (24)	76 (30.4)	187 (24.93)
Total	250 (100)	250 (100)	250 (100)	750 (100)

(Figures in bracket indicate percentage)

Both distance education and conventional classroom education aim at attaining predetermined educational goals. This being the fact, learners prefer distance education to conventional education. Table 22 shows that more than two-fifths of the total sample had to opt for distance education as they were unable to get admission in regular colleges. This is true for all DEIs in the country. It is to be added with the fact that majority of the respondents are below the age of 30. So our conventional University system in the country is inadequate to accept those who would like to continue their study in the conventional University setup. Moreover the students are going to Open Universities and distance education centers only in the absence of

opportunities in conventional Universities. There is no significant difference among the various Open Universities in this regard.

The second reason marked by them is the ‘employment’ (20.93%). It is evident from Table 17 that majority of the learners are employed either in government or private sector. This is to be added with the percentage of learners having marked ‘job’ (10%) as the study motive, because both are interrelated and interconnected. The cost-effectiveness of distance education is widely reported as a cause in the distance education literature. The per capita cost of distance education is found to be far lower than that of conventional education.

The third reason was ‘life long learning’. It is cited by 12.4 percent of total learners. 11.87 percent of learners prefer distance education due to the flexibility and convenience of the system. Some of the prospective learners preferred distance education due to various problems relating to family (6.67%) and some others due to motivation from friends (6%). It is clear from Table 22 that the majority of the students take to distance education by ‘chance’ and not by ‘choice’. The inability of the Open Universities to offer good quality student support services may be one of the reasons for this state of affairs. Again, lack of awareness about distance education processes among the learners has also hindered the popularity of distance education.

4.12 Adequacy of facilities

The performance of learners depends mainly on the facilities provided by the institution. The learners expect some basic facilities to be made available to them for the smooth conduct of their studies at the institute where they enroll themselves. In distance education, the learner remains in quasi-permanent separation from teachers throughout the learning period; learners do not form a learning group either. Throughout the length of the learning

process the persons taught are individuals; they do not constitute groups. Open Universities offer a number of facilities for the learners; though the degree of their adequacy would vary from institution to institution. It is summarized in Table 23.

Table 23

Adequacy of the Facilities in Open Universities (In percentage)

Response	IGNOU	BRAOU	KSOU	TOTAL
Adequate	9.3	3.3	0.8	4.46
Inadequate	90.7	96.7	99.2	95.53
Total	100.0	100.0	100.0	100

In the view of the sample students of the present study, the facilities provided are grossly inadequate. Nearly 95 percent were of this opinion (Table 23). In IGNOU, the facilities provided are reportedly much better. As a result of the inadequacy of facilities in the Open Universities, the learners are forced to depend on other methods to realize their educational objectives.

4.13 Seriousness of learners in the distance mode

Seriousness of the learners in the field of DE is assessed by considering their time allotment for the learning activities. It is a clear hindrance about the attitude of learners towards distance education. Their responses are summarized in Table 24.

Table 24
Time allotment of distance learners for study
(seriousness - In percentage)

Time allotted/Day	IGNOU	BRAOU	KSOU	Total
Less than one hour	5.6	7.2	2.4	5.06
One hour	6.4	1.6	4.8	4.26
Two hours	3.2	0.8	0.8	1.6
More than two hours	0.0	1.6	0.0	0.53
Irregular	84.8	88.8	92	88.53
Total	100.0	100.0	100.0	100.0

Table 24 clearly shows that as it is proved from the study motives of distance learners, majority of the respondents (88.53%) are not regular learners. The percentage of learners who adopt a systematic method for the study is very small. There is no significant difference among the different Open Universities in this regard. The percentage of learners who spend more than two or three hours for their learning is as small as it is not worth mentioning. It shows the status of distance education not as a standard and systematic way of education but as a liberal and flexible way of learning.

4.14 Globalization of distance education

Distance education is becoming a global scenario. The world initiatives in the field of distance education show the globalization of distance education. So the learners in this field were asked about their opinion regarding whether distance education is becoming a global scenario. Their responses are summarized in Table 25.

Table 25

**Attitude of learners towards the globalization of distance education
(In percentage)**

University	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
IGNOU	43.6	36.8	4.08	07.2	0.4	100
BRAOU	26.4	43.2	13.6	10.8	6	100
KSOU	29.6	40.4	12.8	11.2	6	100
Total	35.2	40.13	11.6	9.7	5.3	100

Table 25 shows that majority of the respondents from all the Universities such as IGNOU (67.4%), BRAOU (69.6%) and KSOU (70%) agree with the fact that distance education is becoming a global scenario. Only a small percentage, i.e. IGNOU (7.6%), BRAOU (16.8%) and KSOU (17.2%) disagree with the fact.

4.15 Opinion of learners about various activities in distance education

In order to study about the existing distance education system in the country a thorough understanding of the activities going on in the field should be studied. Then only alternatives can be created. So here an attempt has been made by the investigator to analyze the opinion of learners regarding various activities going on in sample Open Universities separately. The responses of the learners from IGNOU are given in Table 26.

Table 26
Opinion of learners about various
activities in distance education - IGNOU

Item	Very good	Good	Average	Poor	Very poor	Total
Study material	189 (75.60)	57 (22.8)	4 (1.6)	0 (0.0)	0 (0.0)	250 (100)
Tutor access	28 (11.2)	112 (44.8)	92 (36.8)	18 (7.2)	0 (0.0)	250 (100)
Tutorial quality	42 (16.8)	147 (58.8)	55 (22)	6 (2.4)	0 (0.0)	250 (100)
Mode of assessment	12 (4.8)	104 (41.6)	116 (46.4)	18 (7.2)	0 (0.0)	250 (100)
Assessment quality	23 (9.2)	129 (51.6)	76 (30.4)	16 (6.4)	6 (2.4)	250 (100)

(Figures in brackets indicate percentage)

The respondents from IGNOU (75.6%) have a very good opinion about the study materials provided by the University. Regarding the tutor access also majority of the respondents have positive attitude towards their University, (Very good 11.2%, Good 44.8%). More than 50 percent of the learners from IGNOU feel that tutorial quality and assessment quality are good. The overall opinion from the students of IGNOU indicates that they have a good opinion about the University. This is true especially in the case of study materials where the students are proud of it. It is found that the students from regular Universities are also utilizing the study materials provided by IGNOU. That is a clear indication about the quality of study materials provided by IGNOU. The opinion of learners from BRAOU is discussed in Table 27.

Table 27
Opinion of learners about various
activities in distance education - BRAOU

Item	Very good	Good	Average	Poor	Very poor	Total
Study material	14 (5.6)	78 (31.2)	112 (44.8)	40 (16)	6 (2.4)	250 (100)
Tutor access	24 (9.6)	127 (50.8)	69 (27.6)	21 (8.4)	9 (3.6)	250 (100)
Tutorial quality	8 (3.2)	112 (44.8)	101 (40.4)	29 (11.6)	0 (0.0)	250 (100)
Mode of assessment	4 (1.6)	45 (18)	124 (49.6)	65 (26)	12 (4.8)	250 (100)
Assessment quality	12 (4.8)	54 (21.6)	132 (52.8)	45 (18)	7 (2.8)	250 (100)

(Figures in brackets indicate percentage)

Table 27 shows that about 39 percent of learners from BRAOU have positive attitude towards the study materials provided by the University. When 16 percent feel that the study materials are poor quality, a small percentage, i.e., 2.4 feels it as very poor. Only less than 50 percent of learners have good opinion about tutorial quality, mode of assessment and assessment quality. The opinion of the learners from KSOU is given in Table 28.

Table 28
Opinion of learners about various
activities in distance education - KSOU

Item	Very good	Good	Average	Poor	Very poor	Total
Study material	0 (0.0)	62 (24.8)	128 (51.2)	60 (24)	0 (0.0)	250 (100)
Tutor access	28 (11.2)	132 (52.8)	57 (22.8)	25 (10)	8 (3.2)	250 (100)
Tutorial quality	12 (4.8)	99 (39.6)	124 (49.6)	9 (3.6)	6 (2.4)	250 (100)
Mode of assessment	19 (7.6)	134 (53.6)	88 (35.2)	9 (3.6)	0 (0.0)	250 (100)
Assessment quality	27 (10.8)	154 (61.6)	66 (26.4)	3 (1.2)	0 (0.0)	250 (100)

(Figures in brackets indicate percentage)

It is clear from Table 28 that majority of the respondents from KSOU are neutral regarding their opinion about the study materials. When 24.8 percent feel it good, 24 percent has the opinion that study materials are poor. More than 50 percent of the learners from KSOU have positive opinion about tutor access, mode of assessment and assessment quality. Their opinion about tutorial quality was average.

From the overall analysis it is evident that majority of the learners from all the Open Universities are not fully satisfied about various activities adopted by their Universities in the teaching and learning process. It is to be noted here that a high percentage of learners are reluctant to express their views either positively or negatively.

5. Information Technology awareness among distance learners

Information Technology is developing in a faster rate. IT tools can only be applied in a society where the people are well aware of the technology and are regularly using these tools. Such a society can be called as ‘Cyber society’ or ‘high-tech society’. The society in which we live is frequently referred as ‘cyber society’. So this is also an enquiry about to what extent we can call the present society rightly as ‘cyber society’.

In order to apply the Information Technology tools effectively in the field of distance education the learning community must be well familiar with the IT tools used in the field. Otherwise it will not be useful to them. So here an attempt has been made by the investigator to analyze the familiarity of the Distance Learners (DL) with Internet. Internet is the world’s largest resource of information. IT awareness among distance learners were estimated on the basis of two factors such as:

1. Familiarity with Internet.
2. Mode of Internet use.
3. Place of Internet access.

5.1 Familiarity with Internet.

In this section the familiarity of distance learners with Internet is assessed. It is on the basis of the assumption that those who are familiar with Internet can be judged as familiar with most of the IT tools used in the field of distance education.

Table 29**Familiarity of the distance learners with Internet.**

University	Not familiar	<one year	1-3 year	> 3 year	Total
IGNOU	79 (31.60)	65 (26.00)	81 (32.40)	25 (10.00)	250 (100.00)
BRAOU	69 (27.60)	97 (38.80)	48 (19.20)	36 (14.40)	250 (100.00)
KSOU	102 (40.80)	99 (39.60)	23 (9.20)	26 (10.40)	250 (100.00)
Total	250 (33.33)	261 (34.80)	152 (20.27)	87 (11.60)	750 (100.00)
Pearson Chi-square: 51.1994, df=6, p=.000000					

(Figures in brackets indicate percentage)

The University wise analysis shows that majority (66.67%) of the respondents are aware of the Internet and are using Internet. The table also shows that students are experiencing with the Internet recently, than it was in the earlier times. It also indicates that there exists significant difference among the Universities with regard to the familiarity with the Internet. The percentage of unfamiliar users are high in KSOU (40.80%), followed by IGNOU (31.6%), followed by BRAOU (27.6%). The gender wise analysis of the same is given in Table 30.

Table 30**IT awareness among distance learners –Gender wise**

Gender	Not familiar	<one year	1-3 year	> 3 year	Total
Male	91 (21.36)	167 (39.20)	118 (27.70)	50 (11.74)	426 (100.00)
Female	159 (49.07)	94 (29.01)	34 (10.49)	37 (11.42)	324 (100.00)
Total	250 (33.33)	261 (34.80)	152 (20.27)	87 (11.60)	750 (100.00)
Pearson Chi-square: 74.7885, df=3, p=.000000					

(Figures in brackets indicate percentage)

The gender wise analysis shows that male learners are more familiar (78.64%) with Internet than female learners (50.91%). 49.07 percent of the female learners are not familiar with the Internet. Table 30 also shows that the percentage of learners having more than three-year experience in the Internet familiarity is less while comparing with those who have less than one-year experience. It also shows that our society is developing in a faster rate in acquiring the skills relating to the use of Information Technology tools. In the present days most of the learners are trying to capture the technology. It may be the reason for increase in number of learners having less than one year experience. The p value indicates that there exists significant difference among male and female learners in their familiarity with Internet. Analysis on the basis of level of education is given in Table 31.

Table 31**IT awareness among distance learners –level of education**

Level	Not familiar	<one year	1-3 year	> 3 year	Total
UG	158 (40.00)	125 (31.65)	68 (17.22)	44 (11.14)	395 (100.00)
PG	92 (25.92)	136 (38.31)	84 (23.66)	43 (12.11)	355 (100.00)
Total	250 (33.33)	261 (34.80)	152 (20.27)	87 (11.60)	750 (100.00)
Pearson Chi-square: 17.4998, df=3, p=.000559					

(Figures in brackets indicate percentage)

Table 31 shows that the postgraduate students are more familiar (74.8%) with Internet than the Degree students (60.1%). The percentage of those who are not familiar with Internet is high in the case of degree students (40%) than in the case of PG students (25.92%). Chi-square value indicates that significant difference can be seen among the UG and PG students in the case of their familiarity with Internet. Analysis on the basis of subject of study is given in Table 32.

Table 32**IT awareness among distance learners –subject wise**

Subject	Not familiar	<one year	1-3 year	> 3 year	Total
Science	27 (33.75)	19 (23.75)	21 (26.25)	13 (16.25)	80 (100.00)
Non-science	223 (33.28)	242 (36.12)	131 (19.55)	74 (11.04)	670 (100.00)
Total	250 (33.33)	261 (34.80)	152 (20.27)	87 (11.60)	750 (100.00)
Pearson Chi-square: 6.39794, df=3, p=.093798					

(Figures in brackets indicate percentage)

Table 32 shows that the science students (66.25%) and non-science students (66.71%) are equal in the case of Internet familiarity and there is no significant difference exist among these groups. It is to be noted here that most of the science students are coming from computer science and mathematics. There is more possibility for them to be familiar with Internet and communication technology.

Table clearly indicates that non-science students are not far behind of the science students to use the latest technological advances applied in the field of distance education. So the Universities should take urgent measures to incorporate IT tools not only with subjects relating to computer and Information Technology but with subjects such as humanities and social sciences also.

5.2 Mode of Internet Use

The second hindrance towards the development of society in accepting the IT tools can be assessed by analyzing their mode of using Internet resources. It is estimated that the developed society is always interested in communication and global transformation of ideas. Internet is one of the widest and largest tools of global connectivity. In a technologically driven society IT tools should be utilized to the fullest extent. The basic characteristic of such a society is their regular connection and communication with Internet resources. Here an attempt has been made by the investigator to analyze the mode of Internet use of distance learners. University wise use of Internet resources is given in Table 33.

Table 33**Mode of Internet use –University wise**

University	No use	Regular	Once in a week	Once in a month	Irregular	total
IGNOU	35 (14.00)	38 (15.20)	44 (17.60)	4 (1.60)	129 (51.60)	250 (100.00)
BRAOU	64 (25.60)	29 (11.60)	14 (5.60)	9 (3.60)	134 (53.60)	250 (100.00)
KSOU	61 (24.40)	22 (8.80)	25 (10.00)	10 (4.00)	132 (52.80)	250 (100.00)
Total	160 (21.33)	89 (11.87)	83 (11.07)	23 (3.07)	395 (52.67)	750 (100.00)
Pearson Chi-square: 33.3170, df=8, p=.000054						

(Figures in brackets indicate percentage)

Table 33 shows that majority of the respondents are using Internet irregularly (52.67%) and it has not yet become the part of their habitual action. As per the p value there exists significant difference exist among the Universities in the mode of Internet use, as the percentage of those who are not using Internet is only 14 percent in IGNOU where it is 25.60 percent in BRAOU and 24.4 percent in KSOU. But the percentage of regular Internet users are low (11.87) in the all the sample Universities. The chi-square value indicates that there exists significant difference among the learners of different Open Universities in their mode of use of Internet resources. The gender wise analysis of the same is given in Table 34.

Table 34**Mode of Internet use – Gender wise**

Gender	No use	Regular	Once in a week	Once in a month	Irregular	Total
Male	72 (16.90)	48 (11.27)	43 (10.09)	17 (3.99)	246 (57.75)	426 (100.00)
Female	88 (27.16)	41 (12.65)	40 (12.35)	6 (1.85)	149 (45.99)	324 (100.00)
Total	160 (21.33)	89 (11.87)	83 (11.07)	23 (3.07)	395 (52.67)	750 (100.00)
Pearson Chi-square: 17.7973, df=4, p=.001355						

(Figures in brackets indicate percentage)

Table 34 shows the gender wise analysis of distance learners regarding their mode of Internet use. The analysis reveals that male students are more (83.1%) using the Internet resources than the female learners (72.84%). But the difference is not as high as it is commonly expected. It also shows that the percentage of regular Internet users are high (12.65%) in the case of female users than male learners (11.27%). The chi-square value indicates that there exists significant difference among male and female learners in their mode of use of Internet resources. Analysis on the basis of level of education is given in Table 35.

Table 35
Mode of Internet use –level of education

Level	No use	Regular	Once in a week	Once in a month	Irregular	Total
UG	104 (26.33)	48 (12.15)	43 (10.89)	12 (3.04)	188 (47.59)	395 (100.00)
PG	56 (15.77)	41 (11.55)	40 (11.27)	11 (3.10)	207 (58.31)	355 (100.00)
Total	160 (21.33)	89 (11.87)	83 (11.07)	23 (3.07)	395 (52.67)	750 (100.00)
Pearson Chi-square: 13.9227, df=4, p=.007555						

(Figures in brackets indicate percentage)

Table 35 shows that the mode of use of Internet resources by PG students is high (84.23) when comparing with the UG students (74.3). But in the case of regular users we can find more Degree users (12.15%) than PG students (11.55%). It may be a clear hindrance about acceptance of technology among the youngsters. The chi-square value indicates that there exists significant difference between UG and PG learners in their mode of use of Internet resources. The subject wise analysis is done in Table 36.

Table 36
Mode of Internet use –subject wise

Subject	No use	Regular	Once in a week	Once in a month	Irregular	total
Science	14 (17.50)	32 (40.00)	4 (5.00)	0 (0.00)	30 (37.50)	80 (100.00)
Non-science	146 (21.79)	57 (8.51)	79 (11.79)	23 (3.43)	365 (54.48)	670 (100.00)
Total	160 (21.33)	89 (11.87)	83 (11.07)	23 (3.07)	395 (52.67)	750 (100.00)
Pearson Chi-square: 69.9823, df=4, p=.000000						

(Figures in brackets indicate percentage)

Table 36 shows that the mode of use of Internet resources by science students are high (82.5%) in comparison with the non-science students (78.21%). It is also notable that only 8.1 percent of non-science students are using Internet regularly where the percentage of science students are high (40%). It may be due to the reason that Internet may be more available to the science students than non-science students. The chi-square value indicates that there exists significant difference among science and non-science learners in their mode of use of Internet resources.

From the analysis by using different variables it is evident that majority of the respondents are using Internet resources irregularly.

5.3 Place of Internet access

Another important tool used for analyzing Information Technology awareness is their place of access of Internet resources. It is on the basis of the assumption that the learners having access to the Internet resources in their convenient location may tend to use it than others who have to travel miles to access it. University wise analysis of the place of Internet access is given in Table 37.

Table 37
Place of Internet access-University wise

University	No use	House	Café	Other	Total
IGNOU	34 (13.60)	27 (10.80)	159 (63.60)	30 (12.00)	250 (100.00)
BRAOU	63 (25.20)	33 (13.20)	124 (49.60)	30 (12.00)	250 (100.00)
KSOU	61 (24.40)	24 (9.60)	146 (58.40)	19 (7.60)	250 (100.00)
Total	158 (21.07)	84 (11.20)	429 (57.20)	79 (10.53)	750 (100.00)
Pearson Chi-square: 18.9029, df=6, p=.004338					

(Figures in brackets indicate percentage)

Table 37 shows that majority of the students of IGNOU (63.6%), BRAOU (49.6%) and KSOU (58.4%) are accessing Internet from outside café and only 10.8 percent of IGNOU students and 13.2 percent BRAOU students and 9.6 percent KSOU students are using it from their houses. It means that respondents having Internet connectivity at their home is less in the entire sample Open Universities. When 57.08 percent are depending outside cafés, only 11.2 percent students are accessing Internet from their houses. 10.5 percent of learners use it from various other locations. Significant difference is observed among the students of different Open Universities in their places of Internet access.

6. Information Technology application in distance education

Information and Communication Technology (ICT) is the biggest achievement in the evolution of mankind. ICT is any system design 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. ICT is a key phrase to indicate the dynamism that can be achieved with the convergence of computing and telecommunication. Information is researchers' lifeblood. ICT act as a catalyst for easy and speedy transfer of information and it is most essential tool for the modernization of distance education in the country.

6.1 Communication through Internet

Though the students are using Internet for their communication and entertainment purposes it may not indicate that the students are using it for their educational and learning purposes. On the other hand the students using Internet as and when required it may be using it exclusively for the educational purposes. So an attempt has been made by the investigator to study about the nature of communication among distance learners.

Table 38
Communication through Internet-University

University	No	With colleagues	With faculty	others	Total
IGNOU	31 (12.40)	33 (13.20)	12 (4.80)	174 (69.60)	250 (100)
BRAOU	59 (23.60)	10 (4)	5 (2)	176 (70.40)	250 (100)
KSOU	55 (22)	9 (3.60)	7 (2.80)	179 (71.60)	250 (100)
Total	145 (19.33)	52 (6.93)	24 (3.20)	529 (70.53)	750 (100)
Pearson Chi-square: 34.0807, df=6, p=.000007					

(Figures in brackets indicate percentage)

Table 38 shows that only 18 percent of IGNOU students and 6 percent of BRAOU students and 6.4 percent of KSOU students are using Internet for educational communication and for getting educational resources. 70.53 percent of learners are using it for non-educational purposes such as chatting, entertainment and other browsing facilities. It may be due to the reason that the Universities are not relying upon on-line resources and students are getting all their required information from their Universities. Only 3.2 percent of learners are communicating with their faculty members through Internet and a percentage of 6.93 only use Internet as a communication media among the students. The chi-square value indicates that there exists significant difference among the learners of various Open Universities in their use of Internet for communication purposes.

So it can be inferred that interpersonal communication among distance learners are less.

The gender wise analysis about communication through the Internet is given in Table 39.

Table 39**Communication through Internet-Gender wise**

Gender	No	With colleagues	With faculty	Others	Total
Male	69 (16.20)	29 (6.81)	14 (3.29)	314 (73.71)	426 (100)
Female	76 (23.46)	23 (7.10)	10 (3.09)	215 (66.36)	324 (100)
Total	145 (19.37)	52 (6.93)	24 (3.20)	529 (70.53)	750 (100)
Pearson Chi-square: 6.47202, df=3, p=.090795					

(Figures in brackets indicate percentage)

Table 39 shows that there is no significant difference among male and female learners in using Internet for educational communication among them, i.e. male (10.1%), female (11%). The chi-square value indicates that there exists significant difference among the male and female learners of various Open Universities in their use of Internet for communication purposes.

Analysis on the basis of level of education is done in Table 40.

Table 40**Communication through Internet-level of education**

Level	No	With Colleagues	With Faculty	Others	Total
UG	92 (23.29)	32 (8.1)	14 (3.54)	257 (65.06)	395 (100)
PG	53 (14.93)	20 (5.63)	10 (2.82)	272 (76.62)	355 (100)
Total	145 (19.33)	52 (6.93)	24 (3.2)	529 (70.53)	750 (100)
Pearson Chi-square: 12.2524, df=3, p=.006573					

(Figures in brackets indicate percentage)

Table 40 shows that UG students are more in number (11.64%) than PG students (8.45%) in using Internet as an educational communication media among them. This indicates that due to the development of technology Under Graduate students have more access with technology. The chi-square value indicates that there exists significant difference among the UG and PG learners of various Open Universities in their use of Internet for communication purposes.

Subject wise analysis of the same is given in Table 41.

Table 41
Communication through Internet-subject wise

Subject	No	With colleagues	With faculty	Others	Total
Science	13 (16.25)	12 (15)	2 (2.50)	53 (66.25)	80 (100)
Non-science	132 (19.7)	40 (5.97)	22 (3.28)	476 (71.04)	670 (100)
Total	145 (1.33)	52 (6.93)	24 (3.20)	529 (70.53)	750 (100)
Pearson Chi-square: 9.21514, df=3, p=.026577					

(Figures in brackets indicate percentage)

Table 41 shows that science students (11.5%) are using Internet as an educational communication media than non-science students (9.8%). It may be due to the reason that the major science students are drawn from the field of computer science at both UG level and PG level. The familiarity of computer science students with Internet is an undisputable matter. But the percentage of those who uses it for educational communication is very small. The chi-square value indicates that there exists significant difference among the science and non-science learners of various Open Universities in their use of Internet for communication purposes.

6.2 IT tools used for educational communication among distance learners

Information Technology is developing in a faster rate. New devices and tools are emerging and being applied in various fields of. Distance education is also not an exception to this phenomenon. Here some of the commonly used IT tools are listed and learners are asked to indicate their use of these tools for communication of ideas among them. University wise analysis of IT tools used for educational communication among distance learners is given in Table 42.

Table 42

**IT tools used for educational communication
among distance learners –University wise (In percentage)**

Item	IGNOU		BRAOU		KSOU		TOTAL		P value
	Yes	No	Yes	No	Yes	No	Yes	No	
E-mail	88	12	78	22	80.80	19.20	82.27	17.73	.010462
Chat	14	86	5.60	94.40	3.60	96.40	7.73	92.27	.000023
Bulletin board	5.60	94.40	4.40	95.60	4.00	96	4.67	95.33	.677324
News group	11.20	88.80	6.40	93.60	0.00	100	5.87	94.13	.000001
Telephone	91.20	8.80	82.40	17.60	91.20	8.80	88.27	11.73	.001970
Interactive video	5.20	94.80	2.40	97.60	3.60	96.40	3.73	96.27	.253443
Voice mail	4.00	96	2.40	97.60	1.60	98.40	2.63	97.33	.237333
Browsing	20	80	23.60	96.40	18.00	82	20.53	79.47	.291176
Cell phone	78	22	61.20	38.80	63.20	36.80	67.47	32.53	.000068

Table 42 shows that majority of the respondents from the entire sample Universities have marked Telephone, IGNOU (91.20%), BRAOU (82.40%) and KSOU (91.20%) as their major media used for communication. It shows that even in the technological age telephone has its own relevance.

E-mail is the second most popular tool for communication among learners (82.27%). E-mail communication has become the part of daily life in the world. The importance of this media in the field of distance education is evident from the percentage of users who use this technology. Cell phone is the third preference of the students (67.47%) followed by browsing (20.53%).

There is no significant difference among the learners of different Open Universities in the use of bulletin board, interactive video, voicemail and browsing as the p value is greater than .05. But in the case of e-mail, chatting, browsing, newsgroup and telephone, there exist significant difference among the learners of different Open Universities in using them, as the p value is less than .05. It may be due to the imbalances among Universities and among society in getting accessibility to the IT tools and techniques. Gender wise analysis of the same is given in Table 43.

Table 43

**IT tools used for educational communication
among distance learners - Gender wise (In percentage)**

Item	Male		Female		TOTAL		P value
	Yes	No	Yes	No	Yes	No	
E-mail	85.92	14.08	77.47	22.53	82.27	17.73	.002703
Chat	8.92	91.08	6.17	93.83	7.73	92.27	.162948
Browsing	69.72	30.28	64.51	35.49	67.47	32.53	.131251
Bulletin board	6.10	93.90	2.78	97.22	4.67	95.33	.032456
News group	7.75	92.25	3.40	96.60	5.87	94.13	.012012
Telephone	87.56	12.44	89.20	10.80	88.27	11.73	.489673
Interactive video	5.63	94.37	1.23	98.77	3.73	96.27	.001645
Voice mail	4.69	95.31	0.00	100	2.67	97.33	.000077
Cell phone	22.77	77.23	17.59	82.49	20.53	79.47	.082091

Gender wise analysis shows that in the case of voicemail, interactive video, news group, and e-mail, there exists significant difference among the male and female learners. But in the case of chat, browsing, and use of telephone and cell phone, the difference between male and female learners is very small.

This indicates that female learners are not in backward position in the case of use of Information Technology tools in the distance learning process as it is commonly expected. The general inference can be made from these is that the divide between male and female learners in the technological environment is very low. It is a clear indication that technological application will simplify the gender difference and give more opportunities to the female learners than in the conventional setup. Subject wise analysis of the same is given Table 44.

Table 44

**IT tools used for educational communication
among distance learners - Subject wise (In percentage)**

Item	Science		Non-science		TOTAL		P value
	Yes	No	Yes	No	Yes	No	
E-mail	85.0 0	15.0 0	81.9 4	18.06	82.2 7	17.7 3	.498277
Chat	11.2 5	88.7 5	7.31	92.69	7.73	92.2 7	.212831
Browsing	70.0 0	30.0 0	67.1 6	32.84	67.4 7	32.5 3	.608859
Bulletin board	5.00	95.0 0	4.63	95.37	4.67	95.3 3	.881119
News group	5.00	95.0 0	5.97	94.03	5.87	94.1 3	.727093
Telephone	85.0 0	15.0 0	88.6 6	11.34	88.2 7	1.73	.336770

Interactive video	5.00	95.0 0	3.58	96.42	3.73	96.2 7	.527204
Voice mail	1.25	98.7 5	2.84	97.16	2.67	97.3 3	.405342
Cell phone	21.2 5	78.7 5	20.4 5	79.55	20.5 3	79.4 7	.866668

Subject wise analysis indicates that there is no significant difference among the science or non-science students in the use of IT tools for the educational communication. The p value indicates that in the case of even a single media there is no difference among the students on the basis of the subject of study. It gives a clear indication to the authorities of Open Universities to use the Information Technology related tools and services not only in the case of science subjects but in the case of non-science subjects also. Analysis on the basis of level of education is given in Table 45.

Table 45

**IT tools used for educational communication
among distance learners - Level of education (In percentage)**

Item	UG		PG		TOTAL		P value
	Yes	No	Yes	No	Yes	No	
E-mail	79.4 9	20.5 1	85.3 5	14.65	82.2 7	17.7 3	.035976
Chat	8.10	91.9 0	7.32	92.68	7.93	92.2 7	.690704
Browsing	66.3 3	33.6 7	68.7 3	31.27	67.4 7	32.5 3	.483047
Bulletin board	2.53	97.4 7	7.04	92.96	4.67	95.3 3	.003457
News group	3.54	96.4 6	8.45	91.55	5.87	94.1 3	.004309
Telephone	87.5	12.4	89.0	10.99	88.2	11.7	.546528

	9	1	1		7	3	
Interactive video	2.03	97.9 7	5.63	94.37	3.73	96.2 7	.009254
Voice mail	0.76	99.2 4	4.79	95.21	2.67	97.3 1	.000628
Cell phone	22.0 3	77.9 7	18.8 7	81.13	20.5 3	79.4 7	.285988

Analysis on the basis of level of education indicates that in the case of the use of chat, browsing, use of telephone and cell phone the difference between undergraduate and postgraduate students is very small. But in the case of use of other media such as e-mail bulletin board, news group, interactive video and voice mail, the significant difference among the UG and PG students in the field of distance education in the country can be seen.

It indicates that in the case of modern generation the IT literacy and knowledge is more in the case of younger generation than elder generation. But generally it can be stated that the difference between the students on both these levels is very small.

6.3 Opinion of learners about potentiality of Information Technology

Learners' opinion and attitudes are important in accepting and rejecting a Technology. So they were asked to indicate their opinion about the potentiality of IT in the field of distance education. Their responses are summarized in Table 46.

Table 46

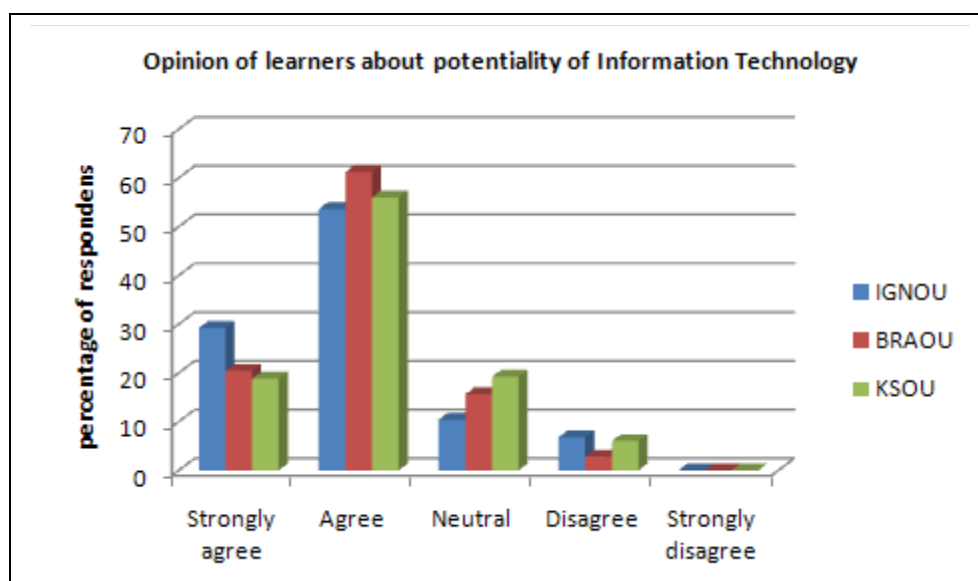
Opinion of learners about potentiality of Information Technology

University	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
IGNOU	73	134	26	17	0	250

	(29.2)	(53.6)	(10.4)	(6.8)	(0.0)	(100)
BRAOU	51 (20.4)	153 (61.2)	39 (15.6)	7 (2.8)	0 (0.0)	250 (100)
KSOU	47 (18.8)	140 (56)	48 (19.2)	15 (6)	0 (0.0)	250 (100)
Total	171 (22.8)	427 (56.98)	113 (15.06)	39 (5.2)	0 (0.0)	750 (100)

(Figures in brackets indicate percentage)

The Table 46 reveals that majority of the respondents of all the Universities either strongly agrees (22.8%) or agrees (56.98%) the potentiality of IT in the field of distance education. The percentage of learners who disagree with this fact is very small (5.2%), and there is no one who strongly disagrees with this. Opinion of learners about potentiality of Information Technology in the field of distance education is represented in Figure 4.

Figure 4

6.4 Opinion of learners about the sufficiency of present IT tools.

An enquiry has been done by the investigator whether the present level of IT application is sufficient in the field of distance education or not. Nowadays it is seen that IT is used as a supplementary tool in the field of distance education. So this is to understand whether the distance learners require a sudden change in the system. Their responses are given in Table 47.

Table 47

Opinion of learners about the sufficiency of present IT tools

University	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	TOTAL
IGNOU	12 (4.8)	25 (10)	6 (2.4)	122 (48.8)	85 (34)	250 (100)
BRAOU	8 (3.28)	32 (12.8)	12 (4.2)	102 (40.8)	96 (38.4)	250 (100)
KSOU	5 (2.0)	36 (14.4)	15 (6)	69 (27.6)	125 (50)	250 (100)
Total	25 (3.33)	93 (12.4)	33 (4.4)	293 (39.04)	306 (40.8)	750 (100)

(Figures in brackets indicate percentage)

Table 47 shows that about 80 percent of the respondents of the Open Universities either disagree or strongly disagree about the sufficiency of the present level of IT application in the field of distance education. IGNOU has started various technology based teaching techniques such as online classes, radio talks, television talks and interactive video conferencing for some of its courses. Though the students are not utilizing them effectively, they have a positive attitude towards these technologies and they are not using them because of the availability of Self Instructional Materials with them. There is no significant difference among the learners of various Open Universities in this regard.

6.5 Multi-Media instruction Services

Being an innovative system, distance education has always been receptive of all teaching methods and media use. The earlier exponents of the system laid great emphasis on printed instructional course materials. Over time, the concept of two-way communication was inducted into the system to make it more effective. The tremendous development of communication technology in recent years has provided a wide choice to distance educators to integrate new media into the distance education teaching-learning process.

6.5.1 Availability of different media at the disposal of respondents

Education through the open and distance mode of learning is possible at different levels and through a variety of media. The format and the model chosen will be dictated by a wide spectrum of factors that include availability of resources, population spread and the accessibility of the chosen media to the student population. Percentage of learners having different communication media at their homes is given in Table 48.

Table 48
Percentage of Respondents having different communication media at home (In percentage)

Media	IGNOU	BRAOU	KSOU	TOTAL
Radio	97.6	96.0	98.0	97.2
Television	72.0	85.3	94.7	84
ACR	54.4	50.7	60.0	55.03
ACP	74.4	60.0	76.7	70.36
VCD	12.8	11.3	18.0	14.03
Telephone	59.6	67.3	78.7	67.63
Computer	28.0	35.3	38.0	33.76
Internet	8.4	8.0	7.3	7.9

Table 48 reveals that accessibility to radio is universal. 97.2 percent of learners have radio in their convenient places of access. Television is also found to be accessible to more than four-fifths of them. The audiocassette recorder (ACR) and Audio Cassette Player (ACP) are also available to the majority. VCP, computer, and Internet facilities have made their entry into their homes, but the proportions are small.

6.5.2 Multimedia instruction system in Open Universities

Most of the Open Universities in the country nowadays follow the multimedia instructional system. In the earlier periods the only media used was the correspondence of study materials supplemented by contact classes. Recently most of the Open Universities are providing radio talks, TV talks, interactive radio and interactive video programs for their learners.

In order to find out the application level of Information Technology the use of multimedia by distance learners should be studied. Table 49 gives a

clear picture about how multimedia instruction system is being used by the students of Open Universities in India.

Table 49
Use of multimedia instruction system in Open Universities (In percentage)

Item	IGNOU		BRAOU		KSOU		TOTAL		P value
	Yes	No	Yes	No	Yes	No	Yes	No	
Correspondence	98.80	1.20	100	0	100	0	99.60	0.40	.049205
Contact classes	78	22	93.20	6.80	89.20	10.80	86.80	13.20	.000001
Radio talks / Gyan Vani	17.60	82.40	6.80	93.20	2	98	8.80	91.20	.000000
TV talks / Gyan Darshan	17.20	82.80	4	96	1.60	98.40	7.60	92.40	.000000
Teleconferencing	20.80	79.20	0	100	0	100	6.93	93.07	.000000
Interactive radio	9.60	90.40	8	92	4	96	7.20	92.80	.044480
Interactive video	5.60	94.40	2.80	97.20	2.80	97.20	0	100	.000747
Others	4	96	1.60	98.40	1.60	98.40	2.40	97.60	.128857

Table 49 reveals that correspondence and use of study material is the major media used by the learners. Even in IGNOU (98.80%) students use correspondence of study material in learning process.

All the respondents from BRAOU and KSOU depend on study materials provided by their University. P value indicates that there exists significant difference among the learners of different Open Universities in using multimedia instruction system in their learning.

When 78 percent of IGNOU students attend contact classes, the percent of learners from other Open Universities, BRAOU (89.20%), KSOU (80.8%) are comparatively high. P value shows the significant difference among the students of Open Universities in this regard. The actual picture about the attendance in the contact classes is less than this amount. The high percentage in the contact class may be with the reason that the investigator could only collect data from those who attend the contact and counseling sessions.

Regarding the use of radio talks or Gyan Vani 17.6 percent of IGNOU students are using the program. The percentage of BRAOU (6.8%) and KSOU (2%) students are low. But it is notable that majority of the courses conducted in the Open Universities does not have Gyan Vani classes and it also indicates that the students of BRAOU and KSOU are also utilizing IGNOU programs like Gyan Darshan and Gyan Vani. That may be the reason for using of radio talks by the students of other Universities, where their University does not provide radio talks in their concerned subject.

TV talks are one of the major media applied by IGNOU in the field of higher education. But surprisingly enough the percentage of IGNOU students who use Gyan Darshan channel in their learning is not high (17.2%) as it is commonly expected. The p value indicates that there exists significant difference among the learners of various Open Universities in using Gyan Darshan as a media of communication. Some of the students of BRAOU (4%) and KSOU (1.6%) are also utilize the TV talks conducted by IGNOU.

Radio phone-in programs are being applied in the field of distance education. This facility is used by 9.6 percent of IGNOU students, 8 percent BRAOU students and 4 percent KSOU students. Difference between various Universities in this regard is very low.

Interactive video programs are conducted by IGNOU only. 20.8 percent of students are making use of this facility. No students either from BRAOU or from KSOU use this facility in their learning process. Among the various media interactive video conferencing is the major media used by IGNOU students after the correspondence and contact classes. It indicates the importance of this media and there is urgent need for other Universities also to adopt this media in their teaching program.

Telephone conferencing with various experts is another media applied in the field of distance education. Teleconferencing sessions are interesting and it is a new method of emerging communication. This facility is used by 5.6 percent IGNOU students, 2.8 percent of BRAOU students. It is to be noted that no students from KSOU use this facility as a media in education.

P value indicates that there exists significant difference among the students of various Universities in using teleconferencing as a media of education. Overall analysis indicate that though the Universities possess the best infra structure facilities and resources, all fail failed to utilize them for improving its services to the society at large. All the systems planned initially in the Universities are plagued with inefficiency, in the absence of accountability. In the absence of proper monitoring mechanisms delivery of student support services and utilization of Information Technology applications have become dysfunctional resulting in total anarchism in the system.

The gender wise analysis of the use of multi media instruction system is given in Table 50.

Table 50
Use of multimedia instruction system in
Open Universities -Gender wise - (In percentage)

Item	Male		Female		TOTAL		P value
	Yes	No	Yes	No	Yes	No	
Correspondence	99.53	0.47	99.69	0.31	99.60	0.40	.729579
Contact classes	85.45	14.55	88.58	11.42	86.80	13.20	.209081
Radio talks/ Gyan Vani	10.80	89.20	6.17	93.83	8.80	91.20	.026777
TV talks / Gyan Darshan	8.69	91.31	6.17	93.83	7.60	92.40	.198362
Teleconferencing	5.87	94.13	8.33	91.47	6.93	93.07	.188079
Interactive radio	7.75	92.25	6.48	93.52	7.20	92.80	.506766
Interactive video	3.99	96.01	1.23	98.77	2.80	97.20	.023439
Others	2.58	97.42	2.16	97.84	2.40	97.60	.708591

Gender wise analysis shows that the difference between male and female learners is very small in the case of Open Universities in the country. More than 99 percent of the male and female learners are depending on correspondence as the major media of learning. More than 85 percent of the both male and female learners are attending contact classes. More male learners are using the programs like Gyan Darshan and Gyan Vani in comparison to the female learners. But in the case of teleconferencing more female learners are more interested than male learners. Interactive radio and video are used by more male learners than female learners. But the difference

between male and female learners is very small and the p value also indicates that there is no significant difference among the male and female learners in using multimedia instruction system in Open Universities in the country. Subject wise analysis of the same is given in Table 51.

Table 51

**Use of multimedia instruction system in
Open Universities-Subject wise - (In percentage)**

Item	Science		Non-science		Total		P value
	Yes	No	Yes	No	Yes	No	
Correspondence	100.00	0.00	99.55	0.45	99.60	0.40	.548706
Contact classes	83.75	16.25	87.16	12.84	86.80	13.20	.393838
Radio talks/ Gyan Vani	16.25	83.75	7.91	92.09	8.80	91.20	.012830
TV talks / Gyan Darshan	6.25	93.75	7.76	92.24	7.60	92.40	.629744
Teleconferencing	13.75	86.25	6.12	93.88	6.93	93.07	.011107
Interactive radio	7.50	92.50	7.16	92.84	7.20	92.80	.912545
Interactive video	1.25	98.75	2.99	97.01	2.80	97.20	.373948
Others	2.50	97.50	2.39	97.61	2.40	97.60	.950698

Analysis on the basis of subject of study indicates that correspondence and contact classes are the major media used by both science and non-science students in their learning process. Radio talks are more used by science students (16.25%) than non-science students (7.91%). In the case of using

television in the learning there is no significant difference among science (6.25%) and non-science students (7.76%). But there exist significant difference among science (13.75%) and non-science students (6.12%) regarding the use of teleconferencing as a media of learning. In the case of interactive radio and video the difference between science and non-science students are very low. The overall analysis shows that the difference between science and non-science students regarding the use of various media in their learning process is very low in Open Universities in the country.

This may be a clear indication for the authorities in the field of distance education to introduce various types of media not only in computer related subjects but in humanities also. Analysis on the basis of level of education is done in Table 52.

Table 52
Use of multimedia instruction system in
Open Universities-Level of education-(In percentage)

Item	UG		PG		TOTAL		P value
	Yes	No	Yes	No	Yes	No	
Correspondence	100.00	0.00	99.15	0.85	99.60	0.40	.067156
Contact classes	86.58	13.42	87.04	12.96	86.80	13.20	.852595
Radio talks/ Gyan Vani	7.09	92.91	10.70	89.30	8.80	91.20	.080973
TV talks / Gyan Darshan	4.81	95.19	10.70	89.30	7.60	92.40	.002358
Teleconferencing	8.61	91.39	5.07	94.93	6.93	93.07	.056917
Interactive radio	5.32	94.68	9.30	90.70	7.20	92.80	.035300
Interactive video	0.25	99.75	5.63	94.37	2.80	97.20	.000008
Others	2.78	97.22	1.97	98.03	2.40	97.60	.467645

Table 52 shows that there exists significant difference among undergraduate and postgraduate students in the field of distance learning regarding the use of Gyan Darshan, interactive radio and interactive video. In using various other media like correspondence, contact classes, and teleconferencing the difference between UG and PG students are very nominal. In the case of media where the significant difference exists, the PG students outnumber the UG students.

This may be due to the reason that PG students are more familiar with the media than UG students. In addition Universities are applying more IT related programs in the PG level than in UG level. The major difference can be seen in the case of interactive video where only 0.25 percent of UG students are using this facility.

6.6 Advantage of Information Technology tools over correspondence methods

Learners' opinion regarding the advantage of IT over correspondence method is an effort to understand whether they are willing to change into technology driven learning system or not. The result is inspiring those who plan educational policies. Their opinions are summarized in Table 53.

Table 53

Opinion of learners about the advantage of Information Technology tools over correspondence methods

University	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
IGNOU	113 (45.2)	75 (30)	12 (4.8)	42 (16.8)	8 (3.2)	250 (100)
BRAOU	175 (70)	31 (12.4)	22 (8.8)	12 (4.8)	10 (4)	250 (100)
KSOU	136	30	24	42	18	250

	(54.4)	(12)	(9.6)	(16.8)	(7.2)	(100)
Total	424 (56.53)	136 (18.13)	58 (7.73)	96 (12.8)	36 (4.8)	750 (100)

(Figures in brackets indicate percentage)

Table 53 shows that majority of the respondents; IGNOU (75.2%), BRAOU (82.4%) and KSOU (66.8%) are on the opinion that the IT based education has advantage over correspondence education.

In a nutshell 74.66 percent of respondents agree the fact that IT based education have advantage over correspondence education. It can also be stated that learners' attitude towards the application of Information Technology is positive and the society is ready to change and adopt new technological advances applied in the field of distance education.

6.7 Use of electronic information for the learning

Information Technology is a technology used for handling, processing and disseminating of information, where the information is in digital format. The use of electronic resources in the learning process indicates the level of IT application in the field of distance education. So an investigation has been conducted by the investigator to understand, what are the digital/ electronic information tools used by the distance learners in the country. Here some of the commonly used electronic information sources are identified and the responses of the learners are tabulated in Table 54.

Table 54

Use of electronic information for the learning-(In percentage)

Item	IGNOU		BRAOU		KSOU		TOTAL		P value
	Yes	No	Yes	No	Yes	No	Yes	No	
Audio	8	92	6.40	93.6	2.4	97.6	5.60	94.4	.019562

cassettes				0	0	0		0	
Video cassettes	2.80	97.20	2.80	97.20	4.80	95.20	3.47	96.5	.369340
CD ROM	61.20	38.80	48.40	51.60	38	62	49.20	50.80	.000000
Data bases	6	94	4	96	3.20	96.80	4.40	95.60	.290496
Network based services	12.80	87.20	9.20	90.80	8.40	91.60	10.13	89.87	.221350

The importance of audiocassettes are decreasing day by day. Its relevance as a storage media is also decreasing. It is reflected in the users' opinion also. Only 8 percent of IGNOU students, 6.4 percent of BRAOU students and 2.4 percent of KSOU students use audiocassettes in their learning programs. Videocassettes have become technologically side tracked by the CD ROMs, which is used by only 2.8 percent of each of IGNOU and BRAOU students and 4.8 percent of KSOU students.

CD ROM technologies such as Audio CD, Video CD and DVD technologies have come to the front of digital information sources. It is used by 61.20 percent of IGNOU students, 28.4 percent BRAOU students and 38 percent KSOU students. It clearly shows that major storage media used by distance learners are CD ROM technology.

Databases also are used by distance learners in their educational purposes. 6 percent of IGNOU students, 4 percent of BRAOU students and 3.2 percent of KSOU students use this facility in their electronic information storage and retrieval purposes.

Network based information services are also important in the digital information dissemination. The responses of learners indicate that 12.8

Audio cassettes	6.57	93.4 3	4.32	95.68	5.60	94.4 0	.183991
Video cassettes	2.58	97.4 2	4.63	95.37	3.47	96.5 3	.128938
CD ROM	51.9 2	48.0 8	45.6 2	54.38	49.2 0	50.8 0	.059855
Data bases	4.69	95.3 1	4.01	95.99	4.40	95.5 0	.651685
Network based services	10.8 0	89.2 0	9.26	90.74	10.1 3	89.8 7	.489077

Table 55 shows that audio cassettes are used by 6.57 of male learners and 4.32 percent of female learners. Videocassettes are used only by 2.58 percent of male and 4.63 percent of female learners. The percentage of male and female learners who use databases and network based services are very low. Majority of the male (51.92%) and female (45.62%) use CD ROM as their electronic media of information storage and retrieval in the learning process. Table clearly indicates that there is no significant difference among the male and female learners with regard to the use of various electronic information media in their learning process. The subject wise analysis of the same is given Table 56.

Table 56

**Use of electronic information for
the learning-Subject wise-(In percentage)**

Item	Science		Non-science		TOTAL		P value
	Yes	No	Yes	No	Yes	No	
Audio cassettes	7.50	92.5 0	5.37	94.63	5.60	94.4 0	.434215
Video cassettes	5.00	95.0 0	3.28	96.72	3.47	96.5 3	.427670
CD ROM	51.2 5	48.7 5	48.9 6	51.04	49.2 0	50.8 0	.669628

Data bases	5.00	95.0 0	4.33	95.67	4.40	95.6 0	.781902
Network based services	12.5 0	87.5 0	9.85	90.15	10.1 3	89.8 7	.457993

Table 56 reveals that only a small percentage of science (7.5%) and non-science (5.37%) students are using audiocassettes. Videocassettes are used by 5 percent of science students and 3.28 percent of non-science students. Majority of the science (51.25%) and non-science (48.96%) use CD ROM technology for the information handling purposes. Databases are used by 5 percent of science students and 4.33 percent of non-science students. Due to the importance of network technology in the modern world it is used by 12.5 percent of science students and 9.85 percent of non-science students. There is no significant difference among the science and non-science students in the use of various electronic information sources in their learning process. Analysis of the same on the basis of level of education is discussed in Table 57.

Table 57
Use of electronic information for
the learning-Level of education-(In percentage)

Item	UG		PG		TOTAL		P value
	Yes	No	Yes	No	Yes	No	
Audio cassettes	6.08	93.9 2	5.07	94.9 3	5.60	94.4 0	.549849
Video cassettes	2.53	97.4 7	4.51	95.4 9	3.47	96.5 3	.139812
CD ROM	46.5 8	53.4 2	52.1 1	47.8 9	49.2 0	50.8 0	.096293
Data bases	3.80	96.2 0	5.07	94.9 3	4.40	95.6 0	.396071
Network based services	10.1 3	89.8 7	10.1 4	89.8 6	10.1 3	89.8 7	.994844

Table 57 shows that when 6 percent UG students prefer audiocassettes 5 percent PG learners use audiocassettes. The significance of videocassettes is very low in both sample learners, UG (2.53%) and PG (4.51%). CD ROM is used by 46.58 percent of UG students and 52.11 percent of PG students. Databases are used by 3.8 percent of UG students and 5.07 percent of PG students. Use of network-based services are comparatively high in the case of both UG (10.13%) and PG (10.14%) students. The p value indicates that there is no significant difference among under graduate and postgraduate students in the case of the use of various electronic information media in learning process.

6.8 Use of digital information sources

Digital information resources have immense potentialities. It can be used for various purposes by the learners. The purpose for which they use these resources are ranked and summarized in Table 58.

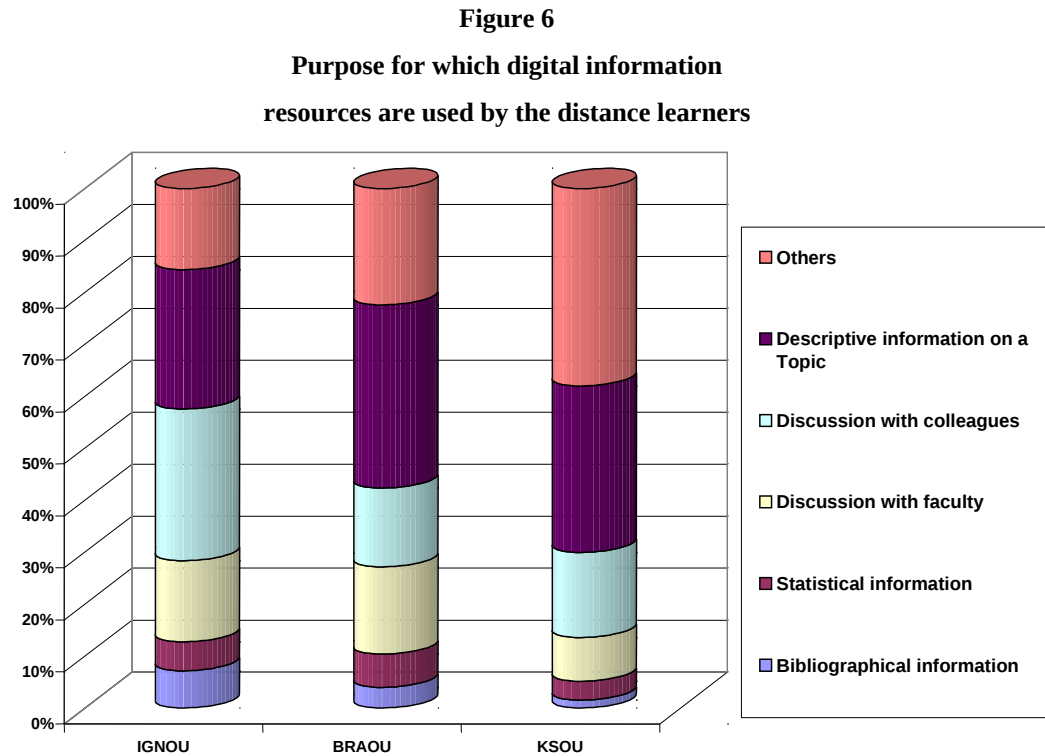
Table 58
Purposes for which digital information resources are used by the distance learners

Purposes	IGNOU	BRAOU	KSOU	TOTAL
Bibliographical information	18 (7.2)	10 (4)	4 (1.6)	32 (4.26)
Statistical information	14 (5.6)	16 (6.4)	9 (3.6)	39 (5.2)
Discussion with faculty	39 (15.6)	42 (16.8)	21 (8.4)	102 (13.6)
Discussion with colleagues	73 (29.2)	38 (15.2)	41 (16.4)	152 (20.26)
Descriptive information on a topic	67 (26.8)	88 (35.2)	80 (32)	235 (31.33)
Others	39 (15.6)	56 (22.4)	95 (38)	190 (25.33)
Total	250 (100)	250 (100)	250 (100)	750 (100)

(Figures in brackets indicate percentage)

Table 58 shows that majority of the respondents (31.33%) are using the digital information sources for getting descriptive information on a topic. It may be due to the development in the field of Internet and related technologies. But the preferences of various Universities have great difference while considering each Open University separately. Majority of IGNOU students use digital information sources for discussion with colleagues (29.2%). Majority of the BRAOU students use it for descriptive information on a topic (35.2%) and majority (38%) of KSOU students have marked no

preference for using digital information sources. Figure 6 shows the purposes for which digital information sources are used by the distance learners.



6.9 Impediments before IT application

Investigator conducted an enquiry about what are the present impediments before applying IT to the fullest extent, from the learners. Their ideas are expressed in Table 59.

Table 59**Opinion of DL about impediments before IT application-(In percentage)**

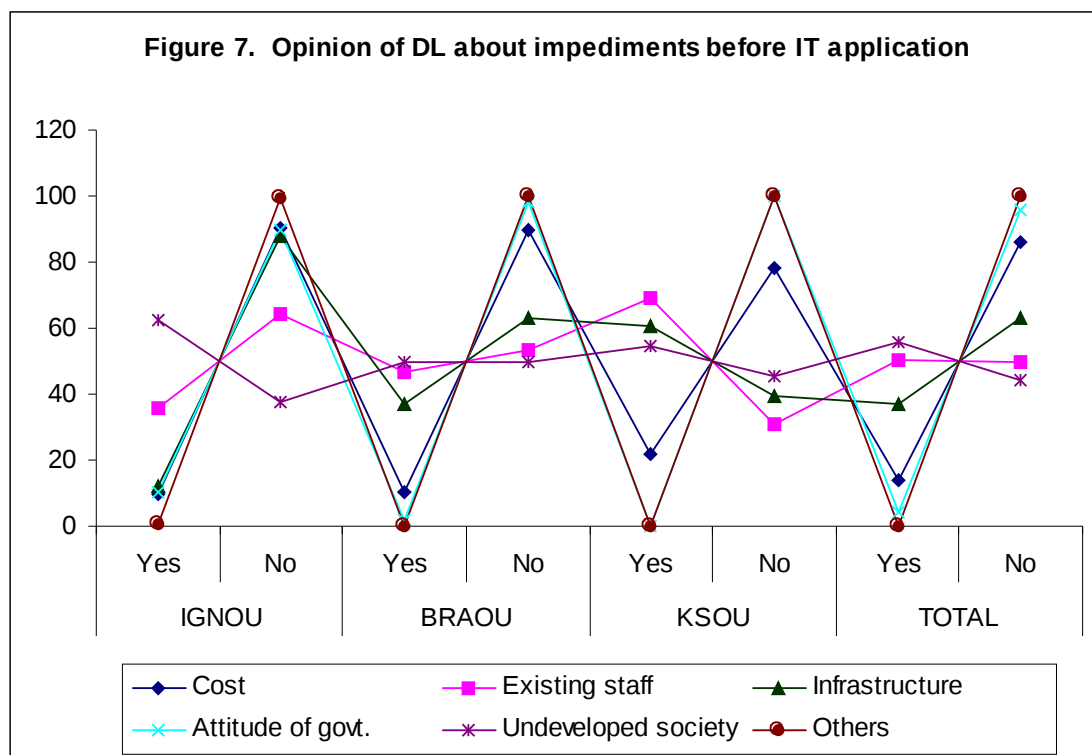
Item	IGNOU		BRAOU		KSOU		TOTAL		P value
	Yes	No	Yes	No	Yes	No	Yes	No	
Cost	9.60	90.40	10.40	89.60	21.60	78.40	13.87	86.13	.000081
Existing staff	35.60	64.40	46.80	53.20	69.20	30.80	50.53	49.47	.000000
Infrastructure	12	88	37.20	62.80	60.80	39.20	36.67	63.33	.000000
Attitude of govt.	10.40	89.60	1.60	98.40	0.00	100	4	96	.000000
Undeveloped society	62.40	37.60	50	50	54.40	45.60	55.60	44.40	.018284
Others	0.80	99.20	0.00	100	0.00	100	0.27	99.73	.134630

Table 59 shows that majority of the students from IGNOU, (62.40%) feel that the society is not so developed into such an extent that IT based tools and resources are only sufficient in the field of distance education. As per the opinion of BRAOU (46.80%) and KSOU (69.20%) students cost is the major factor in utilizing the potentialities of IT to the fullest extent.

Only a small percentage of students marked the existing staff and lack of support from the part of government as a factor in utilizing applying the Information Technology tools in the field of distance education.

P value indicates that though the majority of the students are on the opinion that the society should be developed to adopt latest developments in the field of Information Technology; there exist significant difference among the learners of various Open Universities in their opinion regarding the impediments before IT application. It may be due to the varying level of

services provided various Open Universities in the country. Opinion of learners about impediments before IT application is represented in Figure 7.



6.10 Extent of IT application

To what extent IT application should be done is a major area of importance in the study. Whether it is to be used as a supplementary tool to the existing infrastructure -as it is done in the present situation- or to be used to the fullest extent, as its potential can be fully utilized. Their responses regarding this question are summarized in the Table 60.

Table 60
Opinion about extent of IT application

Extent	IGNOU		BRAOU		KSOU		Total	
	No.	%	No.	%	No.	%	No.	%
Fully	201	80.4	189	75.6	179	71.6	569	75.87
Never be used	0	0.00	0	0.00	0	0.00	0	0.00
Used as supplementary	49	19.6	61	24.4	71	28.4	181	24.13

Total	250	100	250	100	250	100	750	(100)

(No= Number, %= Percentage)

Table 60 clearly indicates that majority of the respondents from all the sample Open Universities, i.e. IGNOU (80.4%), BRAOU (75.6%) and KSOU (71.6%) are on the opinion that the potential of IT should be fully utilized. When 24.13 percent students are on the opinion that IT should be used as supplementary to the distance education, nobody denies the potential of Information Technology in the field of distance education.

6.11 Major concerns in computer mediated distance education

The importance of computer in the field of Information Technology is evident. IT is not possible and practical in the absence of computer technology. In the computer based teaching and learning the preferences in the classroom may be shifted from lecture method to self-study methods. So here an attempt has been made to identify what are the major concerns in the computer mediated distance education. The responses of learners are summarized in Table 61.

Table 61

Major concerns in computer mediated distance education

Major concerns	IGNOU		BRAOU		KSOU		Total	
	No	%	No	%	No	%	No	%
Campus resources	4	4.34	2	5.26	0	0	6	3.89
Computer training	18	19.56	12	31.57	10	41.66	30	19.48
Computerization cost	0	0	0	0	0	0	0	0.00
Teacher computer competency	5	5.43	2	5.26	2	8.33	9	5.84
Student computer competency	35	38.04	14	36.84	8	33.33	57	37.01
Support group	14	15.21	2	5.26	4	16.66	20	12.98

Group interaction	16	17.39	6	15.78	0	0	22	14.29
Total	92	100	38	100	24	100	154	100

(No= Number, %= Percentage)

Table 61 shows that the majority of the respondents (37.01%) have the opinion that student computer competency is the major concerns in the computer mediated distance education. This is true because the beneficiaries of the system should be well familiar with the computer technology to use it. Computer training is another factor pointed out by 19.48 percent of learners, followed by group interaction (14.29%), followed by Support group (12.98%). The teacher computer competency has got least preference, because in the computer based distance learning situation the role of teachers is comparatively small and their computer competency is undisputable.

6.12 Reasons for not using the Information Technology tools

It is evident from the above discussion that many Universities are applying the technological tools in teaching and learning in the field of distance education such as radio lessons, television classes, video conferencing techniques etc. the percentage of students who use these facilities are very low.

A question was asked to the respondents about the reasons for not utilizing IT tools in the distance learning process. Because it will be useful for the policy makers and educational experts in the design of online classes and e-learning courses. The responses of learners are given in Table 62.

Table 62
Reasons for not using the Information Technology tools

Reasons	IGNOU		BRAOU		KSOU		TOTAL	
	No	%	No	%	No	%	No	%
Lack of time	19	7.6	10	4	12	4.8	41	5.46
Lack of suitable programs	13	5.2	119	47.6	135	54	267	35.6
Inadequacy of time	50	20	21	8.4	18	7.2	89	11.86
Due to personal problems	37	14.8	12	4.8	21	8.4	70	9.33
Lack of quality and standards	5	2	17	6.8	2	.8	24	3.2
Unfamiliarity with programs	80	32	60	24	55	22	195	26
Distance to the study centre	46	18.4	11	4.4	7	2.8	64	8.53
TOTAL	250	100	250	100	250	100	750	100

(No= Number, %= Percentage)

Table 62 shows that 35.6 percent of users are not using IT tools due to the lack of suitable program to them. It may be due to the reason that tele-learning facilities and IT tools are more applied in subjects such computer science and related subjects. Subjects like humanities and social science are neglected in the case of applying latest developments in the field of Information Technology. 26 percent of the total respondents are unfamiliar with IT used programs. IGNOU provides wide variety of e-learning programs. Majority of the students from IGNOU (32%) are not using the e-learning programs due to their unfamiliarity with the programs. So the Universities like IGNOU should take more attention in familiarizing and making online programs user friendly.

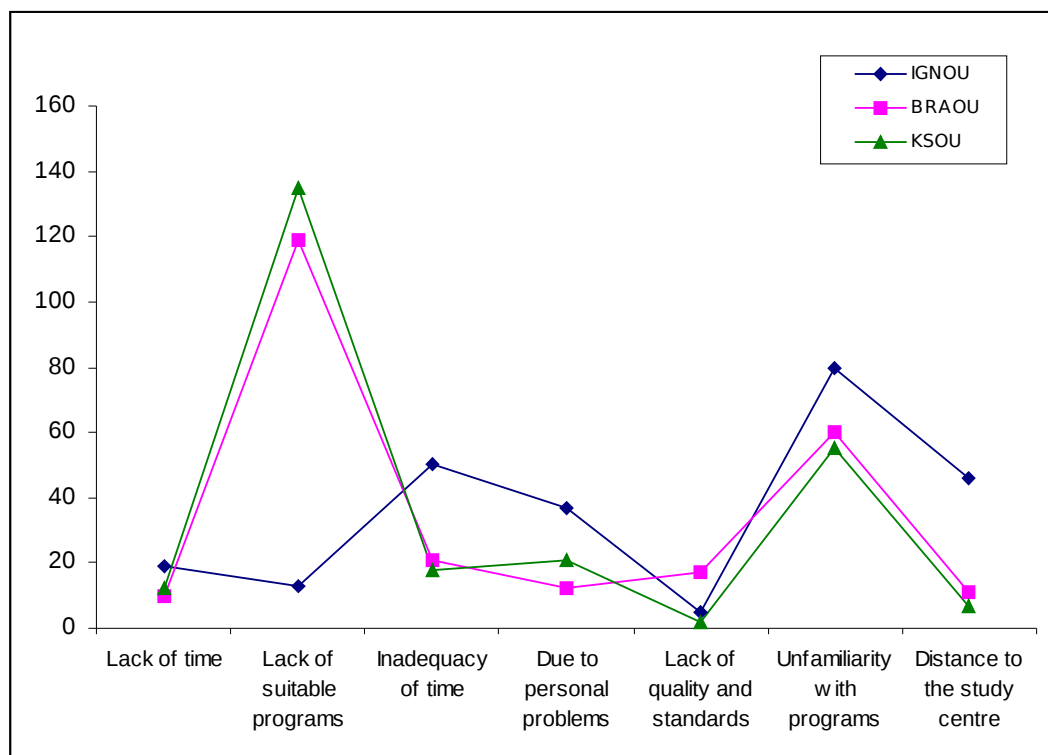
Table also shows that there exists significant difference among the students of various Open Universities in their reasons for not using IT tools. Though all the Open Universities are providing wide variety of programs in the distance teaching process, most of the students still follow the conventional learning system. It also indicates that our educational system

follows the age-old techniques of ‘Guru Kula’ even in the age of IT development.

Majority of the students from BRAOU (47.6%) and KSOU (54%) are pointed the ‘lack of suitable programs’ as the major reason for not using IT tools. Though BRAOU follows the same pattern of IGNOU in teaching and learning, responses of students indicate that the University should strive forward for its better performance.

Lack of quality and standards are marked by very few students (3.2%). It indicates that the students who use these facilities feel that the programs provided by Open Universities are standard. Reasons cited by the distance learners for not using IT tools is represented in Figure 8.

Figure 8
Reasons for not using the Information Technology tools



6.13 Media availability at study centres

Regarding availability of various media at the study centres, majority of the students reported the availability of telephone and computer at the majority of the study centres. Their responses are summarized in Table 63.

Table 63

Media availability at study centres - (In percentage)

Item	IGNOU	BRAOU	KSOU	Total
Computer	80.8	61.6	48.8	63.73
Gyan Darshan	56.4	11.2	0.00	22.53
Gyan Vani	7.6	0.00	0.00	2.53
Cable TV	10	4.8	3.2	6.00
Audio cassettes	21.6	16.4	4.8	14.26
Video cassettes	10.4	7.2	8.4	8.66
CD ROM	34	29.6	27.6	30.4
Fax	4.8	0.00	0.00	1.6
Internet	19.2	6.00	4.00	9.73
Telephone	100	100	100	100
Tele conferencing	11.6	4.8	0.00	5.46

Gyan Darshan facility is pointed out by 56.4 percent of IGNOU students and 11.2 percent of BRAOU students. It shows that Gyan Darshan programs are also utilized and facilitated by BRAOU students. It also shows that even in some of IGNOU study centres facilities for Gyan Darshan and Gyan Vani programs are not there. KSOU is a bit back or it has not reached up to the level of other sample Open Universities. Teleconferencing facilities are only provided in some of the study centres of IGNOU and BRAOU. The significant difference among various Open Universities in making various media available at their study centres / regional centres and the high

imbalance in the country regarding the use and availability of various media is evident from the table itself.

It is evident from Table 63 that out of various media available in study centres telephone was available at all the head offices (100%), followed by computer (63.73%), CD ROM (30.4%), Gyan Darshan (22.53%), Audio cassettes (14.26%) etc. Availability of Internet at various study centres was reported by 8.66 percent learners, while this figure for videocassettes was only 8.6 percent. The percentage of learners reporting the availability of remaining media ranged from 1.6 percent (fax) to 6 percent (cable TV). Availability of different media at study centres is represented in Figure 9.

Figure 9
Media availability at study centers

6.14 Responses of learners to technology based learning system

The data pertaining to responses of learners to technology-based teaching learning system are cumulated and presented in the Table 64.

Table 64

Responses of learners to technology mediated learning

Sl. No	Media Instruction	Aware of programs	Watching/ listening	Useful / Interesting
1	Teleconferencing	604 (80.5)	230 (30.66)	109 (14.53)
2	Television	549 (73.2)	196 (26.13)	69 (9.2)
3	Video lessons	626 (83.46)	97 (12.93)	58 (7.73)
4	Audio lessons	599 (79.86)	64 (8.53)	32 (4.26)
5	Radio lessons	656 (87.46)	202 (26.93)	141 (18.8)
6	Interactive Radio	389 (51.86)	70 (9.33)	52 (6.93)

(Figures in bracket indicate percentage)

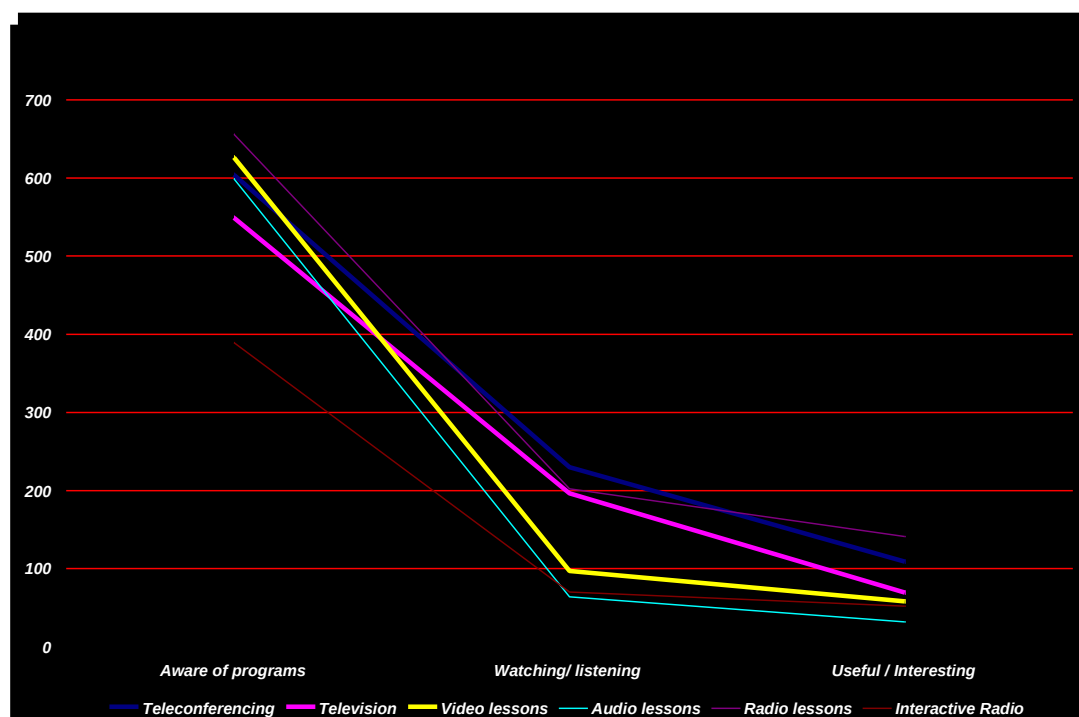
Table 64 shows that though majority (80.5%) of the learners are aware about programs only 30.66 percent (230) of students were able to watch the teleconferencing lessons, and 14.53 percent of students who watched teleconferencing lessons revealed that programs were useful and interesting as they were maintaining high levels of interaction between specialized subject experts and students. Regarding TV programs, though 73.2 percent of learners are aware about it, only 26 percent of them are watching the programs. A small percent i.e. (9.2%) are on the opinion that the programs are useful to them. Regarding video lessons 83.46 percent of learners are aware of programs and 12.93 percent of them are watching the programs. Only 7.73 percent are on the opinion that the programs are useful. Though 79.86 percent

of learners are aware of audio lessons only 8.53 percent are using them. Majority (87.46%) of learners are aware about radio lessons but the percentage of learners who use it very small (26.93%). 51.86 percent of learners are aware about interactive radio facility, only 9.33 percent are using them. Among those who use, only Only 6.93 percent are on the opinion that the programs are useful.

The overall analysis shows that majority of the respondents are aware about various tools used in the field of distance education. Only a few among them are on the opinion that they are useful and interesting.

Responses of learners towards technology-mediated learning are given in Figure 10.

Figure 10
Responses of learners towards technology mediated learning



The reasons cited by them for not using these technological tools were:

- 1) Timings were not suitable for them because they attend contact cum counseling classes on Sundays.
- 2) Majority of the learners were not familiar about programs.
- 3) Teleconferencing facilities were not available at all study centres except a few at district head quarters, and
- 4) The majority of students did not know the schedule of teleconferencing programs.
- 5) Programs are only available in the regional centres. The distance to the centres also prevents them from attending the sessions.
- 6) Programs telecast from the University were not useful to them.

6.15 Advantages & Disadvantages of online learning

It is very important to collect data about the advantages and disadvantages of the online learning system from the direct beneficiaries of the system itself. Learner opinion regarding the advantages and disadvantages are cumulated and summarized in Table 65 and Table 66.

Table 65
Advantages of online learning- (In percentage)

Advantages	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Communication with many students at once	12.6	48.6	29.8	6.0	3
Flexible	12	7.4	6.3	3.2	1
Learning from other's contribution	5.2	70	21.2	2	1.6
Sharing ideas	7	68.7	20	3.3	0
Participants respond quickly	8.4	37.1	34.2	14.4	6
Enhancing students to instruction communication	11.3	48.3	34.3	2	4.1
Equality	18.2	40.7	15.7	12.4	13
Economic	11.1	24.1	44.1	12.4	8.3
Time saving	15.6	32.4	28.8	19.1	4.1

Table 65 shows that majority of the respondents are on the opinion that online learning is more flexible than class room based regular learning. 70 percent of the learners are on the opinion that they are getting ideas from other's contribution while studying online. 68.7 percent of students are on the opinion that the possibility of sharing of ideas is more in the online learning environment. In the classroom environment most of the students are not in the habit of expressing their ideas. So the possibility of sharing if ideas are more in online learning than in class room learning. The responses of students about other advantages of online learning reveal that the attitudes of students are positive towards online learning. It has added advantage of economic and time saving. But the major problem encountered with this is that the students attached to the headquarters or the regional centres can only benefit from most of IT based tools and services such as video conferencing,

teleconferencing as the facilities are not available in all the study centres. So the urgent steps should be taken to implement the technological tools in lower level.

Disadvantages of online learning are given in Table 66.

Table 66
Disadvantages of Online learning- (In percentage)

Disadvantages	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
F2F is more comfortable	55.6	20.1	6.4	10.9	7
Print is more comfortable	43.4	34.5	6.4	8.9	6.8
Limited interaction with instructor	14.8	52.4	22.8	5.5	4.5
Limited learning resources	25.4	32.5	38.2	0	3.9
Computer cause physical exhaustiveness	56.7	22.4	8.6	10.1	2.2
Inconvenience to make notes from web material	12.5	42.8	22.9	13.9	7.9
Limited interaction with students	14.8	52.4	22.8	5.5	4.5
Numerous functions and program are confusing	25.6	34.5	32.3	4.6	3
Isolation from other students	36.9	33.4	12.6	8.1	9
Online material is less accessible and convenient	22.1	25.4	23.2	26.6	2.7

Table 66 reveals that the major disadvantage of online learning is that the physical exhaustiveness caused by the computer is cited by the majority of learners (79.1%) and printed material are more comfortable (77.9%). The readability and usefulness of printed material is undisputable. The continuous reading from the computer may cause physical problem to the learners.

Isolation from other students (70.9%) and limited interaction (62.1%) are other major disadvantages cited by the respondents.

Another important point to be noted is that a high percentage of students are comparatively neutral in expressing ideas regarding the advantages and disadvantages of online learning.

6.16 IT as a substitute for teacher

Teachers are very important in our culture. The ancient Indian mythology is related with 'Guru' and 'Guru Kula'. It will be interesting to know the learners responses regarding whether the Information Technology can become a substitute for a teacher. Their responses are given in Table 67.

Table 67

Opinion of DL about the role of IT as a substitute of teacher

Universit y	Strongly agree	Agree	Neutra l	Disagree	Strongly disagree	Total
IGNOU	14 (5.6)	52 (20.8)	34 (13.6)	114 (45.6)	36 (14.4)	250 (100)
BRAOU	18 (7.2)	48 (19.2)	18 (7.2)	121 (48.4)	45 (18)	250 (100)
KSOU	21 (8.4)	65 (26)	11 (4.4)	97 (38.8)	56 (22.4)	250 (100)
Total	53 (7.07)	165 (22)	63 (8.4)	332 (44.27)	137 (18.27)	750 (100)

(Figures in brackets indicate percentage)

Table 67 shows that, as it is expected the majority of the respondents, IGNOU (60%), BRAOU (66.4%) and KSOU (61.2%) disagree with the idea that IT can be a substitute for teachers.

So it is not possible to fix IT in the position of teachers, but the role of teachers are changing from the old concept of imparting their ideas or

information into facilitate and direct students into the new areas of information and knowledge.

7. Faculty and IT application

In order to study the application of IT in the field of distance education, the investigator feels that both teachers and students should be studied to get a balanced outlook. Otherwise the study will be imperfect. Information Technology is being applied in almost all aspects of distance education such as admission, counseling and evaluation. The most important aspect to utilize and apply Information Technology in distance education is that the faculty members should be well equipped with the developments in the field of Information Technology.

The first criteria used by the investigator to analyze their IT awareness are to find out to what extent they are familiar with Internet. Their responses are provided in 68.

Table 68
Familiarity of faculty members with Internet

Item	IGNOU		BRAOU		KSOU		Total	
	No	%	No	%	No	%	No	%
Very good	53	57.61	20	52.63	10	41.67	83	53.9
Good	18	19.57	4	10.53	5	20.83	27	17.53
Average	21	22.83	7	18.42	4	16.67	32	20.78
Poor	0	0	7	18.42	5	20.83	12	7.79
Very poor	0	0	0	0	0	0	0	0
Total	92	100	38	100	24	100	154	100

(No= Number, %= Percentage)

Table 68 shows that majority of the faculty (very good, 53.9%, Good 17.53%) have enough awareness and familiarity about Internet technology.

Only a small percent i.e., 7.79 percent are poor in the field of computer and Internet technology. That may be faculty members from the field of arts or humanities where the possibility for becoming unfamiliar with Internet resources is comparatively large.

It is also notable that all the IGNOU faculty members are aware and have knowledge about Internet technology, because the samples were drawn from the headquarters of Open Universities where all the faculty members have free Internet connection provided by the University.

7.1 Quality education through distance mode

It is a general belief in the society that quality education is not attainable through the distance mode of learning. It is a liberal way of continuing education only suitable for employed persons or for getting ceremonial qualifications. So an investigation has been made by the researcher from the faculty members about the attainability of quality through distance mode. Their responses are given in Table 69.

Table 69
Opinion of faculty about the attainability
of quality through the distance mode of education

University	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
IGNOU	12 (13.04)	52 (56.52)	3 (32.61)	17 (18.48)	8 (8.70)	92 (100)
BRAOU	5 (13.16)	18 (47.37)	4 (10.53)	4 (10.53)	7 (18.42)	38 (100)
KSOU	4 (16.67)	17 (70.83)	2 (8.33)	1 (4.17)	0 (0)	24 (100)
Total	21 (13.64)	87 (56.49)	9 (5.84)	22 (14.29)	15 (9.74)	154 (100)

(Figures in bracket indicate percentage)

Table 69 shows that majority of the staff (70.13%) agree the fact that standard quality education is attainable through distance mode of learning.

The percentage of those who disagree with this is small (24.73%). For the same the overall attitude of the society should be changed towards the distance education.

7.2 Methods adopted in teaching through distance

Most of the Open Universities claim that they are following multimedia instruction system for teaching at distance. So an investigation has done here to analyze what are the media used by the faculty members and up to what extent they use each of these media. Their responses are summarized in Table 70.

Table 70
Present methods adopted by faculty in teaching

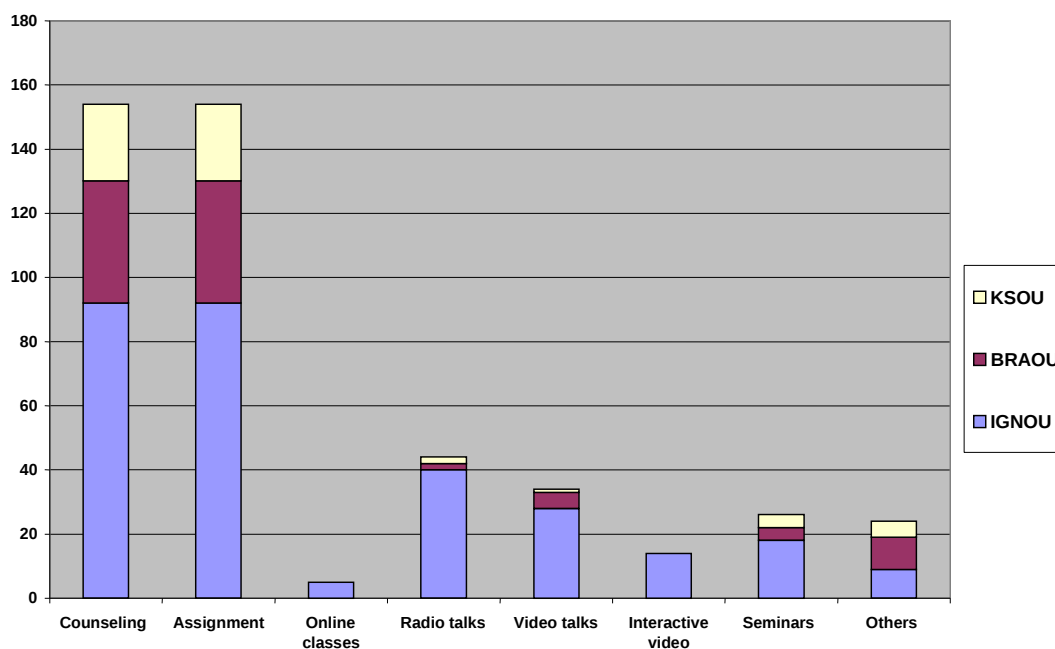
Item	IGNOU		BRAOU		KSOU		Total	
	No	%	No	%	No	%	No	%
Counseling	92	100	38	100	24	100	154	100
Assignment	92	100	38	100	24	100	154	100
Online classes	5	5.43	0	0	0	0	5	3.24
Radio talks	40	43.4	2	5.26	2	8.33	44	35.6
Video talks	28	30.43	5	13.15	1	4.16	34	22.07
Interactive video	14	15.21	0	0	0	0	14	9.09
Seminars	18	19.56	4	10.52	4	16.66	26	16.88
Others	9	9.78	10	26.32	5	20.83	24	15.58

(No= Number, %= Percentage)

Form Table 70 it is clear that 100 percent of faculties of all the sample Open Universities are adopting counseling and assignment methods. Online classes are done by only 3.25 percent of faculty members. Interactive video is done by 15.22 percent of faculty members of IGNOU only, and no one from the respondents of other Universities uses it.

Another important media is radio talks, which is done by 35.06 percent of faculty members, and video talks are done by 23.38 percent of faculty members. The picture is clear that the majority of the faculty members follow contact classes and assignment for teaching at distance and they are not utilizing the potential of Information Technology to the fullest extent. Seminar is another method used by some of the faculty members (16.88%) for teaching. Figure 11 gives an idea about methods used by faculty members for teaching in the distance mode.

Figure 11
Methods used by faculty for teaching at distance



7.3 Performance of students

One of the important indicators for measuring the performance of an educational system is the pass percentage in the examinations. It is estimated that the pass percentage of the learners in the field of distance education is less than 30 percent in all over the country. So the faculties were asked about the reasons for the low pass percentage in the field of distance education. Their responses are given in Table 71.

Table 71
Reasons for low pass percentage- (In percentage)

Item	IGNOU	BRAOU	KSOU	TOTAL
Limited classes	8.69	7.89	16.66	9.74
Out dated techniques	7.6	18.42	0	9.9
Lack of quality study materials	0	7.89	8.33	3.24
Lack of adequate support services	19.56	13.15	16.66	17.53
Lack of IT application	31.52	23.68	13.33	29.87
Lack of seriousness from students	30.43	28.94	25	29.22
Others	2.17	0	0	1.29
Total	100	100	100	100

As per the opinion of faculty members, the major reason cited by them (29.87%) was the lack of IT application. Though Universities are doing much in this regard, the faculty members feel that it is not sufficient to meet the requirement of the learners in future. So studies should be conducted to find the reasons for not utilizing the information technological tools by the learners in the grass root level. Another important reason cited by the faculty members (29.22%) was the lack of seriousness of students who opt the distance education. It is commonly understood that most of the students are attracted to the field of distance learning due to its flexibility and liberal entry procedures. From such students the seriousness of regular students cannot be expected.

The third important reason cited by the faculty members is the lack of adequate supporting services. It is seen that how the Open Universities and distance education institutes in the country neglect the libraries. That is the same situation in the case of other student support services also. Outdated

techniques have been mentioned by 18.42 percent of BRAOU faculty members. It also supplements the opinion of all faculties regarding the lack of IT application. Only limited classes are getting to the students of Open Universities about their program. It has also mentioned by 9.74 percent of faculty members as a reason for the low pass percentage in the field of distance education. The low pass percentages coupled with high rates of dropout make distance education quite unsuccessful as an alternative channel for higher education.

7.4 Impediments before the IT application

Investigator has collected the opinion of faculty members about the major impediments before IT application. It is given in Table 72.

Table 72
Impediments before the IT application (In Percentage)

Impediments	IGNOU	BRAOU	KSOU	Total
Cost	4.35	7.89	8.33	5.84
Attitude of govt.	5.43	10.53	4.17	6.49
Existing staff	0	5.26	0	1.3
Attitude of learners	55.43	42.11	20.83	46.75
Undeveloped society	17.39	21.05	33.33	20.78
Existing infrastructure	17.39	10.53	29.17	17.53
Lack of adequate technology	0	2.63	4.17	1.3
Total	100	100	100	100

The major impediment cited by the faculty members is the attitude of the learners (46.75%), followed by social underdevelopment (20.78%), and followed by the existing infrastructure (17.53%) facilities. A few percentage of them cited attitude of government (6.49%), followed by cost

(5.84%) as impediments before the application of technological tools the field of distance education.

So the development of society will automatically reflect in the learners also because they are the unavoidable part of the society. So creating social awareness and social development will automatically make the society to cop up with the technological advancements.

7.5 Parity with regular studies

The students of sample Open Universities are offered the same courses as in the regular colleges. They are to follow the same syllabi and curricula take the same examinations and awarded the same degrees by the University. However, the degrees offered by the Open Universities are not recognized by most of the conventional Universities and they are not preferred in interviews and other job selection processes. In addition, the bodies like Kerala Public Service Commission do not offer commensurate appointment to candidates with open/liberal degrees. This has created hardship to thousands of students. Even for higher studies, some of the institutions do not permit the candidates who studied through the open stream.

It is seen in the present scenario that there is a great discrimination between regular students and distance learners in the present job market. Majority of the distance learners are getting jobs only in the absence of regular learners. The opinion of the faculty members about the said issue is discusses in Table 73.

Table 73
Opinion of faculty about
discrimination between regular and distance learners

Name of the University	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
IGNOU	5 (5.43)	31 (33.69)	7 (7.6)	29 (31.52)	20 (21.73)
BRAOU	3 (7.89)	20 (52.63)	4 (10.52)	10 (26.31)	1 (2.63)
KSOU	3 (12.5)	17 (70.83)	2 (8.3)	2 (8.3)	0 (0)
Total	11 (7.14)	68 (44.15)	13 (8.44)	41 (26.62)	21 (13.6)

(Figures in bracket indicate percentage)

Table 73 shows that more than 50 percent of the faculty members agrees the fact that there is discrimination between regular and distance learners in the present job market. It is due to the reason that students who are attracted to the distance education are those who are either not serious in their study or they are joining for various courses for the sake of degrees or diplomas. They are not undergoing severe experiments and practical skills, which are more important in the job market.

To some extent this problem can be solved by fully utilizing the potential of Information Technology by making the procedures simple and making the students familiarize with the these technological alternatives. Making the IT as the major media will make students compelled to study about the IT techniques and tools which are more interesting than classroom based teaching and learning. As a result more knowledge content can be imparted. Virtual reality techniques can be used to develop practical tests and experiments. Thus this discrimination can be marginalized.

7.6 Methods adopted by the University for Staff Development.

Different Open Universities conduct different programs for the development of faculty members such as conducting seminars, symposium and online training and occasional refresher programs. But most of the Open Universities are not conducting any programs for the development and training of the counselors who directly interact with the students and they are the actual supporters of the distance education system in the country; instead of training these community they restrict their training and development programs to the fulltime faculty members located at the head quarters. They are the community who take benefit form the development of distance education in the country, where the students for whom these courses are started and for whom these much of money of the society is spending is actually most neglected community in this regard. And the supporting staff from different part of the country is actually neglected and provided no training and development opportunities and getting no assistance for their participation in the distance education system except little pennies as their counseling charge and money for valuation. The staffs at headquarters have little work except to prepare notes and some occasional contact classes at the beginning or at the end of the course for one or two months. In this context an investigation has done about the methods adopted by the University for Staff Development. Different methods adopted by the University for the Promotion of the development of faculty members is given in Table 74. The analysis has done with a view that whether the University is applying any IT tools for the staff development.

Table 74**Methods adopted by the University for Staff Development.**

Methods	IGNOU	BRAOU	KSOU	Total
Meetings	92 (100)	38 (100)	24 (100)	154 (100)
Refresher courses	92 (100)	38 (100)	24 (100)	154 (100)
Online programs	12 (13.4)	5 (13.15)	0 (0)	17 (11.1)
Seminars	25 (27.17)	12 (31.57)	14 (58.33)	51 (33.11)
Others	8 (8.69)	5 (13.15)	3 (12.5)	16 (10.38)

(Figures in bracket indicate percentage)

The entire faculty members agreed about the meetings and refresher courses. Only 11.1 percentage of the staff indicated online programs conducted for the benefit of faculties. 33.11 percent of staff is participating in seminars, which also pave the way for the overall improvement of the faculty members in the field of distance education. It indicates that Open Universities miserably fail in utilizing the potential of IT in the teacher training and development activities.

7.7 Opinion of faculty about IT application

Teachers are the backbone of any education system. So their opinion regarding IT application in the field of distance education is important. The opinion of faculty members about IT application is given in 75.

Table 75
Opinion of faculty about IT application

University	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
IGNOU	61 (66.3)	26 (28.26)	5 (5.4)	0 (0)	0 (0)
BRAOU	16 (42.1)	19 (50)	3 (7.89)	0 (0)	0 (0)
KSOU	5 (20.83)	12 (50)	3 (12.5)	4 (16.66)	0 (0)
Total	82 (53.24)	57 (37.01)	11 (7.14)	4 (2.59)	0 (0)

(Figures in bracket indicate percentage)

Table 75 shows that more than 90 percent of total faculty members either strongly agree or agree about the application of IT in the field of distance education. Only 2.59 percent of faculty members disagree with this. It is clear evidence that the authorities in the field of distance education are well equipped and ready to accept the developments in the field of Information Technology.

7.7.1 Opinion of faculty about IT application in different areas

Different faculties in various Open Universities have different opinion regarding the level of application of Information Technology in different areas of distance education. Their opinions are summarized in Table 76.

Table 76
Opinion of faculty about IT application in different areas

Areas	IGNOU	BRAOU	KSOU	Total
Student enrolment	52 (56.52)	6 (15.79)	16 (66.67)	74 (48.05)
Staffing	33 (35.86)	14 (36.84)	14 (58.33)	61 (39.61)
Instructional delivery	88 (95.65)	8 (21.05)	15 (62.5)	111 (72.08)
Study materials	50 (54.35)	12 (31.58)	6 (25)	68 (44.16)
Tutor access	79 (85.87)	12 (31.58)	9 (37.5)	100 (64.94)
Assignments	18 (19.57)	13 (34.21)	6 (25)	37 (24.03)
Evaluation & assessment	38 (41.30)	9 (23.68)	15 (62.5)	62 (40.26)

(Figures in bracket indicate percentage)

Majority of the faculty members (72.08%) have no doubt about the IT application in instructional delivery, which is the most important aspect of distance education. Their second preference for tutor access (64.94%), followed by student enrolment (48.05%). When 44.16 percent faculty members favor IT application in study materials, 39.61 percent visualize its importance in staffing.

In a nutshell it can be stated that almost all the faculties are unanimous in the potentiality of IT in the field of distance education

There exists significant difference among the opinion of faculty members regarding the application of Information Technology in different

areas, because when 95.9 percent of faculty members of IGNOU favors IT in the field of instructional delivery only 21.05 percent of BRAOU faculty has this opinion. Similarly 56.52 percent of IGNOU faculties have opinion about IT application in student enrolment and only 15.79 percent faculty members of Ambedkar Open University have this opinion.

While comparing the response rates of different faculties of different Open Universities it can be seen that the BRAOU faculty has comparatively low response towards the application of IT in different areas.

7.7.2 Pre requisites for IT application

Faculties of Universities in India are educational experts available in the country. So their opinions are very important in policy making in the field of distance education. So the investigator asked them about the pre-requisites for the application of IT in the field of distance education. It is given in Table 77.

Table 77

**Opinion of faculty about pre requisites for IT application-
(In percentage)**

Pre requisites	IGNOU	BRAOU	KSOU	Total
Fund	8.6	7.89	16.66	9.74
Staff	3.2	5.26	4.16	3.89
Infra structure	15.2	10.52	4.16	12.33
Social development	45.65	42.10	33.33	42.85
Support of Government	21.73	28.94	25	24.02
Availability of IT tools	0	0	0	0
Adequate supporting services	5.43	5.26	16.66	7.14
Total	100	100	100	100

Table 77 shows that majority of the respondents (42.85%) have the opinion that society should be adaptive with the technology and their development is the major factor for IT application. It was the major opinion of students also in the field of distance education.

Another major pre-requisite mentioned by the faculty members is support from the part of the government (24.02%) in terms of money and technology, followed by infrastructure facilities (12.33%). It is to be noted here that fund (9.74%) is not a major problem in Open Universities unlike the conventional Universities.

7.8 Globalization of distance education

The investigator feels that the popularization of distance education is the result of globalization of education, because the timelessness and speed are the glaring symbols of globalization. The students are more attracted to the field due to their job and other problems, which are the results of globalization. Not only in India, in all the countries distance education is becoming an alternative method of learning. The opinion of faculty members in the field of distance education is important in this regard. Opinion of faculty about globalization of distance education is given in Table 78.

Table 78**Opinion of faculty about globalization of distance education**

University	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
IGNOU	66 (71.73)	18 (19.5)	5 (5.43)	3 (3.26)	0 (0)
BRAOU	24 (63.15)	8 (21.05)	2 (5.26)	3 (7.89)	1 (2.63)
KSOU	12 (50)	10 (41.66)	0 (0)	2 (8.33)	0 (0)
Total	102 (66.23)	36 (23.37)	7 (4.5)	8 (5.19)	1 (0.6)

(Figures in bracket indicate percentage)

It is clear from the Table 78 that about 90 percent of the faculties agree that distance education is becoming a global scenario. Only a small percentage disagrees with this.

7.8.1 Opinion of faculty about establishment of virtual Universities

Another important hindrance about the globalization of distance education is the establishment of virtual Universities in the international level. Virtual Universities are the Universities in effect, but without having great infrastructure facilities like conventional Universities. In most of the western countries a number of virtual Universities have started and students from all over the world are enrolling for various courses. Here is the importance of establishment of a virtual University in India. The opinion of faculty members in this regard is expressed in Table 79.

Table 79**Opinion of faculty about establishment of Virtual Universities in India**

University	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
IGNOU	18 (19.56)	58 (63.04)	3 (3.36)	10 (10.86)	3 (3.26)
BRAOU	7 (18.42)	15 (39.47)	0 (0)	6 (15.78)	10 (26.31)
KSOU	5 (20.83)	10 (41.66)	2 (8.33)	4 (16.66)	3 (12.5)
Total	30 (19.48)	83 (53.89)	5 (3.24)	20 (12.98)	16 (10.3)

(Figures in bracket indicate percentage)

From the Table 79 it is clear that 73.37 percent of total faculty members agree with the establishment of virtual Universities in the country. 23.28 percent of faculty members disagree with this. It may be due the fear about the lack of quality and standards with the virtual Universities or with their unfamiliarity with the concept of virtual Universities.

7.9 Faculty and Web Based Learning (WBL)

World Wide Web has conquered almost all the walks of life. So the preferences of teachers in the web based learning environment, is very important for policy makers. The preferences of faculty members in the web based learning environment are summarized in Table 80.

Table 80
Opinion of faculty about delivery
models in the Web Based Learning (WBL) environment

Delivery models	IGNOU	BRAOU	KSOU	TOTAL
WBL only	5 (5.43)	8 (21.05)	6 (25)	19 (12.33)
WBL supported by face to face (F2F)	24 (26.08)	4 (10.52)	2 (8.33)	30 (19.48)
WBL with F2F and other media	41 (44.56)	12 (31.57)	7 (29.16)	60 (38.96)
WBL (50%) and F2F (50%)	15 (16.3)	10 (26.31)	7 (29.16)	32 (20.77)
CD with online support	5 (5.43)	2 (5.26)	0 (0)	7 (4.54)
CD with F2F support	2 (2.17)	2 (5.26)	2 (8.33)	6 (3.89)
Total	92 (100)	38 (100)	24 (100)	154 (100)

(Figures in bracket indicate percentage)

Table 80 reveals that majority of the respondents (38.96%) prefer WBL supported by face to face and other media as their preference in the WBL environment, followed by WBL 50percent and face to face 50 percent (38.96%), followed by WBL supported by face to face (19.48%). Only 12.33 percent of faculty members favors the WBL only as the media of education in the web based learning environment.

The importance of teachers in every educational system is undisputable. Face to face education has its own implication even in the online or web based learning environment. It proves that an entire transformation into a web-based society is not practical or it is impossible.

7.10 Future of conventional Universities

If web based learning and distance education is going to overtake the conventional Universities what will be the future of conventional Universities is an important area of research. The opinion of faculty members regarding this question is given in Table 81.

Table 81

Opinion of faculty members about future of conventional Universities

Opinion	IGNOU		BRAOU		KSOU		Total	
	No	%	No	%	No	%	No	%
Will remain unchanged	64	69.56	21	5.26	16	66.6	101	65.58
Will dominate over Open Universities	0	0	0	0	0	0	0	0
Will be dominated by OU	8	8.69	3	7.83	2	8.33	13	8.44
Remain as supplementary to OU	2	2.17	2	5.26	0	0	4	2.59
OU will remain as supplementary	15	16.3	11	28.94	6	25	32	20.77
No idea	3	3.26	1	2.63	0	0	4	2.59
Total	92	100	38	100	24	100	154	100

(No= Number, %= Percentage)

Majority of the faculty members (65.58%) are on the opinion that nothing will happen to the conventional Universities with the developments in the field of distance education. It will continue for a long time as a parallel way of flexible learning and education. The second major opinion expressed by them (20.77%) is that Open Universities will remain as supplementary to the conventional Universities. Only a small percentage (8.44%) of faculty members believes that Open Universities and distance education system will dominate over the conventional University system.

7.11 Curriculum restructuring for IT application

In order to apply IT in the field of distance education an entire change in the whole structure of distance education is required. The opinion of faculty members regarding this issue is summarized in Table 82.

Table 82

Opinion of faculty about curriculum restructuring for IT application

University	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
IGNOU	5 (5.43)	62 (67.39)	5 (5.43)	16 (17.39)	4 (4.34)	92 (100)
BRAOU	6 (15.78)	14 (36.84)	4 (10.52)	9 (23.68)	5 (13.15)	38 (100)
KSOU	6 (25)	12 (50)	3 (12.5)	3 (12.5)	0 (0.0)	24 (100)
Total	17 (11.03)	90 (58.44)	12 (7.79)	28 (18.18)	9 (5.84)	154 (100)

(Figures in bracket indicate percentage)

Table 82 reveals that 69.47 percent of faculties are on the opinion that a curriculum restructuring is required in the field of distance education to adopt latest technological advances in the field of distance education. No significant difference can be seen among the staff of the various Open Universities in this regard.

7.12 Improvement in the standard of distance education

In the modern world distance education has been visualized as a liberal way of education, which is used mainly for the promotion of those who are employed, or for the students who are unable to go to regular colleges due to

various reasons. From such a system the quality and standard cannot be expected. So an investigation has been made from the faculty members to understand the measures to be taken to improve the standard of distance education in the country. The responses of faculty members about the methods for the improvement of distance education in the country are discussed in Table 83.

Table 83
**Opinion of faculty members about
improvement in the standard of distance education**

Opinion	IGNOU		BRAOU		KSOU		Total	
	No	%	No	%	No	%	No	%
Infra structure facilities	4	4.34	2	5.26	2	8.33	8	5.19
Regular staffing	3	3.26	4	10.52	4	16.66	11	7.14
Timely distribution of study material	18	19.56	9	23.68	4	16.66	31	20.12
IT application	47	51.08	16	42.10	8	33.33	71	46.10
Adequate funding	6	6.52	3	7.89	3	12.5	12	7.79
Job oriented courses	9	9.78	2	5.26	1	4.16	12	7.79
More contact programs	5	5.43	2	5.26	2	8.33	9	5.84
Total	92	100	38	100	24	100	154	100

(No= Number, %= Percentage)

Table 83 clearly shows that majority of the respondents i.e., IGNOU (51.08%), BRAOU (42.1%), KSOU (33.33%) are on the opinion that through the effective application of Information Technology tools the standard and quality of the distance education in the country can be improved. Another important point mentioned by them is the timely distribution of study materials. It clearly indicate their conventional attitude and it shows to what extent the distance education stream depend on the study materials in the

teaching and learning process. 7.79 percent of the total faculty members have the opinion that job oriented courses and adequate funding should be made for improving the standard of the distance education in India. Only a small percentage (7.14%) has the opinion about the need for regular staffing. At the same time 5.84 percent of faculty stress on the need for more contact and counseling sessions for improving the standard of distance education in the country.

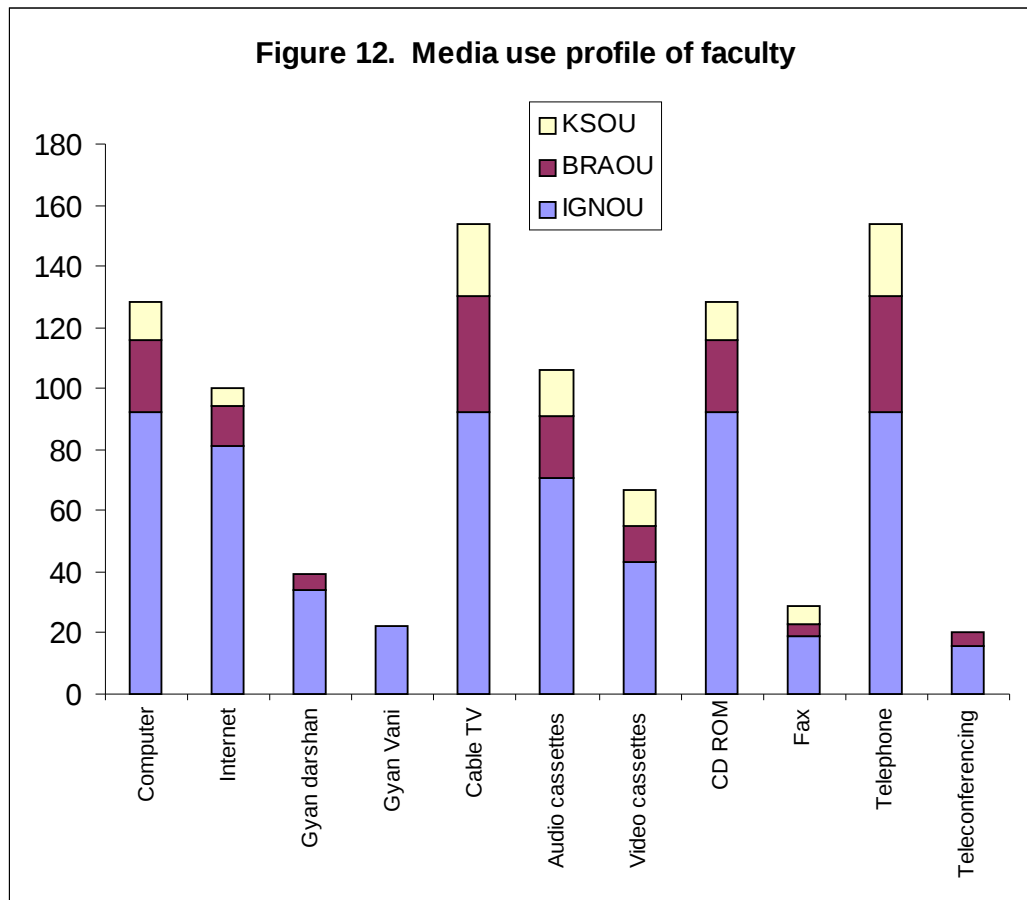
7.13 Media used by faculty members

The faculty members were asked to provide their choices and usage of various media in their teaching activities. Their responses are given in Table 84.

Table 84
Media use profile of faculty members

IT Tools	IGNOU		BRAOU		KSOU		TOTAL	
	No	%	No	%	No	%	No	%
Computer	92	100.00	24	63.15	12	50.0	128	83.11
Internet	81	88.04	13	34.21	6	25.0	100	33.33
Gyan Darshan	34	36.95	5	13.15	0	0.0	39	13.00
Gyan Vani	22	23.91	0	0.0	0	0.0	31	7.33
Cable TV	92	100.00	38	100.00	24	100.0	154	100.00
Audio cassettes	71	77.17	20	52.63	15	60.0	106	68.83
Video cassettes	43	46.73	12	31.57	12	48.0	67	43.50
CD ROM	92	100.00	24	63.15	12	50.00	128	83.11
Fax	19	20.65	4	10.52	6	25.0	29	18.83
Telephone	92	100	38	100	24	100.0	154	100
Teleconferencing	16	17.39	4	10.52	0	0.0	20	6.66

The trends in the media use of faculty members show that on an average four media were used by one faculty member in their academic activities. The usage percentage was highest in the case of telephone and cable TV (100%), followed by the computer (55.2%), followed by the computer and CD ROM (83.11%), followed by Audiocassettes (68.83%), followed by videocassettes (43.5%), followed by Internet (33%). Among these various media the telephone and cable TV are the most popular media, which may or may not use for academic interaction with learners. Less than 15 percent of faculty members were taking help of Gyan Darshan for assisting learners in counselling while Gyan Vani were being used by nearly 8 percent. Surprisingly enough less than 10 percent of academic faculty participated in teleconferencing sessions, while Open Universities are incurring a lot of efforts and expenditure for academic delivery through this mode. Media use profile of faculty members is given in Figure 12.



7.14 Impact of media on academic activities

Application of various electronic and other media in the field of distance education will have wide impact on various academic activities. Here the major academic activities in the field of distance education are identified and the opinions of faculty members are recorded. The responses of faculty members about the impact of media on academic activities are given in Table 85.

Table 85
Impact of media on academic activities

Factor	Very good	Good	Neutral	Poor	Very poor	Total
Attendance	40 (26)	75 (49)	23 (15)	6 (4)	9 (6)	154 (100)
Quality of assignment	28 (18)	88 (57)	22 (14)	3 (2)	14 (9)	154 (100)
Participation in counseling sessions	35 (23)	71 (46)	28 (18)	8 (5)	14 (9)	154 (100)
Writing term-end exam	38 (25)	69 (45)	25 (16)	3 (2)	18 (12)	154 (100)
Understanding the facts	59 (38)	68 (44)	15 (10)	2 (1)	12 (8)	154 (100)
Improving the over all performance	48 (31)	79 (51)	18 (12)	9 (6)	0 (0)	154 (100)

(Figures in bracket indicate percentage)

The viewpoint of faculty members on said issues are discussed below.

Attendance: in the opinion of three forth of the faculty members, electronic media has the potential in boosting up the student attendance (Very good 26% and good 49%) in counseling sessions, contact programs etc. 15 percent of faculty members considered no impact (neutral) of electronic media on

students attendance in various academic activities while 10 percent of the faculty members visualized its negative impact (Poor 4% and very poor 6%).

Quality of assignment can be improved with the help of electronic media. This was emphasized by 57 percent of faculty members, 18 percent of them viewed very good impact on the quality of assignment. On the other hand, quality of assignment might deteriorate, was feared by 13 percent of them (poor 2% and very poor 9%) and the remaining 14 percent expressed that quality of assignment was a matter of individual capacity and electronic media or IT tools has no role to play.

Participation in counselling sessions: 69 percent of counsellors believed that with the support of IT tools active participation of distance learners can be enhanced (good 46% and very good 23%) in counselling sessions. 13 percent feared that learners might become silent separators in electronic media assisted counselling sessions (poor 4% and very poor 9%), where as remaining 18 percent visualized no impact (neutral) of media in learners participation in counselling sessions.

Writing term-end examinations: One forth of counselors expected that writing skill of students for term end examinations can be very much improved with the assistance of electronic media, while forty six percent visualized lesser degree of improvement. 14 percent of counselors visualized negative impact of electronic media on writing skills of the learners. Within this category nearly 86 percent of them (12/14) visualized very poor. The remaining 16 percent neither agreed with positive nor with negative impact of electronic media on writing skill of the learners.

Understanding the facts: In the case of understanding facts majority of the faculty members expressed that electronic media has the potential in boosting up the understanding the facts (Very good 38% and good 44%) in

counseling sessions, contact programs etc. 10 percent faculties considered no impact (neutral) of electronic media on students attendance in various academic activities while 10 percent visualized its negative impact (Poor 1% and very poor 8%).

Improving the over all performance: 82 percent of the counselors believed that with the support of IT tools the overall performance of distance education system can be enhanced (good 51% and very good 31%). Only 6 percent feared that learners might become silent separators in electronic media assisted counseling sessions (poor 6% and very poor 0%), where as remaining 12 percent visualized no impact (neutral) of media in improving the overall performance of the learners.

8. Virtual Universities and web based learning

Virtual Universities are emerging globally and web based learning has become the method of learning of a cyber society. So the investigator has asked a question to the distance learners that they enrolled for any course in any virtual Universities in the world. Only a very few percentage, i.e. (0.8) percentage enrolled for courses in virtual Universities. Majority of them (62.4) percentage students are not even heard about virtual Universities. 36.8 percentage students heard but not enrolled for any courses in virtual Universities. It indicates that web based learning and virtual Universities have not become the part and practice in our educations system till now. There is a scope for establishing a virtual University in the country. Learners' attitude towards the establishment of Virtual Universities is given in Table 86.

Table 86
Attitude of learners towards the establishment of virtual Universities

University	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
IGNOU	54 (21.6)	165 (66)	22 (8.8)	9 (3.6)	0 (0)	250 (100)
BRAOU	45 (18)	152 (60.8)	38 (15.2)	15 (96)	0 (0)	250 (100)
KSOU	46 (18.4)	134 (53.6)	43 (17.2)	27 (10.8)	0 (0)	250 (100)
Total	145 (19.33)	451 (60.13)	103 (13.730)	51 (6.8)	0 (0)	750 (100)

(Figures in brackets indicate percentage)

Table 86 shows that majority of the respondents (79.46%) agree for establishing virtual Universities in the country. 13.73 percentage of learners have not expressed their opinion either positively or negatively. Only 6.8 percent students are against the establishment of virtual Universities in the country. Nobody strongly disagrees with the establishment of Virtual Universities in the country.

8.1 Enrolment in Virtual University courses

Here an investigation has been made by the investigator to find out whether the virtual Universities have become the part of education system in India. Responses of the learners regarding this issue are given in Table 87.

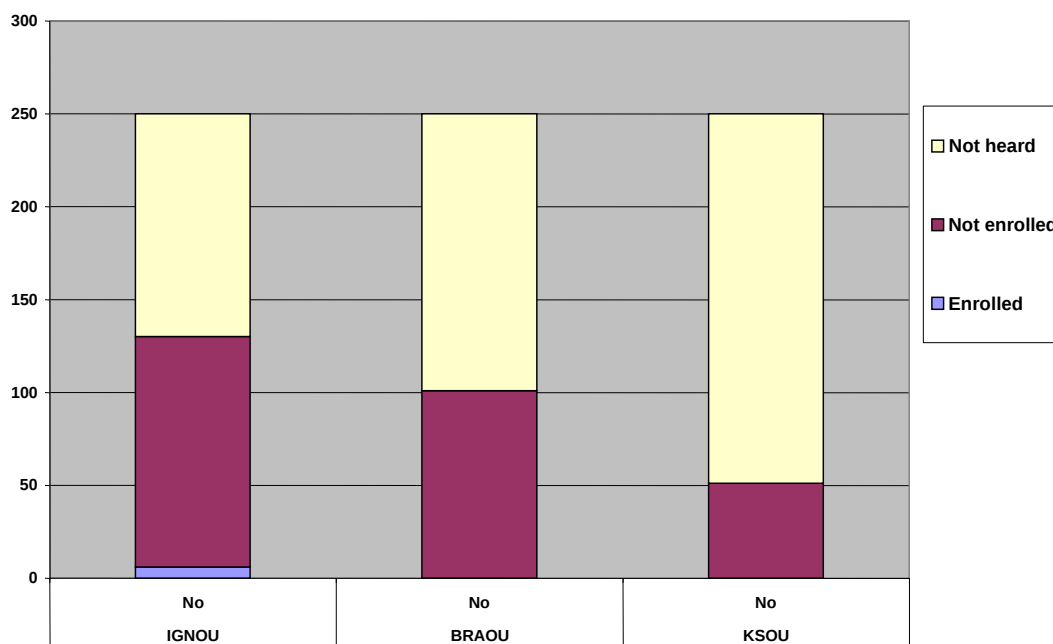
Table 87**Enrolment in Virtual University courses**

Status	IGNOU		BRAOU		KSOU		TOTAL	
	No.	%	No.	%	No.	%	No.	%
Enrolled	6	2.4	0	0	0	0	6	0.8
Not enrolled	124	49.6	101	40.4	51	20.4	276	36.8
Not heard	120	48	149	59.6	199	47.6	468	62.4
Total	250	100	250	100	250	100	750	100

(No= Number, %= Percentage)

Table 87 clearly indicates that a total of 6 percent students are enrolled for various courses in various virtual Universities. At the same time majority of the respondents (62.4%) did not even heard about such an education system. Enrolment status of distance learners in virtual Universities for various courses is given in Figure 13.

Figure 13
Enrolment in virtual University courses



8.2 Preferences in the web based learning environment

A question is asked by the investigator regarding the preferences of learners in the web based learning environment. Different learners have various preferences in the web based learning environment. Their responses are summarized in Table 88.

Table 88
Preferences in the web based learning environment

Preferences	IGNOU		BRAOU		KSOU		Total	
	No	%	No	%	No	%	No	%
Electronic annotation	18	7.2	39	15.6	26	10.4	83	11.07
Discussion groups	17	6.8	11	4.4	23	9.2	51	6.8
Online chat	47	18.8	40	16	36	14.4	123	16.4
Voice chat	30	12	35	14	31	12.4	96	12.8
Online tutorial	7	2.8	5	2	0	0	12	1.6
Reading online	67	26.8	52	20.8	53	21.2	172	22.93
Questions online	23	9.2	28	11.2	36	14.4	87	11.6
Feedback online	17	6.8	9	3.6	8	3.2	34	4.53
Online mentoring	9	3.6	2	0.8	4	1.6	15	2
Others	15	6	29	11.6	33	13.2	77	10.26
Total	250	100	250	100	250	100	750	100

(No= Number, %= Percentage)

Table 88 shows that learners have different preferences regarding the web based learning. Major group among them (22.93%) marked reading materials online are their preferences in the web based learning environment. According to 16.4 percent of learners chatting is their preference, followed by voice chat (12.8%), followed by electronic annotation (11.07%). A small percent of learners prefer discussion groups (6.8%), followed by feed back

online (4.53%). It indicates that learners have no clear idea about the web based learning environment.

8.3 Support media in the web based learning environment

It will be interesting to know that whether any support media is required in the web based learning environment or not. The responses of learners regarding the support media are summarized in Table 89.

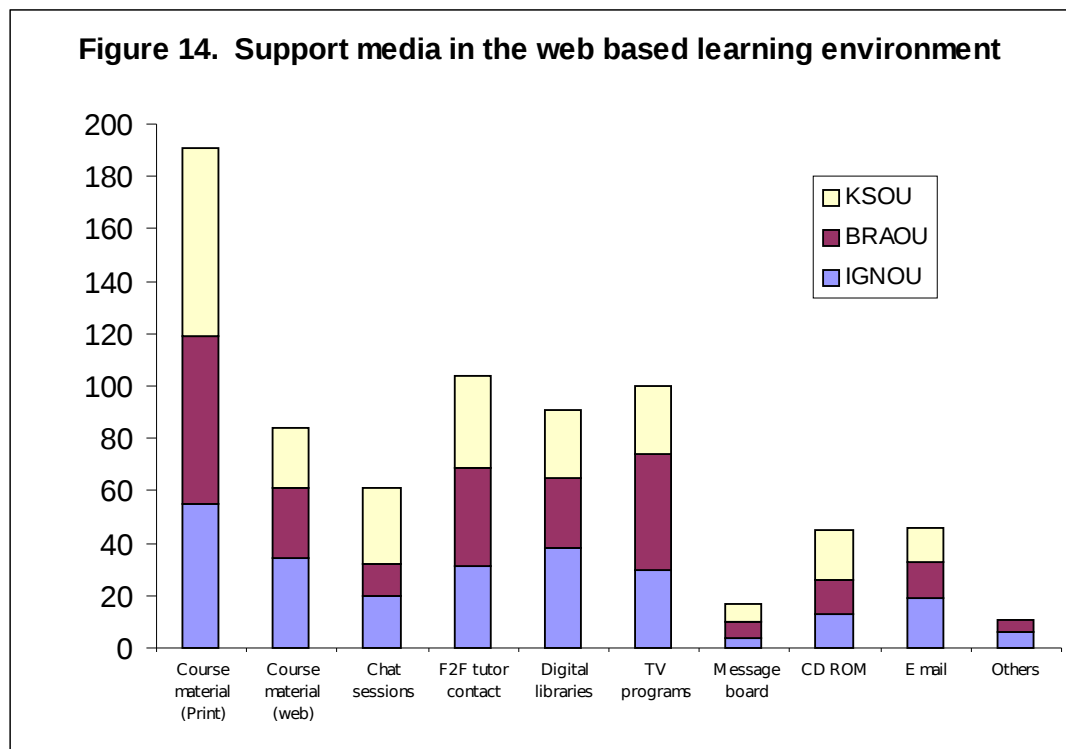
Table 89
Support media in the web based learning environment

Support media	IGNOU		BRAOU		KSOU		Total	
	No.	%	No.	%	No.	%	No.	%
Course material (Print)	55	22	64	25.6	72	28.8	191	25.46
Course material (web)	34	13.6	27	10.8	23	9.2	84	11.2
Chat sessions	20	8	12	4.8	29	11.6	61	8.13
F2F tutor contact	31	12.4	38	15.2	35	14	104	13.66
Digital libraries	38	15.2	27	10.8	26	10.4	91	12.13
TV programs	30	12	44	17.6	26	10.4	100	13.33
Message board	4	1.6	6	2.4	7	2.8	17	2.26
CD ROM	13	5.2	13	5.2	19	7.6	45	6
E mail	19	7.6	14	5.6	13	5.2	46	6.13
Others	6	2.4	5	2	0	0	11	1.46
Total	250	100	250	100	250	100	750	100

(No= Number, %= Percentage)

Table 89 shows that majority of the respondents (25.46%) from the entire Universities feel the printed course material as the support media in the web based learning environment. Their second preference goes to face-to-face tutor contact (13.66%), followed by TV programs (13.33%), followed by digital libraries (12.13%). Web study material (11.2%) and chat sessions

(8.13%) are also marked by a notable percentage of users. Figure 14 gives various support media in the web based learning environment.



9. Student support services

Student Support Services (SSS) are considered as the backbone of the distance education. The important SSS of Open Universities are provision of study materials, in written, magnetic as well as digital forms, personal contact programs/counseling sessions, assignments, study centres and library services. Some of the key SSS of the Open Universities in India are discussed below.

9.1 Study materials

The printed and the electronic-based study materials are widely used in many DEIs. The learners consider these materials highly valuable. It is an instrument by means of which a teacher imparts instruction to his students. In distance education, since the teacher is away from the student, the only way for the student is in frequent contact with the study materials. It hardly needs

to be emphasized that quality of the study materials is the touchstone of the success or failure of distance education. The DEIs in India provide only printed study materials as a strong student support device. It is the heterogeneity of the learners that complicates the problem of quality of study materials in distance education. They have to cater to a wide range of learners' needs from basic awareness in the subject to the excellence in the area studying. Keeping in view of the mixed nature of the students in distance education, such as the experienced and the novices, the knowledge-seekers and the college drop-outs, the adults and the non-adults, the study materials should have some qualities.

9.2 Personal Contact Program / Counseling Sessions

One of the important SSS of any distance education program is the personal contact programs (PCP). The reliance on study materials cannot be absolute. Contact session is believed to afford personal interaction among participants, contribute towards course completion, and reduce the load on student support services. Face-to-face contact sessions with distance learners are accepted as a necessary strategy to overcome their social as well as academic alienation. Those who are against the provision of PCPs hold the view that distance education, unlike its conventional counterpart, is an independent self-study. 'Independent self-study' consists of various forms of teaching-learning arrangements in which teachers and learners carry out their essential tasks and responsibilities apart from one another. This apartness from one another is the feature that has received the attention of theorists and policy makers. In the Indian situation, a distance education student has to complete the given course in a specified period of time and has to take examination along with the regular University student; the need for the face-to-face contact sessions therefore is justified. This fact has been categorically emphasized by the UGC guidelines (1974) in the following words: "the provision of contact programs should be an essential feature of

correspondence education in order that the mind of the student is exposed to the mind of the teacher lectures, tutorials, seminars and other forms of discussions.” UGC recommends that a “a contact program of at least two weeks duration should be organized in different places, wherever there is a cluster of 200 or more students.”

With the advent of efficient communication technologies, the mode of personal contact programs in the distance education system has vastly changed. Along with the face- to face contact in the counseling sessions, the same may occur through such technologies. In the Open Universities of India, the PCPs have become an integral part of their Student Support Services. So here an attempt has been made by the investigator to analyze various activities at contact classes. Responses of learners are expressed in Table 90.

Table 90

Activities at contact classes- (In percentage)

Activities	IGNOU	BRAOU	KSOU	TOTAL
Lecture	85.2	58.7	65	69.63
Lecture cum discussion	14.8	40.7	34	29.83
Audio-Video Presentation	0.0	0.0	0.0	0.0
Only Discussion	0.0	0.0	1.0	0.3
Total	100.0	100.0	100.0	100

In actual practice PCP has degenerated into a series of lecture sessions in which teachers dominate, while, students listen to them passively. In the present study also, in most of the Open Universities, the lecture method dominates. The provision of audio-video presentation is practically non-existent. Thus, the covering of the whole syllabus of a course as in the conventional classes, in a short series of lectures in distance education, dilutes the very purpose of PCP.

9.3 Study centres

In an Open University, the Students Support Services are built with the help of local centres. One kind of local center is known as a Study Centre. A Study Centre is established to offer students various communication channels to enable them to interact with academic counselors and fellow students as also to provide access to modern technological services through the use of audio-visual aids. Functions and activities of Study Centres are manifold and ever increasing with the increase in the activities of the University. In general, the study centres perform functions like academic-counseling, conduct of orientation program for counselors and other staff, providing library and information services, handling assignments and conducting examinations. In the context of distance education, a Study Centre is, thus, a miniature extension of the supporting distance organization into a locality where there is concentration of students. Among the four Open Universities studied, it is seen that only IGNOU maintains Study Centres. The other Open Universities in India do not give proper attention and planning for study center activities. In this context, any meaningful discussion is not possible on student support services in these institutions through Study Centres.

9.4 Assignments

Submission of assignments/response sheets is an integral part of the distance education programs. It forms a part of the evaluation system in many institutions. The treatment given to assignments varies from institution to institution. In IGNOU, the assignments carry a weight of 25 to 30 percent in the term-end examinations. Through the assignments, interaction between the tutor and learner becomes possible. In our sample of institutions all the sample Universities insists on submission of assignments.

9.5 Other support systems

The success of the distance education program depends on many other support systems as well. Some of these supports are pre-enrolment guidance, induction programs, library services, and enquiry services. As far as the institutions studied are concerned, most of these services are found to be weak. Although IGNOU provides, pre-entry guidance and induction programs, it is revealed that its library and enquiry services are not satisfactory. The learners are not issued any books from the Study Centres. As most of the learners are employed, they do not find time to make all the references required sitting in the library. Similarly, the study centres are not well equipped to give proper direction to the doubts raised by the learners. A number of learners expressed their concern over these two issues.

9.6 Learners' perceptions about Student Support Services (SSS)

Learners are the central focus of any educational system. All activities within a system are geared towards producing persons who would be useful to the society. There is no doubt that distance education is expanding in our country. This expansion could be noted in terms of students' enrolment, number of institutions, number of programs/courses etc. However, the system is plagued by a number of problems, among which lack of facilities is an important one. The Open Universities provide certain services, which are geared towards making students comfortable within the University set-up. The important services are provision of study materials, PCPs, library services, enquiry services, and multi-media. These provisions make distance education distinct from education through private registration. An attempt is made here to analyze the perception of learners about these services. To indicate the level of the services, the responses were classified into adequate, rich, inadequate, and not available at all. Table 91 provides the details on the learners' perception about study materials.

Table 91
Perception of Learners about the Study materials

Response/ Category	IGNOU		BRAOU		KSOU		TOTAL	
	No.	%	No.	%	No.	%	No.	%
Adequate	148	59.2	20	8.00	16	16.25	174	23.2
Rich	78	31.2	125	50.00	82	32.8	247	32.93
Inadequate	24	9.6	87	34.8	143	57.2	292	38.93
Not available	0	0.00	0	0.00	27	10.8	27	3.6
Total	250	100.0	250	100.0	250	100.0	750	100.0

(No= Number, %= Percentage)

The majority of the learners of Karnataka State Open University find the study materials inadequate, where as in BRAOU, study materials are found to be fairly adequate by the majority of learners. In IGNOU, the majority finds the study materials adequate. The sample as a whole, only 23.2 percent consider the study materials adequate. About 33 percent consider them rich. However, more than 38 percent perceive them inadequate.

It is well known that PCPs are an integral part of the distance education programs of most of the Universities. It is through the PCP that the learners make close contact with their tutors. In this context, it is interesting to know how the learners of the different distance education Institutes respond to the PCPs. Perception of learners about contact sessions are given in Table 92.

Table 92
Perception of Learners about Contact Classes

Response/ Category	IGNOU		BRAOU		KSOU		TOTAL	
	No.	%	No.	%	No.	%	No.	%
Adequate	5	2.00	19	7.6	22	8.8	46	6.13
Rich	131	52.4	146	58.4	30	12	229	30.53
Inadequate	114	45.6	85	34	198	79.2	475	63.34
Not available	0	0.00	0	0.00	0	0.00	0	0.00
Total	250	100	250	100	250	100	750	100.00

(No= Number, %= Percentage)

Table 92 shows that as in the case of study materials, more than two-third of the learners of the Karnataka State Open University find the PCPs 'inadequate'. In IGNOU and BR. Ambedkar Open Universities, the majority perceives the PCPs rich. Generally, the learners feel that the counseling/contact classes are inadequate to meet their requirements.

9.7 Libraries in distance education

The need for providing a strong infrastructure for the successful operation and implementation of distance education programs cannot be over emphasized. The main prop of distance education should be provided much more than in the case of formal education. In their absence the students will unavoidably be driven to cheap publications in the form of guides, which are nothing but capsulated information. They give the students just minimum information often erroneously and shabbily presented, for passing examinations. The students would get no access to serious books and periodicals in different disciplines and imbibe knowledge of their subject in depth. Even at present when the main thrust is on formal education the consequences of under utilization of library resources are evident. Therefore, when distance education facilities are widened and the number of students

increase with little opportunity for personal contact programs, the tide decline in the standard of education is bound to assume serious proportions unless proper steps are taken in advance in the form of developing library facilities and encouraging the students to make their self study library centered. (Isaac, 1979)

Libraries are the symbols of cultural maturity of the society. Since the study is being conducted in the field of library science, the investigator feels that type of library used by the distance learners should be assessed using all the classificatory variables. Here an attempt has been made by the investigator to analyze which type of library the distance learners are using, i.e., whether they are using the libraries of their institution or other libraries. This is to get an overview picture about the importance of libraries in the distance education system. Their responses about the type of library they used are given in Table 93.

Table 93
Type of library used by distance learners

University	No use	Attached to OU	Conventional University	Special	Public	Total
IGNOU	119 (47.6)	9 (3.6)	49 (19.6)	21 (8.4)	52 (20.8)	250 (100)
BRAOU	180 (72)	4 (1.6)	14 (5.6)	12 (4.8)	40 (16)	250 (100)
KSOU	179 (71.6)	6 (2.4)	11 (4.4)	7 (2.8)	47 (18.8)	250 (100)
Total	478 (63.73)	19 (2.53)	74 (9.87)	40 (5.33)	139 (18.53)	750 (100)
Pearson Chi-square: 200.585, df=10, p=0.00000						

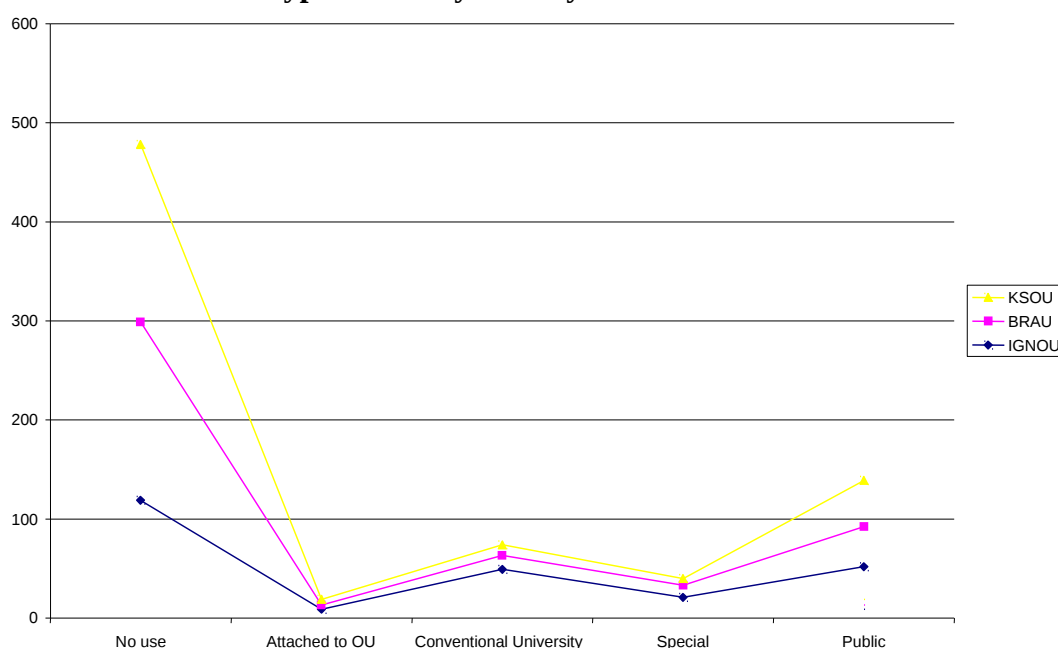
(Figures in brackets indicate percentage)

Table 93 reveals that the majority (63.73) of the respondents are not in the habit of using the library. Among those who use the library (18.53) percentage are using the public libraries. The point is mentioned by various similar studies in the field of library science, which indicate that public libraries can act as a greater promoter of life long learners' education, which is one of the major goals of public libraries. Only 2.53 percent of the respondents are using the libraries attached to the Open Universities.

There exists significant difference among the distance learners of various Open Universities in the country in their use of library resources. Figure 15 gives a clear picture about the types of library used by the distance learners.

Figure 15

Type of library used by distance learners



The gender wise analysis is done Table 94.

Table 94
Type of library used by distance learners -Gender wise

University	No use	Attached to OU	Conventional University	Special	Public	Total
Male	255 (59.86)	14 (3.29)	53 (12.44)	27 (6.34)	77 (18.08)	426 (100)
Female	223 (68.83)	5 (1.54)	21 (6.48)	13 (4.01)	62 (19.14)	324 (100)
Total	478 (63.73)	19 (2.53)	74 (9.87)	40 (5.33)	139 (18.54)	750 (100)
Pearson Chi-square: 14.0594, df=10, p=.015252						

(Figures in brackets indicate percentage)

Table 94 reveals that the number of male learners who use the library facility is more (40.15%) than female learners (31.17%). It is against the common picture in the conventional University setup, where normally female learners are more using library facilities. It is to be notable here is that only 1.54 percent of female learners and 3.29 percent of male learners are using the libraries attached to the distance education institute. This indicates the pathetic situation of libraries attached to the distance education institutes in the country. But no significant differences can be seen in the case of gender acceptance of various types of libraries, as the p value is more than .05. The responses of learners on the basis of their level of education is given in Table 95.

Table 95**Type of library used by the Distance learners- level of education**

Level	No use	Attached to OU	Conventional University	Special	Public	Total
UG	248 (62.78)	10 (2.53)	42 (10.63)	25 (6.33)	70 (17.72)	395 (100)
PG	230 (64.79)	9 (2.54)	32 (9.01)	15 (4.23)	69 (19.44)	355 (100)
Total	478 (63.73)	19 (2.53)	74 (9.87)	40 (5.33)	189 (18.54)	750 (100)
Pearson Chi-square: 8.29093, df=5, p=.140948						

(Figures in bracket indicate percentage)

Table 95 shows that there is no significant difference between the Undergraduate (37.21%) and Postgraduate learners (35.22%) in using the library facilities of different institutions in the country.

It is a common belief that science students are more using the library facilities than non-science students. So the subject wise analysis about the percentage of students who use the library and which libraries they are using is important. It is given in Table 96.

Table 96**Type of library used by the learners- Subject wise**

Subject	No use	Attached to OU	Conventional University	Special	Public	Total
Science	41 (51.25)	3 (3.75)	10 (12.5)	3 (3.75)	23 (28.75)	80 (100)
Non-science	437 (65.22)	16 (2.39)	64 (9.55)	37 (5.52)	116 (17.31)	670 (100)
Total	478 (63.73)	19 (2.53)	74 (9.87)	40 (5.33)	139 (18.54)	750 (100)
Pearson Chi-square: 16.1303, df=5, p=.006491						

(Figures in brackets indicate percentage)

Table 96 shows that science students (48.75%) outnumber the non-science students (34.77%) in using the library facilities. It is clear from the table that most of the science and non-science students are using the public libraries in satisfying their information requirements. P value also indicates that, there exists significant difference in using various libraries by the science and non-science students in the field of distance education.

Another important area the investigator conducted the study is the seriousness and attitude of learners towards the libraries. This has been studied using two criteria such as:

1. Mode of library use
2. Purpose of library visit
3. Time allotment in libraries

9.7.1 Mode of library use

Library is the heart of an institution. So the students should be regularly attached with the library in a serious learning system. This is an

enquiry about to what extent the students feel the importance of libraries in their learning system. Responses of learners regarding their mode of library uses are summarized in Table 97.

Table 97

Mode of library use by the distance learners

Library use pattern	IGNOU		BRAOU		KSOU		Total	
	No.	%	No.	%	No.	%	No.	%
Once in a week	26	10.4	18	7.2	14	5.6	58	7.73
Twice in a week	22	8.8	10	4	2	0.8	34	4.53
More than twice / week	26	10.4	15	6	9	3.6	50	6.66
Irregular	61	26.4	37	14.8	35	14	133	17.73

(No= Number, %= Percentage)

Table 97 clearly shows that the students in distance education institutes are not in the habit of using libraries regularly. It indicates the adequacy of the study materials provided by their Universities and lack of development of knowledge base among the learners on the other. The percentages of irregular users are high in the entire sample Universities, i.e., IGNOU (26.4%), BRAOU (14.8%), and KSOU (14%) while comparing with other categories. The percentage of those who attend the libraries more than twice in a week is very low in all the Open Universities, i.e. IGNOU (8.8%), BRAOU (4%), and KSOU (0.8%)

From this discussion it is very clear that though the libraries are the most important supporting system, it is the most neglected supporting system in the field of distance education. In libraries attached to the headquarters of IGNOU and BRAOU, there is no access or membership to students, and it is restricted to the faculty members only.

Similarly the libraries attached to the study centres and regional centers have lot of limitations such as lack of fund, lack of staff and lack of adequate infrastructure facilities. Moreover the percentages of students who use the library facilities are very small.

9.7.2 Purpose of library visit

The second criteria used by the investigator to study about the purpose for which the distance learners are using the libraries. Their responses are summarized in Table 98.

Table 98
Purpose of library visit

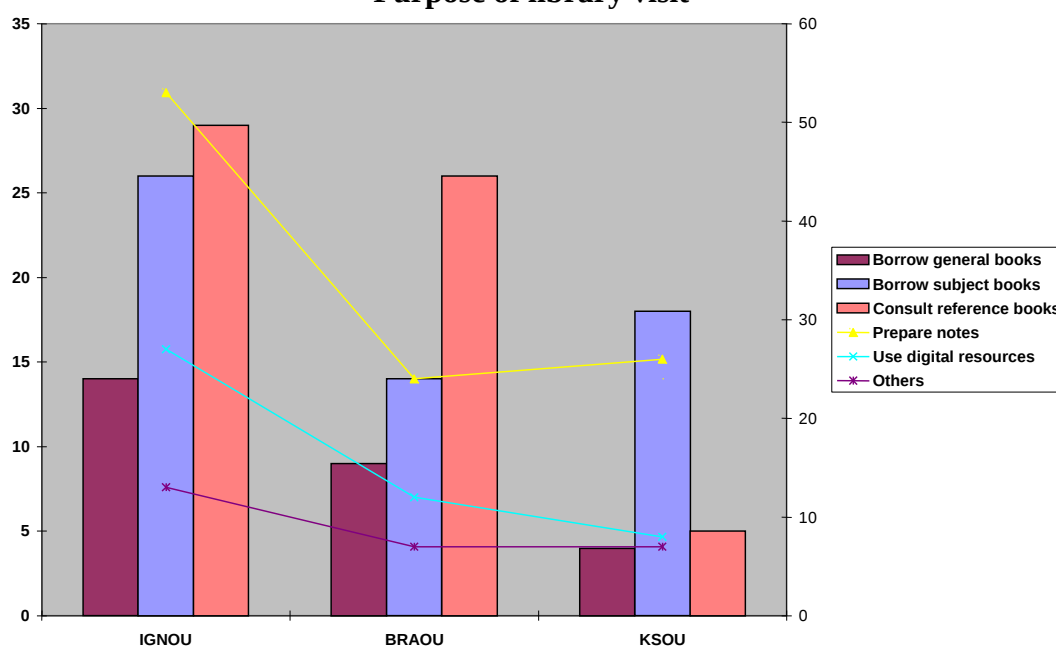
Purpose	IGNOU		BRAOU		KSOU		Total	
	No	%	No	%	No	%	No	%
Borrow general books	14	5.6	9	3.6	4	1.6	27	3.6
Borrow subject books	26	10.4	14	5.6	18	7.2	58	7.73
Consult reference books	29	11.6	26	10.4	5	2	60	8
Prepare notes	53	21.2	24	9.6	26	10.4	103	13.73
Use digital resources	27	10.8	12	4.8	8	3.2	47	6.26
Others	13	5.2	7	2.8	7	2.8	27	3.6

(No= Number, %= Percentage)

Table 98 reveals that majority of the respondents (13.73%), though it is small, marked that they are coming to libraries to prepare notes relating to their subject of study. Their next preference were to consult reference books (8%), followed by to get subject books (7.73%). Purposes for which distance learners are using the library are given in Figure 16.

Figure 16

Purpose of library visit



The point is to be added with this is the inadequacy of the collection in libraries attached to the Open Universities as it is mentioned by the students in Table 100.

9.7.3 Seriousness in the library use

Another attempt has been made by the investigator to analyze the time allotted by the students during their visit to the libraries. It is also to identify the seriousness of students in using the library resources during their time of visit. It is given in Table 99.

Table 99
Seriousness in the library use

Time allotted / Day	IGNOU		BRAOU		KSOU		Total	
	No	%	No	%	No	%	No	%
< Hour	28	11.2	13	5.2	5	2	46	6.13
1-2 Hours	22	8.8	12	4.8	12	4.8	46	6.13
2-3 Hours	6	2.4	0	0	1	0.4	7	0.93
3-4 Hours	0	0	0	0	0	0	0	0
> Five hour	0	0	0	0	0	0	0	0
Irregular	79	31.6	55	22	42	1.8	176	23.46

(No= Number, %= Percentage)

As the students are attracted to the system due to its flexibility, it is reflected in their opinion regarding mode of use and seriousness in library use.

Majority of the students, i.e. IGNOU (31.6%), BRAOU (22%) and KSOU (16.8%) are irregular in their timing during their visit to the libraries. It is evident from Table 99 that during their visit distance learners are spending very few hours only for the purpose of study and reference.

9.7.4 Availability of documents in the libraries attached to distance education institutes

To what extent the libraries of Open Universities can satisfy the information requirements of its clientele is another area of major concern. So an enquiry has been done regarding the opinion of learners about availability of different types of documents in the libraries attached to the distance education system. The learners' responses are given in Table 100.

Table 100
Availability of documents in the libraries
attached to distance education institutes - (In percentage)

Type of books	IGNOU	BRAOU	KSOU	Total
General books	7.60	5.60	6.40	6.53
Subject books	9.20	4.80	2.40	5.47
Reference books	18.40	10.00	8.40	12.27
Digital resources	0.80	1.20	0.00	0.67
Journal/magazines	5.2	0.8	1.6	2.53
Not available	58.80	77.60	81.20	72.53
Total	100.00	100.00	100.00	100.00
Pearson Chi-square :48.9887, df=16, p=.000034				

Table 100 indicates that majority of the respondents (72.53%) of total students are on the opinion that the documents which they want for their learning purposes are not available in their libraries. Among the different documents available reference books comes first (12.27%), followed by general books (6.53%), followed by subject books (5.47%). Journals got only 2.53 percent and only 0.67 percent opined that digital resources are available in the libraries of Open Universities.

P value also indicates that there exists significant difference among the learners of different Open Universities in their opinion regarding the availability of various documents in the libraries of Open Universities in the country.

The data pertaining to the availability of the documents clearly shows that the libraries of the Open Universities have to strive forward for satisfying the information requirements of the learners. The government and the authorities should give much more care and attention towards the

development of collection in libraries attached to the Open Universities. Especially in a situation where digital resources and electronic information sources are becoming the major concern of the learners, Open Universities should give emphasis to the digital information resources in the libraries.

9.7.5 Opinion of DL about the libraries of the institute.

Distance learners were asked to indicate their opinion about the libraries of their institute. Their responses are given in Table 101.

Table 101
Opinion of DL about the libraries of the institute.

Opinion	IGNOU		BRAOU		KSOU		Total	
	No.	%	No.	%	No.	%	No.	%
Excellent	0	0.00	0	0.00	0	0.00	0	0.00
Good	50	20	38	15.2	13	5.2	101	13.47
Satisfactory	72	28.8	61	24.4	44	17.6	177	23.6
Not satisfactory	128	51.2	151	60.4	193	77.2	472	62.93
Total	250	100	250	100	250	100	750	100

(No= Number, %= Percentage)

Table 101 shows that majority of the respondents (62.93%) are on the opinion that the libraries of their institute are not satisfactory in terms of its resources and services. Only a small percentage of users have the opinion that their libraries are good (13.47%). It is to be noted here that most of the study centers are attached to the regular schools or colleges where the classes are going on in Sundays and holidays for the distance learners. There is no library for them to access. In most of the study centres there is no exclusive library for the distance education students. It will be difficult for the students to go and use the libraries of the regional centers on a regular basis. That is the

major reason for this amount of backwardness in the case of libraries in the field of distance education.

It is seen that, in the sample as whole, only a little learners exclusively depends on the SSS of DEIs. The inadequacy of the facilities and the poor SSS of Open Universities force the learners to make alternative arrangements for successful pursuance of the course. Some of the learners depend on notes and guides published by agencies other than their Universities. This is true for IGNOU learners as well. A few depend both on private coaching centres and published guidebooks. As a result of these arrangements, the private cost of distance learning goes up and the claim of its cost effectiveness is called into question. In the circumstances, distance education constitutes only an agency to grant registration to students for a course or a program.

IGNOU maintains a main library and documentation centre at the headquarters at New Delhi and small collections at various regional centres and study centres relevant to the needs and requirements of various courses of study. Inspire of these library facilities most of the IGNOU students are not satisfied with the present library and information services made available to them. The public library system in most of the states is not very well developed and hence many IGNOU students are not able to derive the desired library support services from the existing public libraries. The existing regulations of University libraries in various regions primarily permit their own students, research scholars and teachers to use library facilities.

9.7.6 Requirement of learners from the libraries in future

Learners of the Open Universities are changing their attitude towards distance education. So they were asked to indicate their expectations from the libraries in future. Their preferences are summarized in Table 102.

Table 102
Requirement of learners from the libraries in future

Item	IGNOU		BRAOU		KSOU		Total	
	No	%	No	%	No	%	No	%
Network based Services	195	78	139	55.6	136	54.4	470	62.67
CD-ROM search	159	63.6	111	44.4	175	70	445	59.33
Database search	87	34.8	95	38	66	26.4	248	33.07
Others	20	8	30	12	27	10.8	77	10.27

(No= Number, %= Percentage)

Table 102 shows that majority of the students (62.67%) expect network-based services from the libraries in future. It may be due to the importance and acceptability of emerging Internet technology in the society. A very good percent of learners (59.33%) prefer CD ROM search facility and 33.07 percent expect data base search facilities from the libraries in future.

It shows that the students of Open Universities expect sophisticated information services from the libraries. It also indicates the students' opinion about the promotion of library services through IT application. For this the libraries should get access to e-learning resources such as e-journals to meet the information requirement of its clientele in the present and future.

9.7.7 Opinion of faculty members about library services

The opinion of students regarding the library facilities is proved from the above discussion. In this section the opinion of faculty members regarding this is issue is assessed and tabulated in Table 103.

Table 103
Opinion of faculty about library services provided by the University

Opinion	IGNOU		BRAOU		KSOU		Total	
	No.	%	No.	%	No.	%	No.	%
Highly effective	0	0	0	0	0	0	0	0
Effective	0	0	0	0	0	0	0	0
Satisfactory	8	8.69	7	18.42	8	33.33	23	14.93
Not effective	67	72.82	29	76.31	14	58.35	110	71.42
No idea	17	18.47	2	5.26	2	8.33	21	13.63
Total	92	100	38	100	24	100	154	100

(No= Number, %= Percentage)

Table 103 shows that majority of the faculty members (71.42%) believes that library services provided by their University is not effective. Only 14.93 percent of faculty members marked it as satisfactory.

From the discussion it is clear that in the field of distance education lack of integration of the library services are very evident. Students are at present using public libraries or the libraries of conventional Universities for the sake of reference purposes. Others may be satisfied with the study materials provided by the Universities. It not only decreases the standard of students, but it also creates awareness among the society that distance education is a liberal and flexible way of getting a diploma or a degree.

9.8 Utilizations of SSS

Education through the distance mode will be effective only when the learners make use of the SSS. Distance Education Institutes vary among themselves in the provision of SSS. The provision of SSS is found to be grossly inadequate by the distance learners in the present study. The learners of all the Distance Education Institutes frequently make use of the study

materials and contact classes. However, the utilization of library and multi-media services is scanty. Even at IGNOU, only a very small percent of the learners frequently use multi-media facilities. In other Open Universities, the situation is a bit worse. All these have significant impact on making distance education quite unsuccessful as an alternative channel for higher education.

FINDINGS AND SUGGESTIONS

Open and Distance Learning (ODL) assumes special significance in the educational scenario of both developed and developing countries. It has got popularized as an alternative stream of education capable of taking educational benefits to the un-reached and the marginalized. Distance education marks a paradigm shift from the teacher-centered education system to the learner-centered education system. The ODL system rests on the pillars of democracy, equity, and flexibility. It has earned legitimacy and expanded worldwide. The main purpose of this study has been to examine the perspective of its learners i.e., the main stakeholders of the system, about its functioning.

The specific objectives of the study have been:

- 1) To assess the background characteristics of distance learners in the field of higher education in India.
- 2) To assess the attitude of distance learners and faculty members towards the distance education and conventional education and to examine the relevance of distance education as an alternate system of education.
- 3) To assess the present status and quality of distance education conducted by Open Universities in the country, and to suggest certain methods for improvement.
- 4) To assess the Information Technology awareness of distance learners and faculty members of the Open Universities in the country.

- 5) To review the availability and use of Information Technology tools at different Open Universities in the country.
- 6) To study about the present status of IT application in the field of distance education in the country and to examine the changes occurred in the curriculum of Open Universities due to the application of Information Technology.
- 7) To find out the areas in which IT can be effectively applied and to identify certain prerequisites for the same.
- 8) To examine the information needs and problems and to assess the library use and library services provided by the Open Universities in the country.
- 9) To examine the feasibility of the establishment of 'virtual universities' and web based learning in India and to examine the delivery models, which are preferred in the web based learning environment.
- 10) To explore the possibility of modernization of distance learning through the application of Information Technology and to formulate certain policies and plans for the same.
- 11) To understand whether there exist any significant difference between large/ medium and small Open Universities in the application of Information Technology in distance learning.

1. MAJOR FINDINGS

The major findings are systematically presented in order of the objectives of the study.

1. The analysis shows that Open University system in is slowly picking up in India (Table 7, 8, 9). Enrolment in the field of distance education

is increasing day by day. Wide variety of courses are being introduced using modern technological tools. Majority of the learners are using modern and traditional methods for learning. All these clearly indicate that distance education is growing as an alternative system of learning.

2. Profile of distance learners reveals that Open Universities and distance education institutes in the country conducts more programs dealing with non-science subjects (Table 16). Among the various subjects computer science and mathematics are the major disciplines in Open Universities in the country. More over majority (71.33%) of the students coming to Open Universities are having general subject background (Table 14).
3. Age profile of the distance learners shows that majority of the learners (78.53%) in the Open Universities were below 30 years old. Gender profile shows that male learners outnumber (56.8%) female learners (43.2%) in Open Universities in India (Table 11). Distribution of learners on the basis of area of residence shows a high concentration of learners registered in Open Universities in the country belongs to urban (60.66%) areas. Only 39.33 percent of learners belong to rural areas (Table 13).
4. Analysis on the basis of Gender shows that more male learners (56.8%) are attracted to the Open Universities than female learners (43.2%). Similarly more urban learners (67.6%) are attracted to the distance education system than rural learners (61.2%). Table 12 shows that only 17.73 percent of students having professional subject background are coming to the distance education. Students having general academic background (71.33%) are more attracted to the distance education system. All these clearly indicate that learners in the

field of distance education come from different academic background in India.

5. Table 18 shows that majority of the respondents from IGNOU (54.8%) are not satisfied with the present methods and procedures adopted in the field of distance education. Only 38.8 percent students are satisfied about the present distance education system. In the case of BRAOU 37.2 percent students are satisfied and 41.2 percent are not satisfied. In the case KSOU 32 percent students are satisfied and 46.8 percent are not satisfied. In general it can be said that the percentage of learners who are satisfied about the present methods and practices is low in comparing with the percentage of students who are not satisfied with the present methods and practices adopted in the field of distance education in India.
6. Table 19 shows that 88 percent of students of IGNOU and 86 percent of students of BRAOU and 78.4 percent of students of KSOU agree that the mode of learning is gradually changing into distance mode especially in the field of higher education in the country. Only 7.7 percent of students disagree with this opinion. Moreover the majority of the respondents from all the universities such as IGNOU (67.4%), BRAOU (69.6%) and KSOU (70%) agree with the fact that distance education is becoming a global scenario (Table 25). Only a small percentage, i.e. IGNOU (7.6%), BRAOU (16.8%) and KSOU (17.2%) disagree with the fact.
7. Table 20 reveals that a high percent of students (39.73%) agree that the change in to the field of distance education is due to the convenience (39.73%), followed by economic problems (25.6%), and followed by social problems (12.53%). It is to be noted here that it is not the quality of the distance education methods, which attract the learners to the

field of distance education, but the flexibility and convenience are the factors, which bring the learners to the field of distance education.

8. Table 21 reveals that the glaring problem faced by the distance education system in India is the lack of seriousness (31.46%) from the part of students. The second problem marked by the learners (26%) is the lack of technological support. It is wonder to note that even students from IGNOU feel that technological support is not adequate to them. There is no notable difference among the universities as it is commonly expected. Another important problem is the lack of quality study material in BRAOU and KSOU where the percentage of IGNOU is small. Most of the IGNOU students are satisfied about their study materials. Another important problem is limited classes (12.4%) and lack of staff (10.4%) has pointed out by a small percent of the students. Because of the liberal attitude of government towards open and distance education in the country, fund is not a major problem in Open Universities in India.
9. More than two-fifths of the total sample had to opt for distance education as they were unable to get admission in regular colleges or universities. This is true for all Open Universities in the country. It is to be added with the fact that majority of the respondents are below the age of 30. So the conventional university system in the country is inadequate to accept those who would like to continue their study in the conventional university setup. Moreover the regular learners are going to Open Universities and distance education centers mainly in the absence of opportunities in conventional Universities. Another reason cited by them is due to professional and work-related motives. By completing the course, the learner gets qualified to apply for new jobs in public or private sectors. Attainment of higher qualification and

increasing specialized knowledge enable the learner to seek better employment. In the case of the learners who are already employed, improving the chances of promotion motivates them in a big way. The third reason was 'life long learning' (12.4 %). 'Financial difficulty' as a reason was pointed out by about 12.4 percent of learners. The percentage of learners having marked 'job' (10%) as the study motive can also be added with this, because both are interrelated and interconnected. Some of the prospective learners preferred distance education as the student support services of Open Universities are of good quality (Table 22). There is no significant difference among various Open Universities in this regard.

10. Majority of the respondents (88.53%) in the study are not regular learners. The percentage of learners who adopt a systematic method for the study is very small. There is no significant difference among the students in different Open Universities in this regard. The percentage of learners who spend more than two or three hours for their learning is as small as it is not worth mentioning. It shows the status of distance education not as a standard and systematic way of education but as a liberal and flexible way of learning (Table 24).
11. The respondents from IGNOU (75.6%) have a very good opinion about the study materials provided by the university. Regarding the tutor access also majority of the respondents have positive attitude towards their university, (very good 11.2, and good 44.8). More than 50 percent of the learners from IGNOU feel that tutorial quality and assessment quality are good. The overall opinion from the students of IGNOU indicates that they have a good opinion about the university. This is true especially in the case of study materials where the students are proud of it (Table 26).

12. Table 27 shows that about 39 percent of learners from BRAOU have positive attitude towards the study materials provided by the university. When 16 percent of students feel that the study materials are poor quality, a small percentage, i.e., 2.4 percent feels it as very poor. Only less than 50 percent of learners have good opinion about tutorial quality, mode of assessment and assessment quality. It is to be noted here is that a high percentage of learners are reluctant to express their views either positively or negatively.
13. Majority of the respondents from KSOU are neutral regarding their opinion about the study materials. When 24.8 percent feel it good, 24 percent has the opinion that study materials are poor. More than 50 percent of the learners from KSOU have positive opinion about tutor access, mode of assessment and assessment quality. Their opinion about tutorial quality was average (Table 28).
14. The University wise analysis shows that majority of the respondents (66.67%) was aware of the Internet and is using Internet. Table 29 also shows that students are experiencing with the Internet recently, than it was in the earlier times. It also indicates that there exists significant difference among the universities with regard to the familiarity with the Internet. The percentage of unfamiliar users is high in KSOU (40.80%), followed by IGNOU (31.6%), and followed by BRAOU (27.60%).
15. The gender wise analysis shows that male learners are more familiar (78.64%) with Internet than female learners (50.91%). A high percent of the female learners (49.07%) are not familiar with the Internet (Table 30). It also shows that the percentage of learners having more than three-year experience in the use of Internet is less while comparing with those who have less than one-year experience. It also

shows that our society is developing in a faster rate in acquiring the skills relating to the use of Information Technology tools. In the present days most of the learners are trying to capture the technology. It may be the reason for increase in number of learners having less than one year experience. The p value indicates that there exists significant difference among male and female learners in their familiarity with Internet.

16. Table 31 shows that the Post Graduate students are more familiar (74.8%) with Internet than the Under Graduate students (60.1%). The percentage of the users who are not familiar with Internet is high in the case of UG students (40%) than in the case of PG students (25.92%). Chi-square value indicates that significant difference can be seen among the UG and PG students in the case of their familiarity with Internet. Analysis also shows that the mode of use of Internet resources by PG students is high (84.23%) when comparing with the UG students (74.3%). But in the case of regular users we can find more Under Graduate students (12.15%) than Post Graduate students (11.55%).
17. Table 32 shows that the science students (66.25%) and non-science students (66.71) are equal in the case of Internet familiarity and there is no significant difference among these groups. It is to be noted here that most of the science students are coming from computer science and mathematics. There is more possibility for them to be familiar with Internet and communication technology. Table clearly indicates that non-science students are not far behind of the science students to use the latest technological advances applied in the field of distance education.
18. Table 33 shows that majority of the respondents are not using Internet regularly (52.67%) and it has not yet become the part of their habitual

action. As per the p value there exists significant difference exist among the Universities in the mode of internet use, as the percentage of those who are not using internet is only 14 percent in IGNOU where it is 25.6 percent in BRAOU and 24.4 percent in KSOU. But the percentage of regular Internet users is low (11.87%) in the all the sample Open Universities.

19. Table 34 reveals that male students are more (83.1%) using the Internet resources than the female learners (72.84%). But the difference is not as high as it is commonly expected. It also shows that the percentage of regular Internet users is high (12.65%) in the case of female users than male learners (11.27%).
20. Table 36 shows that the mode of use of Internet resources by science students are high (82.5%) in comparison with the non-science students (78.21%). It is also notable that only 8.1 percent of non-science students are using Internet regularly where the percentage of science students are comparatively high (40%). From the analysis by using different variables it is evident that majority of the respondents are not regularly using Internet resources.
21. Table 37 shows that majority of the students of IGNOU (63.6%), BRAOU (49.6%) and KSOU (58.4%) are accessing internet form outside cafés and only 10.8 percent of IGNOU students and 13.2 percent BRAOU students and 9.6 percent KSOU students are using it from their houses. It means that respondents having Internet connectivity at their home is less in the entire sample Open Universities. When 57.08 percent are depending outside cafés, only 11.2% students are accessing Internet from their houses.

22. Table 38 shows that only 18 percent of IGNOU students and 6 percent of BRAOU students and 6.4 percent of KSOU students are using Internet for educational communication and for getting educational resources. Majority of the learners (70.53%) are using it for non-educational purposes such as chatting, entertainment and other browsing facilities. Only 3.2 percent of learners are communicating with their faculty members through Internet and only 6.93 percent of learners use Internet as a communication media among them. So it can be inferred that interpersonal communication among distance learners are less.
23. There is no significant difference among male and female learners in using Internet for educational communication among them, i.e. male (10.1%), female (11%) (Table 39). Similarly UG students are more in number (11.64%) than PG students (8.45%) in using Internet as an educational communication media among them (Table 40). Science students are more (11.5%) are using Internet as an educational communication media than non-science students (9.8%) (Table 41). The overall analysis shows that the percentage of the learners who use Internet for educational communication is very small.
24. Table 42 shows that majority of the respondents from the entire sample Universities have marked Telephone, IGNOU (91.20%), BRAOU (82.40%) and KSOU (91.20%) as their major media used for communication. It shows that even in the technological age telephone has its own relevance. E-mail is the second most popular tool for communication among learners (82.27%). E-mail communication has become the part of daily life in the world. The importance of this media in the field of distance education is evident from the percentage of users who use this technology. Cell phone is the third preference of

the students (67.47%) followed by browsing (20.53%). There is no significant difference among the learners of different Open Universities in the use of bulletin board, interactive video, voicemail and browsing as the p value is greater than .05. But in the case of e-mail, chatting, browsing, newsgroup and telephone, there exist significant difference among the learners of different Open Universities in using them as the p value is less than .05. The imbalances among universities and among society in getting accessibility to the IT tools and techniques is clear from the analysis.

25. Gender wise analysis shows that in the case of voicemail, interactive video, news group, and e-mail, there exist significant difference among the male and female learners. But in the case of chat, browsing, and use of telephone and cell phone the difference between male and female learners is very small. This indicates that female learners are not in backward position in the case of use of Information Technology tools in the distance learning process as it is commonly expected. The general inference can be made from these is that the divide between male and female learners in the technological environment is very low. It is a clear indication that technological application will simplify the gender difference and give more opportunities to the female learners than in the conventional setup (Table 43).
26. Subject wise analysis indicates that there is no significant difference among the science or non-science students in using various IT tools for the educational communication. The p value indicates that in the case of even a single media there is no difference among the students on the basis of the subject of study. It gives a clear indication to the authorities of Open Universities to use the Information Technology

related tools and services not only in the case of science subjects but in the case of non-science subjects also (Table 44).

27. Analysis on the basis of level of education indicates that in the case of the use of chat, browsing, use of telephone and cell phone the difference between Under Graduate and Post Graduate students is very small. But in the case of use of other media such as e-mail, bulletin board, news group, interactive video and voice mail, the significant difference among the UG and PG students in the field of distance education in the country can be seen (Table 45).
28. The table 46 shows that majority of the respondents of all the Universities either strongly agree (22.8%) or agree (56.98%) the potentiality of IT in the field of distance education. The percentage of learners who disagree with this fact is very small (5.2%), and there is no one who strongly disagrees with this.
29. Table 47 shows that about 80 percent of the respondents from the Open Universities either disagree or strongly disagree about the sufficiency of the present methods and practices adopted in the field of distance education. IGNOU has started various technology based teaching techniques such as online classes, radio talks, television talks and interactive video conferencing for some of its courses. Though the students are not utilizing them effectively, they have a positive attitude towards these technologies and they are not using them because of the availability of Self Instructional Materials with them. There is no significant difference among the learners of various Open Universities in this regard.
30. Table 48 reveals that 97.2 percent of learners have radio in their convenient places of access. Television is also found to be accessible

to more than four-fifths of them. The audiocassette recorder (ACR) and Audio Cassette Player (ACP) are also available to the majority. VCP, computer, and Internet facilities have made their entry into their homes, but the proportions are small.

31. Table 49 reveals that a wide variety of media are being applied in the field of distance education in the country. Among them correspondence and use of study material is the major media used by the learners. Even in IGNOU majority of the students (98.8%) students are using correspondence of study material and contact classes in learning process. All the respondents from BRAOU and KSOU depend on study materials provided by their University. P value indicates that there exists significant difference among the learners of different Open Universities in using multimedia instruction system in their learning.
32. When 78 percent of IGNOU students attend contact classes, the percent of learners from other Open Universities, BRAOU (89.20%), KSOU (80.80%) are comparatively high. P value shows the significant difference among the students of Open Universities in this regard. The actual picture about the attendance in the contact classes is less than this amount (Table 49).
33. Regarding the use of Radio talks or Gyan Vani 17.6 percent of IGNOU students are using the program. The percentage of BRAOU (6.80%) and KSOU (2%) students are low. TV talks/ Gyan Darshan are one of the major media applied by IGNOU in the field of higher education. But surprisingly enough the percentage of IGNOU students who use Gyan Darshan channel in their learning is not high (17.2%) as it is commonly expected. The p value indicates that there exists significant difference among the learners of various Open Universities in using Gyan Darshan as a media of communication. Some of the students of

BRAOU (4%) and KSOU (1.6%) are also utilize the TV talks conducted by IGNOU. It is notable that majority of the courses conducted in the Open Universities does not have Gyan Vani and Gyan Darshan classes (Table 49).

34. Radio phone-in programs are being applied in the field of distance education. This facility is used by 9.6 percent of IGNOU students, 8 percent BRAOU students and 8 percent KSOU students. Difference between various universities in this regard is very low. Interactive video programs are conducted by IGNOU only. 20.8 percentages of students are making use of this facility. No students either from BRAOU or from KSOU use this facility in their learning process. Among the various media interactive video conferencing is the major media used by IGNOU students after the correspondence and contact classes. It indicates the importance of this media and there is urgent need for other universities also to adopt this media in their teaching program (Table 49).
35. Tele conferencing with various experts is another media applied in the field of distance education. Teleconferencing sessions are interesting and it is a new method of emerging communication. This facility is used by 5.6 percent IGNOU students, 2.8 percent of BRAOU students. It is to be noted that no students from KSOU use this facility as a media in education (Table 49).
36. Gender wise analysis shows that the difference between male and female learners is very small in the case of Open Universities regarding the use of various media in the learning. More than 99 percent of the male and female learners are depending on correspondence as the major media of learning. More than 85 percent of the both male and female learners are attending contact classes.

More male learners are using the programs like Gyan Darshan and Gyan Vani in comparison to the female learners. But in the case of teleconferencing female learners are more interested than male learners. Interactive radio and video are used by more male learners than female learners. But the overall analysis shows that the difference between male and female learners is very small and the p value also indicates that there is no significant difference among the male and female learners in using multimedia instruction system in Open Universities in the country (Table 50).

37. Table 51 indicates that correspondence and contact classes are the major media used by both science and non-science students in their learning process. Radio talks are more used by science students (16.25%) than non-science students (7.91%). In the case of use of Television in the learning, there is no significant difference among science (6.25%) and non-science students (7.76%). But there exist significant difference among science (13.75%) and non-science students (6.12%) regarding the use of teleconferencing as a media of learning. In the case of interactive radio and video the difference between science and non-science students are very low. The overall analysis shows that the difference between science and non-science students regarding the use of various media in their learning process is very low in Open Universities in the country.
38. Table 52 shows that there exists significant difference among Under Graduate and Post Graduate students in the field of distance learning regarding the use of Gyan Darshan, interactive radio and interactive video. In using various other media like correspondence, contact classes, and teleconferencing the difference between UG and PG students are very nominal. In the case of use of various media where

the significant difference exists, the PG students outnumber the UG students.

39. Table 53 shows that majority of the respondents; IGNOU (75.2%), BRAOU (82.4%) and KSOU (66.8%) are on the opinion that the IT based education has advantage over correspondence education.
40. The importance of audiocassettes is decreasing day by day. Its relevance as a storage media is also decreasing. It is reflected in the users' opinion also. Only 8 percent of IGNOU students, 6.4 percent of BRAOU students and 2.4 percent of KSOU students use audiocassettes in their learning programs. Videocassettes have become technologically side tracked by the CD ROMs, which is used, by only 49.2 percent of total students from sample Open Universities. It clearly shows that major storage media used by distance learners are CD ROM technology (Table 54).
41. Databases also are used by distance learners in their educational purposes. 6 percent of IGNOU students, 4 percent of BRAOU students and 3.2 percent of KSOU students use this facility in their electronic information storage and retrieval purposes. Network based information services are also important in the digital information dissemination. The responses of learners indicate that 12.8 percent of IGNOU students, 9.2 percent BRAOU students and 8.4 percent of KSOU students use network-based services in their information dissemination and transfer purposes (Table 54).
42. Table 55 shows that audio cassettes are used by 6.57 percent of male learners and 4.32 percent of female learners. Videocassettes are used only by 2.58 percent of male and 4.63 percent of female learners. Majority of the male (51.92%) and female (45.62%) use CD ROM as

their electronic media of information storage and retrieval in their learning process. It also indicates that there is no significant difference among the male and female learners with regard to the use of various electronic information media in their learning process.

43. Table 56 reveals that only a small percentage of science (7.5%) and non-science (5.37%) students are using audiocassettes. Videocassettes are used by 5 percent of science students and 3.28 percent of non-science students. Majority of the science (51.25%) and non-science (48.96%) use CD ROM technology for the information handling purposes. Databases are used by 5 percent of science students and 4.33 percent of non-science students. Due to the importance of network technology in the modern world Network based services are used by 12.5 percent of science students and 9.85 percent of non-science students. There is no significant difference among the science and non-science students in the use of various electronic information sources in their learning process.
44. Table 57 shows that when 6 percent UG students prefer audiocassettes 5 percent PG learners use audiocassettes. The significance of videocassettes is very low in both sample learners, UG (2.53%) and PG (4.51%). CD ROM is used by 46.58 percent of UG students and 52.11 percent of PG students. Databases are used by 3.8 percent of UG students and 5.07 percent of PG students. Use of network-based services are comparatively high in the case of both UG (10.13%) and PG (10.14%) students. The p value indicates that there is no significant difference between Under Graduate and Post Graduate students in the case of the use of various electronic information media in learning process.

45. Table 58 shows that majority of the respondents (31.33%) are using the digital information sources for getting descriptive information on a topic. It may be due to the development in the field of Internet and related technologies. But the preferences of various Universities have great difference while considering each Open University separately. Majority of IGNOU students use digital information sources for discussion with colleagues (29.2%). Majority of the BRAOU students use it for descriptive information on a topic (35.2%) and majority (38%) of KSOU students have marked no preference for using digital information sources.
46. Table 67 shows that, the majority of the respondents, IGNOU (60%), BRAOU (66.4%) and KSOU (61.2%) disagree with the idea that IT can be a substitute for teachers.
47. Table 59 shows that majority of the students from IGNOU, (62.40%) feel that the society is not so developed into the extent that IT based tools and resources are only sufficient in the field of distance education. As per the opinion of the learners from BRAOU (46.80%) and KSOU (69.20%) cost is the major factor in utilizing the potentialities of IT to the fullest extent. Only a small percentage of students marked the existing staff and lack of support from the part of government as a factor in utilizing applying the Information Technology tools in the field of distance education. But in future they have the opinion that the IT tools can be fully utilized and it will be sufficient media in the field of distance education (Table 60).
48. Table 61 shows that the majority of the respondents (37.01%) have the opinion that major concern in the computer mediated distance education is the student computer competency. This is true because the beneficiaries of the system should be well familiar with the computer

technology to use it. Computer training is another factor pointed out by 19.48 percent of learners, followed by group interaction (14.29%), followed by Support group (12.98%). The teacher computer competency has got least preference, because in the computer based distance learning situation the role of teachers is comparatively small and their computer competency is undisputable.

49. Table 62 shows that 35.6 percent of users are not using IT tools due to the lack of suitable program to them. It may be due to the reason that tele-learning facilities and IT tools are more applied in subjects such as computer science and related subjects. Subjects like humanities and social science are neglected in the case of applying latest developments in the field of Information Technology. 26 percent of the total respondents are unfamiliar with IT used programs. IGNOU provides wide variety of e-learning programs. Majority of the students from IGNOU (32%) are not using the e-learning programs due to their unfamiliarity with the programs. So the universities like IGNOU should take more attention in familiarizing and making online programs user friendly. Table also shows that there exists significant difference among the students of various Open Universities in their reasons for not using IT tools. Majority of the students from BRAOU (47.6%) and KSOU (54%) are pointed the 'lack of suitable programs' as the major reason for not using IT tools. Though BRAOU follows the same pattern of IGNOU in teaching and learning, responses of students indicate that the University should strive forward for its better performance. Lack of quality and standards are marked by very few students (3.2%). It indicates that the students who use these facilities feel that the programs provided by Open Universities are standard.

50. Availability of Gyan Darshan facility is pointed out by 56.4 percent of IGNOU students and 11.2 percent of BRAOU students. It shows that Gyan Darshan programs are also utilized and facilitated by BRAOU students. It also indicates that even in some of IGNOU study centres facilities for Gyan Darshan and Gyan Vani programs are not there. KSOU is a bit back or it has not reached up to the level of other sample Open Universities. Teleconferencing facilities are only provided in some of the study centres of IGNOU and BRAOU. The significant difference among various Open Universities in making various media available at their study centres / regional centres and the high imbalance in the country regarding the use and availability of various media is evident from the study (Table 63).
51. Table 64 shows that though majority (80.5%) of the learners were aware about multimedia programs only 30.66 percent of students were able to watch the teleconferencing lessons, and 14.53 percent of students who watched teleconferencing lessons revealed that programs were useful and interesting as they were maintaining high levels of interaction between specialized subject experts and students. Regarding TV programs, though 73.2 percent of learners are aware about it, only 26 percent of them are watching the programs. A small percent i.e. (9.2%) are on the opinion that the programs are useful to them. Regarding video lessons 83.46 percent of learners are aware of programs and 12.93 percent of them are watching the programs. Only 7.73 percent are on the opinion that the programs are useful. Majority (87.46%) of the learners are aware about radio lessons but the percentage of learners who use it very small (26.93%). 51.86 percent of learners are aware about interactive radio facility, and only 9.33 percent are using them. Among those who use, only 6.93 percent are on the opinion that the programs are useful.

52. Table 65 shows that majority of the respondents are on the opinion that online learning is more flexible than class room based regular learning. Another advantage is that the students are getting ideas from other's contribution while studying online (70%). The third advantage mentioned by 68.7 percent of students is the sharing of ideas in the online learning environment. The possibility of sharing if ideas are more in online learning than in classroom learning. It has added advantage of economic and time saving. The students attached to the headquarters or the regional centres can only benefit from most of IT based tools and services such as video conferencing, teleconferencing as the facilities are not available in all the study centres.
53. Table 66 reveals that the major disadvantage of online learning is the physical exhaustiveness caused by the computer (79.1%). Majority of learners are on the opinion that printed materials are more comfortable (77.9%). Isolation from other students (70.9%) and limited interaction (62.1%) are other major disadvantages cited by the respondents.
54. Table 68 shows that majority of the faculty members have enough awareness and familiarity about Internet technology (Very good, 53.9%, Good 17.53%). Only a small percent i.e., 7.79 percent are poor in the field of computer and Internet technology. That may be faculty members from the fields of arts or humanities where the possibility for becoming familiar with Internet resources is comparatively small.
55. Table 69 shows that majority of the staff (70.13%) agree the fact that standard quality education is attainable through distance mode of learning. The percentage of those who disagree with this is small (24.73%).

56. Form Table 70 it is clear that 100 percent of faculty members from the entire sample Open Universities adopt counseling and assignment methods in teaching. Online classes are done by only 3.25 percent of faculty members. Interactive video is done by 15.22 percent of faculty members of IGNOU only, and no one from the respondents of other Universities uses it. Another important media is radio talks, which is used by 35.06 percent of faculty members, and TV talks are done by 23.38 percent of faculty members. The picture is clear that the majority of the faculties follow contact classes and assignment for teaching at distance and they are not utilizing the potential of Information Technology to the fullest extent. Seminar is another method used by some of the faculty members (16.88%) for teaching.
57. As per the opinion of faculty members (29.87%), major reason for the low pass percentage in the field of distance education was the lack of seriousness of students who opt the distance education. It is commonly understood that most of the students are attracted to the field of distance learning due to its flexibility and liberal entry procedures. From such students the seriousness of regular students cannot be expected. Another important reason cited by them (29.22%) was the lack of IT application. Though universities are doing much in this regard, the faculty members feel that it is not sufficient to meet the requirement of the learners in future (Table 71). The third important reason cited by the faculty members is the lack of adequate supporting services. Outdated techniques have been mentioned by 18.42 percent of BRAOU faculty members. It also supplements the opinion of all faculties regarding the lack of IT application. Only limited classes are getting to the students of Open Universities about their program. It has also mentioned by 9.74 percent of faculty members as a reason for the low pass percentage in the field of distance education. The low pass

percentages coupled with high rates of dropout make distance education quite unsuccessful as an alternative channel for higher education.

58. Table 75 shows that more than 90 percentages of total faculty members either strongly agree or agree about the application of IT in the field of distance education. This opinion is supplemented by their opinion that IT should be applied in all the fields such as instruction delivery, student enrolment, study materials evaluation etc (Table 76). Only 2.59 percent of faculty members disagree with this. The major impediment cited by the faculty members in the field of application of IT in distance education is the attitude of the learners (46.75%), followed by social under development (20.78%), and followed by the existing infrastructure (17.53%) facilities (Table 72). So creating social awareness and social development will automatically make the society to cop up with the technological advancements.
59. Table 73 shows that more than 50 percent of the faculty members agrees the fact that there is discrimination between regular and distance learners in the present job market. It is due to the reason that students who are attracted to the distance education are those who are either not serious in their study or they are joining for various courses for the sake of a degree or diploma. They are not undergoing severe experiments and practical tests, which are more important in the job market. To some extent this problem can be solved by fully utilizing the potential of Information Technology by making the procedures simple and making the students familiarize with the these technological alternatives. Making the IT as the major media will make students compelled to study about the IT techniques and tools which are more

interesting than classroom based teaching and learning. As a result more knowledge content can be imparted.

60. From the Table 79 it is clear that 73.37 percent of total faculty members agree with the establishment of Virtual Universities in the country. 23.28 percent of faculties disagree with this. It may be due the fear about the lack of quality and standards with the virtual universities or with their unfamiliarity with the concept of Virtual Universities.
61. Table 77 shows that majority of the faculty members (42.85%) have the opinion that society should be adaptive with the technology and their development is the major factor for IT application. It was the major opinion of students also in the field of distance education. Another major pre-requisite mentioned by the faculty members is the support from the part of the government (24.02%) in terms of money and technology, followed by infrastructure facilities (12.33%) both in terms of hardware and software. It is to be noted that fund (9.74%) is not a major problem in Open Universities.
62. Table 80 reveals that majority of the faculty members (38.96%) prefer Web Based Learning (WBL) supported by face to face and other media as their preference in the WBL environment, followed by WBL 50 percent and face to face 50 percent (38.96%), followed by WBL supported by face to face (19.48%). Only 12.33 percent of faculty members favor the WBL only as the media of education in the web based learning environment. The importance of teachers in every educational system is undisputable. Face to face education has its own implication even in the online or web based learning environment. It proves that an entire transformation into a web-based society is not practical or it is impossible.

63. Majority of the faculty members (65.58%) are on the opinion that nothing will happen to the conventional universities with the developments in the field of distance education. Open Universities will continue for a long time as a parallel way of flexible learning and education. The second major opinion expressed by them (20.77%) is that Open Universities will remain as supplementary to the conventional universities. Only a small percentage (8.44%) of faculty members believes that Open Universities and distance education system will dominate over the conventional University system (Table 81).
64. Table 82 reveals that 69.47 percent of faculties are on the opinion that a curriculum restructuring is required in the field of distance education to adopt latest technological advances. No significant difference can be seen among the opinions of faculties of various Open Universities in this regard.
65. Table 83 shows that majority of the respondents i.e., IGNOU (51.08%), BRAOU (42.1%), KSOU (33.33%) are on the opinion that through the effective application of Information Technology tools the standard and quality of the distance education in the country can be improved. Another important point mentioned by them is the timely distribution of study materials. 7.79 percent of the total faculty members have the opinion that job oriented courses and adequate funding should be made for improving the standard of the distance education in India. At the same time 5.84 percentage stress on the need for more contact and counseling sessions for improving the standard of distance education in the country.
66. The trends in the media use of faculties show that on an average four media were used by one faculty member in the academic activities.

The usage percentage was highest in the case of telephone and cable TV (100%), followed by the computer (55.2%), followed by the computer and CD ROM (83.11%), followed by Audiocassettes (68.83%), followed by videocassettes (43.5%), and followed by Internet (33%). Among these various media the telephone and cable TV are the most popular media, which may or may not use for academic interaction with learners. Less than 15% of faculty members were taking help of Gyan Darshan for assisting learners in counseling while Gyan Vani was being used by nearly 8 percent. Surprisingly enough less than 10% of academic faculties participated in teleconferencing sessions, while Open Universities are incurring a lot of efforts and expenditure for academic delivery through this mode (Table 84).

67. In the opinion of the majority of the faculty members, electronic media has the potential in boosting up the student attendance (Very good 26% and good 49%) in counseling sessions, contact programs etc. similarly quality of distance education, and participation in counseling sessions and the overall performance of the distance education can be improved with the application of Information Technology in the field of distance education. The percentage of those who have negative opinion regarding this matter is very small (Table 85).
68. Table 86 shows that majority of the students (79.46%) agree for establishing Virtual Universities in the country. A few percent of learners (13.73%) have not expressed their opinion either positively or negatively. Only 6.8 percent students are against the establishment of Virtual Universities in the country. Nobody strongly disagrees with this. A total of 6 percent students are enrolled for various courses in various Virtual Universities.

69. Table 88 shows that learners have different preferences regarding the web based learning. Major group among them (22.93%) marked reading materials online are their preferences in the web based learning environment. According to 16.4 percent of learners chatting is their preference, followed by voice chat (12.8%), followed by electronic annotation (11.07%). A small percent of learners prefer discussion groups (6.8%), followed by feed back online (4.53%).
70. Table 89 shows that majority of the respondents (25.46%) from the entire Universities are on the opinion that the printed course material is the major support media they want in the web based learning environment. Their second preference goes to face to face tutor contact (13.66%), followed by TV programs (13.33%), followed by digital libraries (12.13%). Web study material (11.2%) and chat sessions (8.13%) are also marked by a notable percentage of users.
71. The learners in the field of distance education feel that the student support services provided by various universities are inadequate to meet their requirements. Regarding the study materials majority of the learners of Karnataka State Open University find it as inadequate, where as in BRAOU, study materials are found to be fairly adequate by the majority of learners. In IGNOU, the majority find the study materials adequate (Table 91). Regarding the Personal Contact Programs the learners feel that the counseling / contact classes are inadequate to meet their requirements (Table 92).
72. Table 93 reveals that the majority (63.73%) of the respondents are not in the habit of using the library. Among those who use the library, 18.53 percent are using the public libraries. This indicates that public libraries can act as a greater promoter of life long learning. Only 2.53 percent of the respondents are using the libraries attached to the Open

Universities. Majority of the respondents (62.93%) are on the opinion that the libraries of their institute are not satisfactory in terms of its resources and services (Table 101). There exists significant difference among the distance learners of various Open Universities in the country in their use of library resources.

73. Table 94 reveals that the number of male learners who use the library facility is more (40.15%) than female learners (31.17%). It is against the common picture in the conventional university setup, where normally female learners are more using library facilities. It is to be noted that only 1.54 percent of female learners and 3.29 percent of male learners are using the libraries attached to the distance education institutes. This indicates the pathetic situation of libraries attached to the distance education institutes in the country. But no significant differences can be seen in the case of gender acceptance of various types of libraries as the p value is more than .05.
74. Table 95 shows that there is no significant difference among the Under Graduate (37.21%) and Post Graduate learners (35.22%) in using the library facilities of different institutions in the country. Similarly Science students (48.75%) outnumber the non science students (34.77%) in using the library facilities. It is clear from the table that most of the science and non science students are using the public libraries in satisfying their information requirements. P value also indicates that, there exists significant difference in using various libraries by the science and non science students in the field of distance education (Table 96).
75. Table 97 shows that the students in distance education institutes are not in the habit of using libraries regularly. It indicates the adequacy of the study materials provided by their universities and lack of development

of knowledge base among the learners on the other. The percentages of irregular users are high in all the sample universities, i.e., IGNOU (26.4%), BRAOU (14.8%), and KSOU (14%), while comparing with other categories. The percentage of those who attend the libraries more than twice in a week is very low in all the Open Universities, i.e. IGNOU (8.8%), BRAOU (4%), and KSOU (0.8%).

76. Table 98 reveals that majority of the respondents (13.73%), though it is small, marked that they are coming to libraries to prepare notes relating to their subject of study. Their next preference were to consult reference books (8%), followed by to consult subject books (7.73%).
77. As the students are attracted to the distance education system due to its flexibility, it is reflected in their opinion regarding mode of use and seriousness in library use. Majority of the students, i.e. IGNOU (31.6%), BRAOU (22%) and KSOU (16.8%) are irregular in their timing during their visit to the libraries. Distance learners are spending very few hours only for the purpose of study and reference (Table 99).
78. Table 100 indicates that majority of the total respondents (72.53%) are on the opinion that the documents which they want for their learning purposes are not available in their libraries. Among the different documents available reference books comes first (12.27%), followed by general books (6.53%), followed by subject books (5.47%). Journals got only 2.53 percent and only 0.67 percent opined that digital resources are available in the libraries of Open Universities. P value indicates that there exists significant difference among the learners of different Open Universities in their opinion regarding the availability of various documents in the libraries of Open Universities in the country. Similarly Majority of the faculty members (62.93%) also feel

that the libraries of their institute are not satisfactory in terms of its resources and services (Table 103).

79. Table 102 shows that majority of the students from Open Universities (62.67%) expect network based services from the libraries in future. It may be due to the importance and acceptability of emerging Internet technology in the society. 59.33 percent of learners prefer CD ROM search facility and 33.07 percent expect data base search facilities from the libraries in future. It shows that the students of Open Universities expect sophisticated information services from the libraries. It also demands the promotion of library services through all the ways including IT application. For this, the libraries should get access to e-learning resources such as e-books and e-journals to meet the information requirement of its clientele in the present and future.

2. TENABILITY OF HYPOTHESES

Based on statistical analysis of data the hypotheses are tested.

Hypothesis No. 1.

“The learners in the field of distance education come from different academic and social background in India.”

Analysis on the basis of gender shows that more male learners (56.8%) are attracted to the Open Universities than female learners (43.2%). Similarly more urban learners (67.6%) are attracted to the system than rural learners (61.2%). Data also shows that only 17.73 percent students having professional subject background are coming to the distance education. Students having general academic background (71.33%) are more attracted to the distance education system (Finding No 3). All these clearly indicate that learners in the

field of distance education come from different academic background in India.

Thus Hypothesis No. 1 is substantiated.

Hypothesis No. 2.

“Distance learning is a highly relevant alternate system of education in the modern times.”

The analysis reveals that a good number of students are attracted to the distance education system for their continuing education in the higher education level. Level of application of Information Technology is increasing day by day. Moreover the number of distance education institutes and Open Universities are increasing in the country. Finding number 1 indicates that majority of the learners are using a mixed method of traditional and modern technologies in learning process. More and more younger generation is attracted to distance education methods (Finding No. 3). All these clearly show that distance learning is a highly relevant alternate system of education.

Thus Hypothesis No.2 is fully substantiated.

Hypothesis No. 3.

“The academic community in the field of distance education is not satisfied with present methods and practices adopted in the field of distance education in India.”

The analysis reveals that only 35.87 percent of learners are satisfied with the present methods and practices followed in Open Universities in the country. At the same time 40 percent of them are not satisfied with the present practices. They are on the opinion that IT should be applied with distance learning in accordance with the development of society (Finding No. 5).

Thus Hypothesis No. 3 is validated.

Hypothesis No. 4.

“The learners and faculty members in the field of distance education in India are well aware and equipped with Information Technology tools.”

From the study it has become clear that majority of the students in the field of distance education are aware of latest developments in the field of Information Technology. The trend of increase in familiarity is observed through the study (Finding No.14). Moreover Finding number 54 shows that majority of the faculty members in the field of distance education have enough awareness and familiarity with latest advances in Information Technology.

Thus Hypothesis No. 4 is fully substantiated.

Hypothesis No. 5.

“The Distance learning and teaching methods practiced in the country is under the verge of extinction due to the recent developments in the field of Information and Communication Technology.”

Analysis reveals that Open Universities are applying a variety of technological tools for teaching in the field of distance education such as radio talks, TV talks, Teleconferencing, Interactive radio, interactive video etc. (Finding No. 31, 32). Majority of the learners are not using these facilities (Finding No. 49). It may be due to the unfamiliarity of learners with the new method of learning system. Solving the problems and leaving the traditional methods will change the learning style of the students. Thus it indicates that distance education in India is under the verge of extinction due to the recent developments in the field of Information Communication Technology.

Thus Hypothesis No. 5 is confirmed.

Hypothesis No. 6.

“Various distance learning institutions and Open Universities are in different levels in the case of application of Information and Communication Technology.”

From the analysis it has become clear that IGNOU, being the National Open University provides various instructional facilities for teaching the students. BRAOU also started to provide radio, TV and teleconferencing programs. KSOU being the small University also trying to incorporate various IT tools in teaching. From Finding No. 50 it is clear that Open Universities are at different levels in making various IT tools available in their university study centres or regional centres.

Thus Hypothesis No. 6 is fully validated.

Hypothesis No. 7.

“In order to apply IT in distance learning, building up of infra structure (Hardware), designing and developing software, existences of human ware (overall social development) sector are necessary.”

Analysis shows that majority of the faculty members have the opinion that social development is the major factor required for the development of technology based distance learning. In addition infrastructure facilities should also be developed (Finding No. 61.). Finding No. 50 also supports the opinion of faculty members in this regard.

Thus Hypothesis No. 7 is fully substantiated.

Hypothesis No.8.

“Open Universities and distance learning institutions have a sound library system and provide efficient and competent library services.”

Analysis shows that library is the most neglected student supporting system in the field of distance education in the country. Majority of the learners are not in the habit of using libraries. Among the libraries they use, 18.53 percent of them depend on public libraries for their study and reference purposes. Only a very small percent of them are using the library facilities provided by the Open Universities (Finding No. 72, 73, 74, and 75).

Thus Hypothesis No. 8 is not substantiated.

Hypothesis No. 9.

“Establishment of Virtual Universities are highly feasible in a country like India and it is very much essential for the modernization of distance education in the country.”

From the analysis it has become evident that majority of the faculty members agree with the establishment of virtual universities in India. They are on the opinion that, it will improve the standard of education and will cause rapid for rapid changes in the transformation process of the society (Finding No. 60).

Thus Hypothesis No. 9 is validated.

Hypothesis No. 10.

“Application of Information Technology in is the effective way to improve the quality of distance education and for the very survival of the system in the emerging socio-technological context.”

From the study it has become clear that IT has great potential in the field of distance education (Finding No. 28). Moreover the faculty members in Open Universities are on the opinion that the lack of IT application at its fullest extent is the major reasons for educational backwardness and lack of quality in the field of distance education (Finding No. 58). Social development is the major factor required for development of a technology based education culture among the society.

Thus Hypothesis No. 10 is fully substantiated.

Hypothesis No. 11.

“There exists significant difference among different groups of faculty members in the use of Information Technology in their practice.”

Study reveals that majority of the faculty members from IGNOU are using various technology applications in their teaching process. Other Universities are changing to the technology based education gradually. From BRAOU and KSOU only a small percent of the faculty members are using various media applied in the field of distance education (Finding No. 66). Significant difference among the faculties are evident from the analysis.

Thus Hypothesis No. 11 is fully substantiated.

3. POLICY IMPLICATIONS

No research effort can be said to be worthwhile if it does not emanate some of the important educational implications. Research in the area of open and distance education is catching the attention of many researchers. In India, attempts made in this direction are very scanty. However an attempt has been made in the present piece of research work to investigate the findings of the study may be utilized in various ways. The findings of the study have certain significant educational implications. These are systematically presented below:

1. Analysis of the background characteristics shows a varied nature of distance learners in at undergraduate and post graduate level. This may utilized for future planning of the programs and need analysis of the learners at the open and the distance education institutions / Open Universities.
2. No much difference can be observed between the learners on the basis of two gender groups, level of education and subject of study.
3. Distance education institutions may tailor their self-instructional materials development and application of various media in such a way that it should raise their academic self-concept and inculcate good study habits of learners if quality performance was aimed at.
4. Study centres of the distance education institutions may be equipped with sufficient manpower as well as IT tools to help the learners to carry out their studies more effectively.
5. Monitoring of academic performance has to be done by the distance learning institutions on regular basis in order to enhance the performance of the distance learners at different levels.

6. Distance learning institutions should revise a mechanism of keeping distance learners highly motivated until the completion of their course.
7. Distance learning institutions should make efforts to undertake researches on acceptability of curriculum, changing needs of learners, evaluation procedures, feedback systems and efficacy of learning materials as their regular future.
8. The Open Universities in India, which offer distance education programs, have more or less the same courses, resulting thereby in duplication and wastage of resources. Networking and co-operation among the Distance Education Institutes in India would be desirable.
9. Distance Education is a legitimized mode of higher education worldwide. However, all universities do not give recognition to degrees diplomas awarded to distance education learners. This discrimination has to be ended.
10. The Distance Education Institutes are still evaluated in terms of economic viability rather than effective instructional system. This situation has to be changed.
11. While in developed countries, adults in employment mostly join distance education programs. The Distance Education Institutes in India have failed to attract them in adequate numbers. Courses and programs may be dovetailed to suit the requirements of the prospective adult learners.
12. The methods of instruction followed in distance education have undergone major changes in recent years the entire world over. The latest distance education delivery model, the flexible model, envisages the use of interactive multi media, internet based access to web

resources and computer mediated communication. However, the Open Universities and Distance Education Institutes in India are still using the correspondence model, which uses the delivery technology of 'print only'. The Distance Education Institutes in India should, move towards methods of using modern technologies. Most learners are found to have access to radio, television and Internet.

13. Open Universities should take urgent steps to implement IT tools in all the subjects such as Humanities and Social Sciences.
14. Distance Education programs are not properly advertised and marketed. More effective publicity measures are therefore called for.
15. Personal Contact Programs (PCPs) are to be properly planned. They should start immediately after the completion of admissions. The quality study materials should be made available to learners fairly in advance so as to enable them to read them before attending PCPs.
16. The Staff of Distance Education, both academic and non-academic, should update their knowledge and skills in the methodology of distance education. In selecting staff, preference may be given to persons who have experience and qualifications in using latest technological advances the field of distance education.
17. Training should be provided to all the faculty members relating to the field of distance education in the country, for the use of current developments in technology.
18. The Open Universities and Distance Education Institutes of conventional universities should introduce student support services of distance education programs such as study centres, assignments, library, and multi-media.

19. Some of the regional and study centers are successfully exploiting the cable-broadcasting network. It could be uniformly extended to all the regional centers.
20. Learners' grievances and feedback from the learners should be recorded and attended to immediately. The record should be analyzed periodically in order to obtain the areas of grievances.
21. The IGNOU library system should develop a network where the central library and the documentation center may be connected at least with the regional centers libraries so that the students can remotely access and search the bibliographic records of the central library and documentation center.
22. The IGNOU central library and documentation center should organize some sort of document supply service charging a reasonable fee from the students. Photocopies of the desired documents can be directly mailed to the students on demand so that they may have an access to additional relevant material concerning their courses of study.
23. The IGNOU may sign a memorandum of Understanding (MOU) and contract with various university libraries in different regions to get the facilities of such libraries extended for IGNOU students at least for study and consultation of reading and reference material.
24. To supplement the library support services, IGNOU can also open its library study centres at local public libraries under the supervision of existing public library staff.
25. Priority for establishing Open Universities should be given to those states / provinces which do not have Open Universities.
26. Distance education council should be established in all states.

27. DE institutes should use IT tools in addition to printed lessons and extensive training of academic and administrative staff to mould them to make the functioning of DE system effective.
28. Learners interested in improving their qualifications find the Open Distance education as most suitable media for that.
29. Provisions should be made in collaboration with UGC, NCTE, AICTE, MCI, INFLIBNET etc. for better utilization of existing university and other academic libraries.
30. Joint efforts should be made in collaboration with RRRLF and National libraries for utilization of public libraries and for providing finance and expertise to public libraries.

4. SUGGESTIONS FOR FURTHER RESEARCH

The study of application of Information Technology in distance education is a complex process and multidisciplinary with the theories of Computer science, Communication Technology, Information science and Education. Because of these complexities no previous attempt has been made to conduct research covering all the technological applications in India. Hence this is a pioneering attempt to study the application of Information Technology in Distance education with regard to the instructional delivery, use and student support systems by the investigator and deals with the topic in a general and basic manner and tries to open a gateway for research in depth. The area of the study is India. The suggestions for further research as identified by the investigator are the following:

1. Separate studies may be conducted in every states in India about application of Information Technology in distance education.
2. A comprehensive study covering all the Open Universities in India may be conducted.

3. Distance education institutes attached to the traditional universities should also be studied and developed for the overall development of the distance education field in the country.
4. A detailed study may be conducted to understand whether the application of IT has improved the efficiency of distance education system in the country.
5. A separate study about library facilities provided in the field of distance education may be conducted.
6. A feasibility study for the establishment of a national Virtual University may be conducted.
7. Information seeking behavior or information search pattern of distance learners in India may be studied.

5. CONCLUSION

From the study it is observed that distance education has grown as an alternative system of education. The result of the analysis of data collected from the students and faculties of various Open Universities reveals that a considerable number of students are attracted to the distance education in India; and the number of them is increasing at a wider range. No much difference can be seen among various variables used in the study such as gender, level of education such as UG and PG, and subject differences in using various IT tools in teaching and learning. However considerable difference can be seen in the level of use of Information Technology in various Open Universities in the country. Computers and various communication technologies has become applied in the field of distance education.

At present major Open Universities and distance education institutes are combining traditional way of teaching and learning. Universities like

IGNOU uses multimedia instruction system to a large extent. But they are not reaching to the intended community. The students who use these facilities are comparatively few. Similarly other Open Universities and distance education institutes has also started radio talks, TV talks, interactive radio, interactive video, and teleconferencing programs. Recently with the introduction of 'Edusat' more fields and possibilities are remaining to be exploited in the field of distance education. Low level of research and development activities are going on in the field of distance education in the country.

There is every possibility for becoming this system as a global system of education and learning. Over emphasis on the traditional way of learning is one of the major weaknesses observed in the field of distance education. Even in the technologically developed environment students are still using contact classes and outdated study materials prepared by faculties in the headquarters of the Open Universities. Distance learners are on the opinion that distance education is becoming as a global system of learning. Majority of the faculties are on the opinion that there is scope of online teaching and learning in India. But for attaining the same the attitude of students about distance education as a liberal and flexible of learning, should be changed. The traditional outlook of learners and faculties should be changed. Learners may seek for alternative ways adapting the technological developments, and avoiding the over dependence on the study materials and counseling sessions. IGNOU being the national Open University has a great role to play in practicing and promoting various multimedia technologies in the field of distance education. Similarly more emphasis should be given student supporting services such as development libraries and networking of them. Then only more knowledge can be imparted to them and the society can rightly be called as a knowledge society or cyber society.

BIBLIOGRAPHY

- Abrahamson, C. E. (1998). Issues in interactive communication in distance education. *College Student Journal*, 32(1), 33-43.
- Adiseshiah, Malcom, S. (1986). Some thoughts on the concepts and forms of distance education. *University News*, 24 (2), 45-48.
- Agarwal.S. K, Ansari. M. M. (Eds.). (1995). *Directory of Distance Education Institutes-Part-1 (India)*, New Delhi: Association of Indian Universities.
- Agboola, Bade, A. (1993). Contact Sessions in Distance Education: An asset as well as a burden. *Indian Journal of Open Learning*, 2(1),17-20.
- Amjad Ali. (2004). *Learning in the information age*. New Delhi : Ess Ess Publications, 187-212.
- Anandan, K (1997). Multimedia computer in education. *New Frontiers in Education*. 18 (1), 216-220.
- Ansari. M. M.(1994). *Economics of Distance Education in India*. In G. Dhanarajan. S.Yuen and C.Swales (Ed.) *Economics of Distance Education - Recent Experiences*, Hong Kong: Open Learning Institute Press.
- Ashalatha, J. (1990). *Perceptions of Learners about Distance Education*. M.Phil Dissertation, Hyderabad: Osmania University. 1990.

- Askoh, K Kalia and Indira Kumari Dhull (2006). New technology in education some discernible trends. *University News*. 44 (6), 8-12.
- Association of Indian Universities. (2000). Handbook on Distance Education. New Delhi:AIU.
- Bains, J.S. (1988). Distance Education: Some Improvements suggested. *Indian Journal of Distance Education*, 1(2), 14-19.
- Balasubrahmaniam .S. (1986). The Status of Correspondence Courses in India. *University News* 24(42),33-35.
- Bansal, Kiron, and Choudhary, Sohanvir S. (1999) Interactive radio for supporting distance education: an evaluative study. *Indian Journal of Open Learning*, 8(1), 61 – 71.
- Barnard, J. (1997). The World Wide Web and higher education: The promise of virtual universities and online libraries. *Educational Technology*, 37(3), 30-35.
- Bates, A. (1991). *Diversity or Chaos in Canadian Distance? A view from overseas*. In R. Sweet (Ed.) *Post Secondary Education in Canada: Policies, Practices and Priorities*. Athabasca: Athabasca University and Canadian Society for Studies in Education.
- Bates, A. W. (1994). *Distance education and educational technology*. In T. Husen and T. N. Postlethwaite (Eds.). *The International Encyclopedia of Education*, (2nd ed). Oxford: Elsevier Science, 1573-1580.
- Berge, Z.L. (2002). Barriers to online teaching in post-secondary institutions. *Online Journal of Distance Education Administration*. 1(2), 56-59.

- Bomani, Giapolo. (1982). *Correspondence Teaching: Second chance or second class*. In Daniel, John. Et.al, (Ed.), *Learning at a Distance: A World Perspective*, Edmond Athabasca University.
- Brown, K. M. (1996). The role of internal and external factors in the discontinuation of off-campus students. *Distance Education*, 17(1): 44-71.
- Caron, S (1982). *Student support at Cross Roads In Learning at a Distance: A World Perspective* (Ed.) Daniel.J.S, et al. Athabasca: Athabasca University.
- Chamber's 20th century dictionary*. (1983). Edinburgh: Chambers, 37.
- Chander, Jose. N. (1996). Towards a better student support system in Distance Education. *Paper presented in the IV Annual Conference of IDEA, Hyderabad, 22-24 November*.
- Chib, S.S. (1991). Distance Education in India: Some Issues and Challenges. *Journal of Distance Education*, 3(3), 19-23.
- Chute, A.G, and Gulliver, K.M. (1996). Distance Education and Partnerships: Tools for the Future. <http://www.lucent.com/cedl/disted/> part: html. (October 2004)
- Coombs, P. H. (1985). *The World Crisis in Education: The view from the eighties*. New York: Oxford University Press.
- Couch, L. (1997). *Digital and Analog Communication Systems*, Upper Saddle River, NJ: Prentice-Hall.
- Daniel, John. (Ed.) (1982). *Learning at a Distance: A World Perspective*. Edmond: Athabasca University.

- Datt, Ruddar. (1988). *Developing of Correspondence Courses in India - A Survey cum Stock taking*. In Khan, I (Ed.) *Teaching at a Distance*. Delhi: Amar Prakashan.
- Datt, Ruddar. (1991). Growth of Distance Education in India. *Indian Journal of Distance Education*, IV (1), 21-27.
- Dede, C. (1996). Emerging technologies in distance education for business. *Journal of Education for Business*, 71(4): 197-205.
- Deshmukh, K.G. (1986). Genesis and Growth of Distance Education. *University News*. 8 (1), 19-23.
- Devore, Jay L. (2000). *Probability and statistics for engineering and sciences*. (5th ed.) Chennai : Eswar Press.
- Dharmaraj, S. (1999). "Student Problems in Distance Education in India," *Journal of Distance Education*, 6 (7)39-45.
- Dikshit, H. P. (2004). *Radio Vision In Sreedher Multimedia through Digital Radio*. New Delhi: UNESCO and IGNOU.
- Dikshit, HP (2004). Reflections on the role of open and distance learning for sustainable development. *Indian Journal of Open Learning* 13 (1), 7-14.
- Dillon, C and Gunavardana. (2003). Learners support – the critical link in distance education. *New frontiers in education* 32 (2), 131-134.
- Distance Education Council. (1999). Performance Indicators in Distance Education. *National Seminar Report*. New Delhi: IGNOU.
- Dodds, T, H Perraton, and M Young. (1972). *One Year's work: The International Extension College 1971-'72*, Cambridge: International Extension College.

- Dolly, Simon. (1996). A Study of the Problems faced by IGNOU Students. *Indian Journal of Open Learning*. 5(2), 65-72.
- Drucker. P. F.(1993). *Post Capitalist Society*, Oxford: Butterwork Heinemann.
- Egan, M.Winston et al. (1992). Learners' Perceptions of Instructional Delivery Systems: Conventional and Television. *The American Journal of Distance Education*, 6(2), 28-32.
- Evans, C and Sabry, K (2003). Evaluation of interactivity in web based learning systems: principles and processes. *Innovations in education and teaching international* 40 (1), 89-99.
- Evans, Terry. (1997) *Understanding learners in Open and Distance Education*, London: Kogan.
- Faith, K (Ed.). (1988). *Towards New Horizons for Women in Distance Education: International Perspectives*, London: Routledge.
- Fatt, Poon and Teng J. (2003). Perception of IT in higher education. *Journal of educational technology system*. 31 (2), 115-142.
- Feenberg, A. (1999). Distance Learning: Promise or Threat? Online: <http://www-rohan.sdsu.edu/faculty/feenberg/TELE3.HTM> (January 2003)
- Ford, M E (1992). *Motivating Humans: Goals, Emotions and Personal Agency Beliefs*. Newbury Park, CA: Sage Publications.
- Galda, K. (1984). Learning maths by radio. *Media in Education and Development*, 17(1), 40 – 42.
- Ganeshan. N (2003). A multi-faceted approach to technology mediated learning. *Journal of educational technology system*.31 (2), 157-176.

- Gangappa, K and Chandraiah, E (2004) Responses of learners to technology based learning in ODL: a case study of Dr. B.R. Ambedkar open University. *Indian Journal of Open learning*. 10 (1), 87-96.
- Gopalan, K (1997). Educational technology new horizons. *University news* 10 (1), 14.
- Gordon, Thompson, (1990). How Can Correspondence-based distance education be improved? A Survey of attitudes of Students who were not well disposed towards correspondence Study. *Journal of Distance Education*, 5(1), 16-19.
- Government of Andhra Pradesh. (1982). Towards an Open Learning System, *Report of the Committee on the Establishment of an Open University*, Hyderabad: Prakashan.
- Government of India. (1963). *Report of the Expert Committee on Correspondence Courses and Evening Colleges*, New Delhi: Ministry of Education.
- Government of India. (1966). *Report of the Education Commission (1964-'66)*. Education and National Development, New Delhi.
- Government of India. (1986). *National Policy on Education*. 1986 - New Delhi: MHRD.
- Guha, Ananya S (2006). ICT and Distance Education : Critiquing Modes And Limitations. *Social Responsibility Journal* 2 (1), 14-16.
- Hanna, D. E. (1998). Higher education in an era of digital competition: Emerging organizational methods. *Journal of Asynchronous Learning Networks*, 2(1). Online: HTTP: http://www.alnorg/alnweb/journal/vol2_issue1/hanna.htm (November 2003).

- Hantula, D H (1998). The Virtual Industrial/Organisational Psychology Class: Learning and Teaching in Cyberspace in Three Iterations. *Behaviour Research Methods, Instruments and Computers*, 30 (2), 205-216.
- Hara, N. and R. Kling. (2000). *Students' Frustrations with a Web-Based Distance Education Course: A Taboo Topic In the Discourse*. Indiana University: Center for Social Informatics, http://www.slis.indiana.edu/CSI/wp99_01.html (December 2005).
- Harasim, L. M. (1987). Teaching and learning on-line: Issues in computer-mediated graduate courses. *Canadian Journal of Educational Communication*, 16(2), 117-135.
- Harry K. and Khan A. (2000). *The use of technologies in basic education*. In Yates, C. and Bradley, J. (Eds.) *Basic Education at a Distance: World review of distance education and open learning*, 2 (2), 3-21
- Harry, Keith. (2000). *Higher Education through Open and Distance Learning*. London: Routledge.
- Heller, R S. (1990). The Role of Hypermedia in Education: A Look at the Research Issues. *Journal of Research on Computing in Education*, 22 (4), 431-441.
- Herring, Susan. (1999). Interactional Coherence in CMC. *JCMC* 4 (4).Online: <http://www.ascusc.org/jcmc/vol4/issue4/index.html> (June 2004).
- Hilary, Bayliss. (1995). Post Graduate Distance Learning in British Dual Mode Universities. *Open Learning*. 10 (1), 20-27.

- Hiltz, S. R. (1998). Teaching in a virtual classroom. Vol. 2: A virtual classroom on EIES: Final evaluation report. Newark, NJ: New Jersey Institute of Technology.
- Hiola, Yahya and Dennis, Moss. (1990). Characteristics of Distance Learners at the Universitas Terbuka, Indonesia. *Distance Education*, 11(I),
- Holmberg, B.(1995). The Evolution of the Character and practice of distance education, *Open learning*, 10 (2), 35-39.
- Huges,K (1994). *Entering the World Wide Web: a guide to cyberspace*. London: Enterprise Integration Technologies.
- IGNOU (2000). Course ES-318: *Communication Technology for Distance Education*, Post Graduate Diploma in Distance Education program, New Delhi: IGNOU.
- IGNOU. (2001). *Gyan Vani: the educational FM radio network of India*. Publicity material developed by IGNOU, New Delhi: IGNOU.
- Illich, Ivan.(1971). *Deschooling Society*, London: Penguin Books.
- Jaffee, D. (1998). Institutionalized resistance to asynchronous learning networks. *Journal of Asynchronous Learning Networks*, 2(2). Online: http://www.aln.org/alnweb/journal/vol2_issue2/jaffee.htm
- Jaminson, D. and McAnany, E. (1978). *Radio for Education and Development*, Beverley Hills CA: Sage
- Jane, Seeker (2005). Delivering library resources to the virtual learning environment. *Electronic library and information systems*. 39 (1),39-49.

- Jeevan, VK (1999). IT enabled library services for distance learning: threats and opportunities. *The Journal of Electronic Publishing*, 5 (1),19-25.
- Jeevan, VK. (2001) IT enabled library services for distance learning: threats and opportunities. *The Journal of Electronic Publishing*, 5 (1), 12-19.
- Jonassen, D. et.al.(1995). Constructivism and computer-mediated communication in distance education. *The American Journal of Distance Education*, 9(2), 7-26.
- Jones, Steven G.(1998). *Cyber society: revisiting computer mediated communication and community*. London: Sage, 12-46.
- Joseph, A, and Raja Muthirulandy. (1994). Distance Education in India; The Dangers of relying on Expediency and Measures to maximize the role of distance education in human resource development. *Indian Journal of Open Learning*, 3(1), 14-18.
- Kachroo, Kanchan Bala. (1999). Distance Education Programs at College and University Levels in Jammu Region: An Evaluative Study. *Indian Journal of Open Learning*, 8(3), 45-50.
- Karisiddappa, CR and Padhi, P. (1989). From Information explosion to Information Technology. *Information, Library and society*, 2 (2), 141-168.
- Kato, Hidetoshi. (1992). Technology and Distance Education - Keynote Address. *Seminar on Open Learning and New Communication Technologies*. New Delhi: IGNOU and UGC.

- Keegan, D. (1990). *Foundations of Distance Education*, (2nd ed.), London: Routledge.
- Kem, Tilak.R, Esirgen, Ruhi. (1998). *Information Technology – Reengineering of Distance Education*, New Delhi: Aravali Books International.
- Khan, I. (1989) *Teaching at a Distance*. Delhi: Amar Prakasan.
- Killedar, Manoj (2001). Distance education through internet based e-learning. *Indian Journal of Open Learning* 10, (1), 68-79.
- King, B. (1998). Possible Directions for the support of Distance Students in Australian Higher Education. Paper presented at the Workshop *Towards A Student Support system for Distance Education*. Canberra: Australian Committee of Directors and Principals working on External Studies and the Australian Distance Education consortium, University House.
- Kishore, S. (1998). Management of Student Support Services and its Cost in IGNOU. *Indian Journal of Distance Education*, 6 (2), 54-56.
- Kling, R. (1999). What is Social Informatics and Why Does it Matter?. *D-Lib Magazine*, 5 (1), 18-24. Online: <http://www.dlib.org/dlib/january99/kling/01kling.html> (November 2003).
- Kothari, CR. (1990). *Research Methodology: Methods and techniques*. (2nd ed.) New Delhi: Wiswa Prakashan.
- Krishnan, C. (2001). Learners Perception and Utilization of ODL services – A Case Study. *Paper presented in the VIII Annual Conference of IDEA, SDLCE, Kakatiya University, Andhra Pradesh, 22-24 March.*

- Kulandai Swamy, V.C. (2002). *Education for Knowledge Era: Open and Flexible Learning*, New Delhi: Kogan, 25-49.
- Kulandai Swamy.V.C. (1998) Keynote Address In Seminar on Distance Education, MIT.
- Kumar, Anil. (1999). *Learner Performance in Distance Education*, New Delhi: Commonwealth Publishers.
- Kumar, Anil.(1999). Kumar's Scale for Measuring Distance Learner's Attitude towards Distance Education. *University News*, 37(2), 34039.
- Kumar, Prasanna, V. (1998). Education for Social Change: Role of Distance Education in Tribal Upliftment. *Indian Journal of Open Learning*, 3(2), 56-59.
- Kuruba, Gangappa.(1999). Distance Education in Developing Countries - A Case Study of Botswana. *Indian Journal of Open Learning*, 8(1), 11-16.
- Kyle, Franks. (1996). Attitudes of Alaskan Distance Education Students towards media and Instruction. *The American Journal of Distance Education*, 10 (3), 23-32.
- Laird, B and R Layard. Traditional Versus Open University Teaching Methods: A Cost Comparison. *Higher Education*, 3 (4), 56-62.
- Long, T. (1984). Broadcasting for rural development. *Media in Education and Development* 17(1), 17 – 19.
- Madhukar, Indira. (2005) *Impact of globalization on education: Learning to live together*. New Delhi: Authors press.

- Magagula, Cisco. M. (1999). Distance Education: An Alternative Strategy for providing University Education. *Staff and Educational Development International*, 3(3), 67-70.
- Malhan, I.V. et al. (2001). *Quality Library and Information Services for the Distance Education Students*. IN S.M. Dhawan, ed: *Quest for Quality; Strategies and Applications in Library and Information Services*. New Delhi, ILA, 506.
- Malhotra, S. P. (1999). Distance Education in India. *Journal of Distance Education* 6 (7), 45-53.
- Mandal, Sushmita and Anupama Shah. (1992). Use of Modern and conventional Media for distance Education-An Experiment. *Kakatiya Journal of distance Education*, 1(2), 35-40.
- Manjulika, S and Venugopal Reddy. (1996). *Distance Education in India - A model for developing countries*. New Delhi: Vikas.
- Manjulika, S. (1995). *Effectiveness of Distance Education: A Case Study of Karnataka State*. Doctoral Dissertation, Jamia Milia Islamia, New Delhi.
- Markovitz, Harold. (1987). Financial Decision Making. Calculating the Cost of Distance Education. *Distance Education*, 8 (2), 19-25.
- Marland, Perc. (1997). *Towards more effective Open and Distance Teaching*, London: Kogan.

- Martey, Alfred (2004). ICT in Distance Education in Ghana. *Library Hi Tech News* 21 (5), 16-18.
- Mathew, Raju M. (1998). Role of information technology for the sustained development of Kerala: strategies and policies. *Kelpro bulletin*, 2 (1) 3-8.
- Mathew, Raju. M (2005). Technological foundations of Knowmatics and Knowledge Technology. In *National Seminar on Knowledge Technology and Knowledge Industry: Kerala's development potentialities*, 27-28 May, Calicut University.
- Mathew, Raju. M. & Santhamma Raju (1992). strategies and policies for developing tele-teaching for science and technology Education at University level in India and the third world, (*Contributed paper for the second World conference on tele- teaching held at Norway, Organized by the international Federation for information processing in collaboration with the Council of distance Education, UNESCO and ITU*).
- Mathew, Raju. M. (1987). The third world factor. *Transactional data and communication Report*,10.
- McIsaac, M. S. and Gunawardena, C. N. (1996). *Distance education*. In D. Johnassen (Ed.), *Handbook of research for educational communications and technology*. New York: Macmillan, 403-437.
- Mehndiratta, Mamta (1997). *Encyclopaedic dictionary of education*. Vol.2 New Delhi: Sarup and Sons, 475.
- Mendels, Pamela. (1999). Study Finds Problems With Web Class. *New York Times*. Online: <http://www.nytimes.com/library/tech/99/09/cyber/education/22education.html> (Sept 2005).

- Menon, Mohan. B. (2000). Open Universities in India at Cross Roads. *University News*, 38(6), 27-34.
- Mestiri, Matha and Gowder, Kumar. (2002). E-learning and its applications in library and information services. *University news*, 40 (1) 13-18.
- Milstein, Mark H. (1998). *Attending University by computer: the HINDU speaks on Information Technology*. Comp. by N Ravi. Madras : Kasturi and sons, 216-218.
- Mirza, J. S. "Distance Learners Call for conventional ways of teaching," *Indian Journal of Open Learning*, 7(2). 1988.
- Mishra, Rammanohar, (1999). A. Student support services in Distance Education. *Journal of Distance Education*, 6(7).
- Mishra, Sanjaya.(1999). An Empirical analysis of Interactivity in Teleconference," *Indian Journal of Open Learning*, 8 (3), 23-27.
- Mittal, Chanchal. (2000). *Foundations of IT*. Meerat: Pragati Prakashan, 36-44.
- Moore, M.G. (1977). *On a Theory of Independent Study*, Hagen: Fern Universitat.
- Muilenberg, Lin.Y and Berge, Zan.L (2005). Student barriers to online learning : A factor analytic study. *Distance Education* 26 (1), 29-48.
- Mukhopadhyay, D (2002). IT for quality education of learning society. *University news*, 40 (44), 27-31.
- Mukhopadhyay, D and Parhas. (1997). *Educational technology in higher education in India: search of quality*. New Delhi : Association of Indian Universities, 127-129.

- Mukhopadhyay, D. (2002). Educational technology: challenging issues. New Delhi: Sterling, 1-26.
- Muller, J. (1985). *Radio for Literacy. A Reader on the Use of Radio in Literacy Programs*. Bonn, Germany: German Foundation for International Development.
- Murthy, SS. (1997). Use of Information Technology in Library and Information science education. *Desidoc bulletin of IT*, 17 (3), 3-7.
- Myrdal, Gunnar. (1971). *The Challenge of World Poverty*, London: Penguin Series.
- Naidu, C.G. (1998). The Economics of Quality in Distance Education: An Indian Perspective. *Indian Journal of Open Learning*, 7(3). 39-43.
- Naidu, J, Ramu. (1998). Role of Distance Education Institutes in India. *Indian Journal of Distance Education*. 1(2), 32-37.
- Narang, A. S. (2000). Education for Women: Role of Open Universities. *Paper presented in the VIIth Annual Conference of IDEA, IGNOU, New Delhi, 27-29 April*.
- Nasirudheen,TPO and Bavakutty.M (2003). *Measures for effective information services for the promotion of distance mode of learning in Information Access, Management and exchange in the technological age*. New Delhi: Ess Ess publications.,349-375.
- Natarajan, M. (2003). *Implications of information communication technology on distance education*. In Information access, management, and exchange in the technological age. *Ed. By Bavakkutty, M and others*. New Delhi: Ess Ess, 376-390.

- Nellyyappan, N.O. (1999). Problems of Learners in Distance Education. *Journal of Distance Education* (6-7), 36-39.
- Nipper, S. (1989). *Third generation distance learning and computer conferencing*. In R. Mason and A. Kaye (Eds.), *Communication, computers and distance education*. Oxford: Pergamon Press, 63-73.
- Noble, D. F. (1998). *Digital diploma mills: The automation of higher education*. On-line: http://www.firstmonday.dk/issues/issues3_1/noble/index.html. (March 2004).
- Nyonda, Andrew Chola. (1999). Educational Media in Open and Distance Learning: The Papua New Guinea Experience. *Indian Journal of Open Learning*, Vol.8 (1), 18-19.
- Ormond, Simpson. (2000). *Supporting Students in Open and Distance Learning*, London: Kogan.
- Patalong, S. (2003). Using the virtual learning environment Web CT to enhance information skills teaching at Conventy University. *Library Review* 52 (3-4), 103-110.
- Patnaik, MS. (1999). *Interactive distance learning over Internet*. New Delhi: Rajat Publications, 87-96.
- Pawar, KB. (2000) Web based school education in India: problems, consideration, approaches and important features of web based learning environment” *Library progress International*, 20 (2), 23-29.
- Perraton, Hilary. (2000). *Open and Distance Learning in the Developing World*, London: Routledge.

- Porter, L (1997). *Creating the Virtual Classroom: Distance Learning with the Internet*. New York: Wiley Computer Publishing.
- Raghubanshi, A.S and Mishra S (1999) Satellite Technology and Student Support Services *Paper presented in the 10th Asian Association of Open University Conference*, Tehran, Iran.
- Rahm, D. and Reed, B. J. (1998). Tangled webs in public administration: Organizational issues in distance learning. *Public Administration and Management: An Interactive Journal*, 3(1). Online: <http://www.pamij.com/rahm.html> (October 2005).
- Raja Mouli, C. (1998). Economy in Distance Education through institutional network: An Indian perspective. *Paper submitted for the Asian Association of Open Universities 7th Conference, Hong Kong*, 21-25 November, 1993.
- Ramadevi V and Karasiddappa, CR (1998). Impact of IT on Distance education: Indian scene. *IT: issues and trends*, 1 (1), 216-229.
- Rao, Renga CV. (1997). Women's Education through Distance Mode: Use of Media. *Communication*, 8 (8), 33-36.
- Rathore, H.C.S, Gunjan Dubey, and Sunil Kumar Singh.(1999). Correspondence Courses in India: Students' Profiles and Motivating Reasons. *Journal of Distance Education*, 6(7), 17-28.
- Ravichandran, R and Sasikala, P. (2001). Computer based advanced technologies in education: developments, challenges and opportunities. *Journal of Indian education*. 27 (1) 25-30.

- Raymond, Frank B. (2000). Delivering distance education through technology: a pioneer's experience. *Campus –Wide Information Systems*. 17 (2), 49-55.
- Reader's digest Universal Dictionary*. (1993). New York: Reader's Digest, 1210.
- Reiser, VK (1987). The Virtual Industrial/Organisational Psychology Class: Learning and Teaching in Cyberspace in Three Iterations. *Behaviour Research Methods, Instruments and Computers*, 30 (2), 205-216.
- Rowntree, Dereck. (1994). *Teaching with Audio in Open and Distance Learning*, London: Kogan.
- Saettler, P. (1990). *The evolution of American educational technology*. Online: <http://www.Distance Education.com>. (March 2003)
- Sahoo, P. K.(1994). Tele conferencing in Distance Education: The IGNOU Experiment *Indian Journal of Open Learning*, 3(1), 15-22.
- Satyanarayana.P and C Sesharatnam. (1997). Distance Higher Education in India: Promise and Performance. *New Frontiers in Education*, 27 (4), 12-27.
- Schultz, T.W. (1961). *Investment in Human Capital* In M.Blaug (Ed.) *Economics of Education*, London, Penguin.
- Segrave, Stephens and Holt, Dale (2003). Contemporary learning environments: designing e learning for education in the professionals. *Distance education* 24 (1), 7-23.

- Sewart, David. (1993). *Individualizing support services* In Daniel, John. S, et al (Eds.) *Learning at a Distance: A World Perspective*. Edmonton: Athabasca University.
- Sharma, R. C. (2002). Gyan Vani: The Educational FM Radio Network of India, *International Review of Research in Open and Distance Learning* 1(2), 12-20.
- Sharma, R. C. (2002). *Interactive Radio Counselling in Distance Education*, University News, 40 (10), 8 -11.
- Sherman, Whitney H. and Beaty, Danna M. (2007). The use of distance technology in educational leadership preparation programs. *Journal of Educational Administration*. 45 (5), 605 – 620.
- Shih, C and Gamon, J (1999). Student Learning Styles Motivation Learning Strategies and Achievement in Web-Based Course. *Journal of Computer Enhanced learning*, 99 (3). Online: <http://iccel.wfu.edu/publications/journals/jcel/jcel990305/ccshih.htm>.
- Singh, Bakshish.(Ed.) (1995). *New Horizons in Distance Education*. New Delhi: Uppal Publishing House.
- Singh, R.P. (2002). Social Relevance of Open Learning System: the Indian Context. *University News*, 40 (4), 34-45.
- Sisir, Basu. (1996). Regular Telecast by IGNOU: Feedback from Students. *Indian Journal of Open Learning*, 5(1), 45-50.
- Smith, SJ and Robinson, S (2003). Technology integration through collaborative cohorts. *Preparing future teachers to use technology*. 24 (3), 154-160.

- Sreenivasulu, V. (1999). Role of Information Technology in electronic information transfer and in providing value added information services. *Desidoc bulletin of Information technology*. 19 (4&5), 35-38.
- Starr, R. M. (1997). Delivering instruction on the World Wide Web: Overview and basic design principles. *Educational Technology*, 37(3), 7-15.
- Subhayamma, G. (1998). Effectiveness of Teleconferencing; A Student's Perspective. *New Frontiers in Distance Education* 28 (1), 43-56.
- Sukomoto, Takashi. (1981). Use of Communication Technology in Distance Teaching at the University and College Level in Japan. *Paper presented in The Regional Symposium on Distance Teaching in Asia*, Penang, Malaysia.
- Sukumar, B. (2001). IGNOU interactive radio counselling: a study. *Indian Journal of Open Learning*, 10(1), 80 – 92.
- Surya Nath Singh and Gargh, BS. (2002). Impact of IT on bio-medical information centres and libraries in India: a critical evaluation. *Annals of library and Information studies*, 49 (2) 51-56.
- Suzanne, St.Pierre and Larry. K.Olsen.(1991). Student perspectives on the Effectiveness of Correspondence Instruction. *The American Journal of Distance Education*, 5(3), 45-54.
- Takwale, Ram. G. (1994). *Application of New Technologies in Distance Education*. In *Distance Education: An Interface*. New Delhi: Penguin.

- Thompson, G. (1989). *The provision of Student support services in distance education Do we know what they need?* In R. Sweet (Ed.) *Post Secondary Education in Canada: Policies, Practices and Priorities*, Athabasca, AB: Athabasca University and Canadian Society for Studies in Education.
- Tiwari, M. D. (2002). Education to Home. *University News*, 40 (7), 43-46.
- Tripp, S. and Roby, W. (1996). Auditory presentations in language laboratories. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* New York: Simon & Schuster Macmillan, 821- 850.
- University Grants Commission. (1984). *Report of the Committee to enquire into the Working of the Central Universities*, New Delhi: UGC.
- Unsworth, J. (1997). The importance of failure. *The Journal of Electronic Publishing*, 3(2).[On-line: <http://www.press.umich.edu/jep/03-02/unsworth.html> (July 2003).
- Ushadevi, M. D. (1994). Are Contact Sessions necessary in distance education? A Feedback to IGNOU. *Indian Journal of Open Learning*, 3(1), 12-22.
- Vashishth, SR (1997). *Research in educational technology*. Jaipur: Book enclave, 209-220.
- Verduin, JR & Clark, TA. (1991). *Distance education: the foundations of effective practice*. San Frasisco : Jossey-Bass publishers.
- Verma, Romesh. (1999). Distance Education: Concerns in Future. *Journal of Distance Education*, 6(7), 45-49.

- Vernal, Louis and Paily, MU. (2004). ICT in teacher education: a case study. *New frontiers in education*. 34 (3), 215-219.
- Villi. C. (1999). Learning habits of Post Graduate Learners in Distance Education. *Indian Journal of Open Learning*. 8 (2), 21-33.
- Wallace, Lori. (1996). Changes in Demographics and Motivations of Distance Education Students. *Journal of Distance Education*, 11(1), 44-50.
- Waniewiez. G. "Developing Adult Distance Learning as a Collaborative Venture", Paper presented in the 10th Anniversary International Conference of the Open University, U.K.1981.
- Wegerif, R. (1998). The social dimension of asynchronous learning networks. *Journal of Asynchronous Learning Networks*, 2(1).On-line: http://www.aln.org/alnweb/journal/vol2_issue1/wegerif.htm
- White, R. (1976). *An alternative pattern of basic education: Radio Santa Maria*. Paris: UNESCO.
- Williams, Pete et.al (2005) E-learning: what the literature tells us about distance education: An overview. *Aslib Proceedings* 57 (2),109-122.
- WIPO. WWA (2002). Distance learning course on IPR. *Business standard*, 9 (10) 43-45.
- Woodly, A and Parlett, M. (1983). Student Dropouts. *Teaching at a Distance*,.23(1),55-58.
- Zariski, A and Styles I (2000). Enhancing Student Strategies for Online Learning. *Paper presented at 9th Annual Reaching Learning Forum*. Curtin University of Technology. Perth, February 2-4.
- Zimmerman, B J. (1994). *Dimensions of Academic Self-Regulations: A Conceptual Framework for Education*. In D H Schunk & BV J

Zimmerman (Eds). *Self-Regulation of Learning and Performance: Issues and Education Applications*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Useful web sites:

<http://www.adec.edu>

<http://www.ariadne.ac.uk>

<http://www.brunel.ac.uk/research/virtsoc>

<http://www.col.org>

<http://www.csot.net>

<http://www.dec.ctu.vn/ebooks.distedir/index-1.htm>

<http://www.elearning.post>

<http://www.elearningeuropa.info>

<http://www.elearningforum.com>

<http://www.elearningmag.com>

<http://www.geteducated.com>

<http://www.iet.open.ac.uk/research/trg/index.html>

<http://www.internetttime.com>

<http://www.learner.org>

<http://www.lifelonglearning.ch>

http://www.open_universities.com

<http://www.press.umich.edu>

<http://www.shef.ac.uk/uni/projects/csnl>

http://www.shu.ac.uk/virtual_campus/cnl

<http://www.telelearn.ca>

<http://www.ukc.ac.uk>

QUESTIONNAIRE FOR FACULTY

From.
Manzoor Babu.V.
Research Scholar,
Department of Library & Information Science,
University of Calicut.

TO WHOM SOEVER IT MAY CONCERN

Dear Sir/Madam.

Sub: Filling up of Questionnaire – Regarding Ph.D research

I, Manzoor Babu. V, Junior research Fellow in the Department of Library and Information Science, University of Calicut, doing my PhD research on the topic “Application of Information Technology in Distance learning in higher education with special reference to India” under the guidance of Dr. Raju M. Mathew, Reader Department of Library & Information Science. For collection of data regarding this topic I am distributing this Questionnaire to all the faculty members of the selected Open Universities in India such as Indira Gandhi National Open Univerisity, BR. Ambedkar Open University, and Karnataka State Open University. Therefore I kindly request you to fill up this Questionnaire with sufficient care, and return me back as early as possible. I assure you Sir, that the Information you supply through this questionnaire will be purely used for academic purposes.

Thanking you,

Calicut University
27-02-05

Yours Sincerely,

Manzoor Babu.V.

QUESTIONNAIRE

This questionnaire is intended to collect data from the officials and faculty members of Open Universities and Distance education centers in connection with research project undertaken by me under the guidance of **Dr. Raju .M Mathew**, Reader, Department of Library and Information science, University of Calicut. I seek your co-operation and help in obtaining the necessary information. I request you to fill up this Questionnaire with sufficient care and accuracy.

Thanking you,

Manzoor Babu.V.
Research Scholar,
Department of Library and Information Science,
University of Calicut.

(Please tick (✓) your answer and write wherever necessary)

1. Name :
2. Designation :
3. E-Mail :
4. Familiarity with internet:
Very good Good Average Poor Very Poor
5. What is your opinion about the present status of Open / Distance education?
Very good Good Average Poor Very Poor
6. Do you think that the mode of education will change in the near future into distance mode?
Strongly Agree Agree Disagree Strongly Disagree No idea
7. Do you believe that quality/ standard education is attainable through distance mode of learning?
Strongly Agree Agree Disagree Strongly Disagree No idea
8. What are the present methods employed in teaching ?
Lecture / Counseling Assignments Online classes
Radio talks Video talks Interactive Video E-mail
 Voice mail Chat Fax Seminars
 Others (Please specify).....

9. Total Pass percentage of students in the University/ Regional center?

Below20 20-30 30-40 40-50 50-60
60-70 70-80 Above 80 No idea

10. What are the reasons for low pass percentage of the distance learners in India? (Please rank)

Limited class Out dated techniques Lack of quality study materials Lack of adequate supporting services
Lack of Application of IT Lack of seriousness of students
Others (please specify)

11. In your opinion what are the impediments before applying IT in distance learning? (Please rank)

Cost Attitude of government Existing staff Un developed society
Infra structure Lack of adequate technology
Others (please specify)

12. Why in your opinion more and more students are attracted to distance learning? (Please rank)

Due to job Convenience Family problems
Economic Problems Life long learning Promotion
Motivation from friends Quality of distance education
Lack of quality formal university education Non availability of seats in regular Universities Career outside the present job
Others (please specify)

13. Do you agree that there is a great discrimination between regular and distance learners in the job selection process.

Strongly Agree Agree Disagree Strongly Disagree No idea

14. What are the methods adopted by the University for Staff Development?

Seminars Conferences Councelling On-line instructions
Others (Please specify).....

15. In your opinion what will be the future of conventional Universities?

Will remain unchanged
Will dominate over Open Universities
Will be dominated by Open Universities
Remain as supplementary to Open Universities

Open Universities will remain as supplementary
 No idea

16. What is your opinion about the Library services provided by the Univeristy
 Highly effective Effective Satisfactory Not effective
 Highly ineffective

17. What are the methods adopted by the institution to improve the use of the
 Library?
 Library Hours Assignments Reference works Others.....

18. Do you agree that it is essential to apply IT in distance education for its
 modernization ?
 Strongly Agree Agree Disagree Strongly Disagree No idea

19. Are you confident on that distance education is becoming a global scenario?
 Strongly Agree Agree Disagree Strongly Disagree No idea

20. What is your opinion on the establishment of “Virtual Universities” and Web
 Based Learning in India?
 Strongly Agree Agree Disagree Strongly Disagree No idea

21. How the quality/ standard of Distance education can be improved in the
 country? (Please rank)
 Improving Infra structure facilities Regular staffing Timely
 distribution of study materials Information Communication
 Technology Adequate funding Job-oriented courses
 More contact programs Others.....

22. In your opinion what are the pre-requisites for the application of IT in distance
 education? (Please rank)
 Fund Staff Infra structure Social development support of
 Government Computer Technology
 Rapid communication facilities Adequate supporting services
 Others.....

23. In your Opinion what are the areas of distance education in which IT can be
 applied?

Area	More Effective	Effective	Not effective	No idea
Student enrolment				
Staffing				

Instructional delivery				
Study materials				
Tutor access				
Assignments				
Evaluation & Assessment				

24. What are the drawbacks of the existing system of Distance Education in the country (Please rank)

- Campus Oriented Costly
 Seriousness of students
 Lack of adequate technological support
 Inadequate supporting services
 Lack of competent faculty members
 Lack of quality and standards
 Lack of scientific assessment & evaluation

25. What are the Information Technology tools applied by your University to teach at distance?

- Teleconferencing Television
 Video lessons Audio lessons
 Radio lessons Interactive Radio
 Interactive Video Gyan Darshan

26. Do you use any Information Technology tool based on the Internet in the distance teaching?

- World Wide Web E-mail
 Chat Voice mail
 Others (please specify).....

27. Which delivery models do you prefer in the Web assisted instruction? (Please rank)

- Web Based Learning (WBL) only WBL supported by Face to Face (F2F)
 WBL with F2F and other media WBL (50%) and F2F (50%)
 CD with Online support CD with F2F support No response
 Any other

28. What are your opinions/suggestions for the modernization of distance education in the country?

QUESTIONNAIRE FOR DISTANCE LEARNERS

This questionnaire is intended to collect data from the students of Open Universities and distance learners in connection with the research project undertaken by me under the guidance of Dr. Raju M. Mathew, Reader, Department of Library and Information science, University of Calicut. I seek your co-operation and help in obtaining the necessary information. I request you to fill up this Questionnaire with sufficient care and accuracy.

Thanking you

Manzoor Babu.V.
Research Scholar,
Department of Library and Information Science,
University of Calicut.

(Please tick (✓) your answer and write wherever necessary)

General Information

1. Name :
2. Age : Below 30 Between 40-50 Above 50
3. Sex : Male Female
4. Marital status : Single Married
5. E-Mail :
6. Course :
7. Duration of Course :
8. University :
9. Educational qualifications:
 - (a) General
 - (b) Professional
 - (c) Any other
10. Whether you are employed or not?
Yes No

Information Technology

11. Do you have access to Internet?
Yes No
12. How long you have been using the Internet
 - Less than one year
 - 1-3 years
 - More than 3 years

13. Please specify the mode of your Internet use
- Regularly Once in a week
 Once in a month Irregular
14. Which is the preferred place for Internet access?
- House Internet Café Institution
15. Do you use Internet facilities for communication of educational matters?
- Yes No
- If yes, please specify with whom?
- With colleagues With teachers
 With experts With all
16. What are the other IT tools you used for your educational purposes?
- Telephone Cell phone
 Interactive video Voice mail
 E-mail Browsing Bulletin board
 Chat Others (please specify)
17. Do you agree that IT has great potentiality in information transfer?
- Strongly agree agree Neutral Disagree Strongly Disagree
18. Do you agree that the mode of learning is gradually changing to distance mode in the field of higher education?
- Strongly agree agree Neutral Disagree Strongly Disagree
19. Please specify your opinion about defects of higher education in the country (Please rank)
- Lack of staff Lack of quality teaching
 Lack of fund Seriousness of students
 Lack of adequate technological support
 Others (please specify)

Distance Education

20. Why did you enrolled under distance education program instead of regular University education?
- Due to job Convenience
 Due to family problems Economic Problems
 Life long learning Promotion
 Motivation from friends Getting a degree
 Non availability of seats in regular Universities
 Others (please specify)
21. Do you agree that Open Universities can satisfy your educational demands?
- Strongly agree agree Neutral Disagree Strongly Disagree

22. How much time you spend to study the course per day?
 One hour Two hours
 More than two Less than one
 Irregular
23. Have you heard of 'Virtual Universities'?
 Yes No
 If yes, please specify your opinion regarding establishment of virtual universities in India.
 Strongly agree agree Neutral Disagree Strongly Disagree
24. Have you enrolled for any course in any Virtual Universities?
 Yes No
 If yes, specify the course and duration
25. Do you agree with the statement “mode of education will change in the near future into distance mode”?
 Strongly agree agree Neutral Disagree Strongly Disagree
26. Do you agree with the opinion “Distance education and Virtual Universities are becoming a global scenario”?
 Strongly agree agree Neutral Disagree Strongly Disagree
27. What (in your opinion) will be the future of traditional Universities?
 a) Will remain unchanged
 b) Will dominate over Open Universities
 c) Will be dominated by Open Universities
 d) Remain as supplementary to Open Universities
 e) No idea

Methods

28. What are the methods adopted by your University to teach at distance?
 (Please rank according to its usefulness)
 Correspondence of study materials Contact classes
 Radio talks / Gyan Vani Video talks/ Gyan Darshan
 Tele conferencing Interactive video
 Others (please specify)
29. Are you satisfied with present methods of teaching and learning?
 Yes No
30. What are the activities at contact classes?
 Lecture Lecture cum discussion

Audio Video presentation Only discussion

31. What is your opinion about contact classes?

Adequate Rich Inadequate Not available

32. What is your opinion about study materials?

Adequate Rich Inadequate Not available

33. What are the drawbacks of existing methods? (Please Rank)

Limited class Lack of fund

Out dated techniques Lack of seriousness

Lack of quality study materials Lack of staff

Lack of application of technology

Others (please specify)

34. Do you agree that Information Technological tools have advantage over correspondence methods?

Strongly agree agree Neutral Disagree Strongly Disagree

35. Do you use electronic Information Sources for your learning?

Yes No

If yes, please indicate the electronic information source you used (Please rank according to usefulness)

Audio-cassettes Video cassettes

CD-ROMs Network based services

Databases

Others (please specify)

36. What are the media available in your study centre?

Computer Cable Television

Video lessons Audio lessons

Gyan Vani Interactive Radio

Interactive video Gyan Darshan

Telephone Fax CD ROM Internet

37. Do you use any Information Technology tool based on the Internet in the distance teaching?

World Wide Web E-mail

Chat Voice mail

Others (please specify).....

38. Please specify the purpose(s) for which the digital information sources are mainly used in your study:

Bibliographical Information Discussion with staff

Statistical Information Discussion with colleagues

Descriptive information on a topic

Others (please specify)

39. Do you agree that present methods of counseling and evaluation are adequate in the field of distance learning?

Adequate Inadequate

40. Please tick your views on following aspects of distance learning

	Very poor	poor	Average	Good	Very good
Teaching materials					
Tutor access					
Tutorial quality					
Library resources					
Assessment mode					
Assessment Quality					

Application of IT in Distance Learning

41. Do you agree that there will be a great change if IT applied in distance education?

Strongly agree agree Neutral Disagree Strongly Disagree

42. What is your opinion about multi media instruction system followed by your University?

Media of instruction	Aware of programs	Watching / Listening	Useful / interesting
Teleconferencing			
Television			
Video lessons			
Radio lessons			
Interactive radio			

43. Which mode of learning do you prefer in the web based learning environment

a) Electronic annotation f) Grades on-line

b) Discussion groups g) Reading on-line

c) On-line chatting h) Questions on-line

d) Voice chatting i) Feed back on-line

- e) On-line tutorial j) On-line mentoring
44. Which support media do you prefer with on-line learning?
- f) Course material (Print) e) TV programs
- g) Course material (Web) f) Message board
- c) Chat sessions. g) CD-ROM
- d) Face To Face tutor contact h) E-mailing instructor

45. What are the main concerns in computer mediated Distance education?

	Crucial	Very important	Important	Somewhat important	Little important
Teacher computer competency					
Student computer competency					
Support group					
Group interaction					
Campus resources					
Computer training					
Connection cost					
Computer cost					
others					

46. Do you agree with the statement "Present level of application of IT is sufficient in the field of distance learning"

Strongly agree agree Neutral Disagree Strongly Disagree

47. Do you think that IT can play the role of a teacher?

Yes No

48. In your opinion what are the impediments before applying IT in distance learning? (Please rank)

Cost Attitude of government

Existing staff Un developed society

Infra structure

Others (please specify)

49. To what extent IT should be used in distance learning?

Fully used Never be used

Be used as a supplementary tool

50. What (in your opinion) are the advantages of online learning?

Communication with many Flexible

Learning from others contribution Sharing of ideas

Participants respond quickly Equality

Economic Time saving

Enhancing students to instruction communication

51. What (in your opinion) are the disadvantages of online learning?

- Face to Face is more comfortable Print is more comfortable
Limited interaction with teacher Limited learning resources
Computer cause physical exhaustiveness Making notes difficult
Limited interaction with students Numerous programs are confusing
Isolation from other students Online material is less accessible

52. What are the reasons for not using IT tools in you learning process?

- Lack of time Lack of suitable programs
Inadequacy of time Personal problems
Unfamiliarity with programs Distance to the study centre

Use of Library

53. Is there any Library attached to your institution?

- Yes No

54. Please mention which library you used for study and reference purposes?

- Attached to Open University Regular University library
Special library Public library
Not using any library

55. How often do you visit the Library?

- (a) Once in a week (c) More than twice in a week
(b) Twice in a week (d) Irregular

56. Please specify your purpose of Library visit

- (a) To borrow general books (b) To borrow subject books
(c) To consult reference books (d) To prepare notes
(e) Others (Please specify).....

57. How much time do you often spend in the Library in a week?

- (a) Less than one hour (d) 3-4 hours
(b) 1-2 hours (e) More than 4 hours
(c) 2-3 hours (f) Irregular

58. Do you find the documents/materials available in the library are sufficient to meet your information demands?

<u>Types of documents</u>	<u>Available</u>	<u>Not available</u>
General books	<input type="checkbox"/>	<input type="checkbox"/>
Subject books	<input type="checkbox"/>	<input type="checkbox"/>
Reference books	<input type="checkbox"/>	<input type="checkbox"/>
Journals& Magazines	<input type="checkbox"/>	<input type="checkbox"/>

59. What is your opinion about library services provided by your University?

- Adequate Fairly adequate

Inadequate

Not available

60. What are the facilities you expect from the Library in future?

Network based services

CD-ROM search services

Data base searching

Others (please specify).....

61. What is your opinion about overall services provided by the Library?

Excellent Satisfactory

Good Not satisfactory

62. What are the important things that you would like to suggest for the modernization of distance education, especially in the field of higher education in the country?

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