

INFORMATION TECHNOLOGY AND LIBRARIES IN DISTANCE EDUCATION: PRESENT AND FUTURE PROSPECTS FOR INDIA

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INTRODUCTION

Information technology, or IT as it is commonly called, refers to those technologies and devices which facilitate efficient and effective communication. IT also allows us to access and handle with ease vast amounts of information. During the last 30 years, a number of major advances in the use of computers and communication technologies have occurred. These developments expedite access to mega computers which store large volumes of information. The catalyst in the widespread use of modern IT systems has been the availability of low cost micro electronic machines which provide a powerful yet economical means of accessing and processing information. IT has penetrated all spheres of professional and personal life. Education, and in particular distance education, is not and cannot be immune from the influence of IT.

Distance education as a system to provide learning opportunities has been in existence for a considerable period of time. Historical studies reveal that formalised distance education programmes date from the last century. Within the last 25 years, distance education as a system of learning has attracted the attention of many institutions and individuals in both national and international fora. During this period of heightened interest, there have been many changes within the discipline, especially regarding its management, pedagogy and accessibility. The April 1995 International Centre for Distance Learning (ICDL) CD-ROM database on distance education indicates that there are 835 distance teaching institutions offering 29,166 courses located in almost 100 countries.

Several nomenclatures are used to describe this system of education. In Australia it is known as the External System, in France as Télé-enseignement, and in Germany Fernun Terricht. In India it is usually referred to as Correspondence Education. While a variety of definitions are used to describe distance education the following characteristics are common to all of these definitions. They are the:

- separation of teacher and learner ;
- individualisation of learning;
- preparation and provision of learning materials; and
- establishing and using various communication channels to link tutor and student.

The principal aims of distance education are to:

- provide educational opportunities to the masses;
- raise the general level of education;
- serve as an alternative to the formal system of education; and
- provide educational opportunities for those who were unable to access conventional education.

The worldwide communications revolution has led to the development of high-speed computers with huge storage capacities. Additionally, the availability of electronic and telecommunication technologies at reasonable prices have created a tremendous impact on almost all human activities, including education. The characteristics of distance education encourage the use of modern IT.

A principal goal of modern day distance education courses is to motivate students. The design of the self-instructional packages that students receive is firmly rooted in that aim. Therefore, the services of a well-equipped and efficient library which is conveniently accessible is regarded as being very important to

the success of the academic progress of students. Given the important role that IT can play in making information more readily available, it is necessary to include a consideration of IT in any reflection on distance library services. Merging IT with library and information services to distance learners enhances the delivery of such services.

The development of modern-day distance education programmes requires the work of a large and diverse pool of professional talents. Course preparation is a costly and time-consuming exercise. However, once a course is available it can be used by a large number of students at significantly lower per capita costs than conventional education strategies. This makes distance education particularly appealing to planners and governments who need to provide educational opportunities for rapidly increasing populations in cash-strapped economies.

APPLICATION OF IT IN DISTANCE EDUCATION

The ongoing developments in computer and telecommunication technologies occasion tremendous changes in the activities of the distance education institutions in administrative procedures, instructional delivery, and other functions.

Both IT and education work with the same product – knowledge – but for different goals. While IT allows for faster and more comprehensive access to information, education seeks to ensure the better comprehension and assimilation of knowledge. IT and education therefore appear to be “made for each other.”

Central to the concept of distance education is the separation of teacher from the learner. This separation requires that communication between instructor and student takes place in some way other than by direct speech. IT therefore appears to be an ideal channel of communication as it uses various interconnecting media – technical or otherwise – to unite the teacher and the learner and to convey the content of the course.

IT can be deployed in two different but related aspects of distance education. IT can be used to deliver the context of instruction as well as documents. Instructional TV, video and audio cassettes, teleconferencing, computer-aided instruction, interactive video discs and videographic systems are some of the potential components of instructional delivery to which IT can be applied.

The application of IT to document delivery places at “the stroke of a finger” the wealth of information available – regardless of habitat. Advancements in computer and telecommunication technologies have enabled a growth in distance learning opportunities for students in homes, schools, colleges, and the workplace. According to Garrison (1985) the development of distance education can be structured into three generations of technological innovations:

- correspondence;
- teleconferencing; and
- computers.

Correspondence education was a major shift from the traditional face-to-face interaction and it provided freedom to choose where and what to study. Teleconferencing technology dramatically overcame the slow interaction process associated with correspondence study and it is frequently used as a communicating medium in distance teaching. Computers have brought about new possibilities in distance education through computer-assisted learning (CAL) and computer-assisted instruction (CAI). CAL and CAI help students to study at a distance independently as well as to experience immediate interaction with their peers and tutors.

While IT offers tremendous advantages to distance education on its own, the use of other technological aids for distance education should not be disregarded. These are audiovisual materials such as audio and videocassettes, radio and television broadcasting, video discs etc. Sometimes these media can be used in association with IT to great effect. The telephone is also frequently used in distance teaching as an interactive medium.

Distance teaching requires technologies that are cheap, reliable, easy to use, multifunctional and easily accessible to the majority. This limits the integration of some technologies into distance education systems. For example, good quality CAL or CAI and interactive video discs are expensive to produce. Television, radio, audio and videocassette players, and microcomputers are some of the media that are commonly available in homes in developed countries. While there are other technologies their impact on the distance teaching process is limited. These include viewdata and telefax. In addition, some of the technologies listed above such as teleconferencing and cyclopes are not particularly suitable for home study purposes because of their technological requirements.

The use of technology in developing countries such as India is not widespread. Several reasons account for this. Firstly, technological development in developing or Third World countries is not as advanced as it is in the developed world. Secondly, the infrastructure to support the deployment of technology is not always readily available or reliable. Thirdly, although costs are lessening, the capital costs to provide the necessary infrastructure, at the national level, is often beyond the economic capabilities of many of these countries. Fourthly, while the cost of individual equipment is getting lower, for many Third World people the ability to purchase such equipment is beyond their financial means. And fifthly, not all Third World countries possess the cadre of trained personnel which are required to optimise the presentation of information in electronic formats. Despite these recognised difficulties, many Third World countries are making concerted efforts to use IT, especially where it can enhance the delivery of distance education.

IT AND LIBRARIES IN DISTANCE EDUCATION

Each new technological development that takes place impacts on libraries and information centres. IT has affected most of the routine operations of library and information services such as circulation and cataloguing services. These include a reduction in the time required to carry out routine tasks; the opportunity to improve record keeping procedures and the ability to link intra- and inter-library activities in unprecedented ways. IT enables the integrative nature of library services to be actualised, eliminating the need for traditional departments such as acquisitions and cataloguing as it allows these activities to be executed from the same workstation.

In many libraries IT-based services which enrich the access routes to information such as CD-ROM and online searching facilities are now commonplace. Thus, on a growing basis, IT-aware clientele are expecting such services to be readily available. IT has changed the focus of library routines from technical activities and procedures to client-oriented services. IT has also changed the mission and goals of library and information centres. The emphasis has shifted from the mere custody of a document to accessing and exploiting information, whatever its form and wherever it is available. As a result, user-oriented services have gained greater importance in library and information sciences. These professions are no longer limited to collection building and other technical activities. Cooperation, inter-lending and document delivery facilitated by telecommunication links are very important aspects of the work of today's information providers.

Computer-assisted retrieval is now a common phenomenon. Electronic micrographics, electro-magnetic and electronic video-based systems are gaining ground as carriers of information in libraries. The convergence of technologies has given rise to an interchange between various forms and types of information products and services. For example, the convergence of computer and micrographics technologies provides us with the computer-based microfiche catalogues. IT can also be used to assist in the retrieval of information from databases held in other microforms. The convergence of computers with telecommunications facilitates

online searching via networks. And finally, the convergence of optical disk technology with computer-assisted retrieval is enhancing the use of databanks. All of these will impact significantly on the delivery of library services to distance learners.

The significance of the impact of IT for library and information services lies in the reconfiguration of existing services, the creation of entirely new services and the integration of services in ways previously unknown. Because of IT library and information centres are gradually expanding their role by functioning as publishers, database producers, and online hosts with the appropriate application of technologies viz., electronic publishing, E-mail and networking.

Technology can play a key role in a distance education library system. Two important areas of support to this system are:

- access to information; and the
- delivery of information.

Libraries in distance teaching institutions, therefore, should try to convert all their bibliographic records to computer readable formats in order to provide remote students with access to their collections and services through an online facility. IT can solve a number of problems associated with studying at a distance. On-line access to computerised catalogues not only provides access to the local library's database, but also to the remote databases and catalogues of other libraries through national and international gateways.

But providing bibliographic information about a document is only the beginning of library and information services. Access to the actual document or the information stored therein is the ultimate requirement of the client. The distance between the library and the student adds a facet to the delivery of distance library services that traditional library and information services do not have to consider. The use of IT to access databases that provide full text information can solve this problem to a great extent. Other technologies that can help considerably in the document delivery process include E-mail and fax. Journal articles can be easily transmitted by these technologies. However, for books the traditional methods of dispatch must continue to be used until full text digital transmission is practicable and copyright regulations permit.

The use of multi-media packages in instructional delivery requires that these resources and their associated technologies are easily accessible to distance learners. Thus, in addition to providing books, libraries have a vital role in providing multi-media resources to support distance education. The availability of a well-equipped media centre for distance learners is therefore essential if all modern technological innovations are to be exploited to their fullest. The integration of print and non-print resources to support the library and information needs of distance learners is important. The resources of such a service would include in-house and commercially produced multi-media learning packages.

In addition to providing the multi-media packages libraries must also take the steps necessary to ensure that these materials are utilised to the maximum. Bibliographic multi-media instruction for distance learners is therefore an important task that distance librarians have to perform.

THE INDIAN SCENARIO

Distance education systems – university-level systems

In addition to the 40 Correspondence Directorates in India there are two types of distance teaching institutions that provide university-level education. These are dual-mode universities and open universities. The five open universities are divided into two categories – national and state. The national open university is the Indira Gandhi National Open University (IGNOU) in New Delhi.

The state open universities are:

- Dr. B.R. Ambedkar Open University (formerly known as Andhra Pradesh Open University) in Andhra Pradesh;
- Kota Open University in Rajasthan;
- Nalanda Open University in Bihar; and
- Yashwantrao Chavan Maharashtra Open University in Maharashtra.

Enrollment in correspondence courses and the open universities at the end of the Seventh Five Year Plan (1987 – 91) was approximately 500,000 students. During the Eighth Five Year Plan (1992 – 97) enrollment in higher level educational institutions is estimated to reach 1,000,000 of which 50 % are expected to be registered at distance education institutions (India. Planning Commission. 1992).

IT in India

The information technology revolution started in India in the 1980s. Microcomputers were introduced in the government and private sectors to facilitate railway reservations and office automation activities *inter alia*. Over time other technologies such as telefacsimile, teletext and videotext were also introduced. The establishment of a satellite television system has helped to bridge the physical distances between urban, rural and remote areas.

Under the Seventh Five Year Plan the introduction of new technologies such as the digital switching systems, digital microwave, coaxial and optical fibre for long distance transmission, multi-access rural radio systems in rural networks etc., were important accomplishments.

The aim of the Eighth Five Year Plan is to provide a range of value-added services such as cellular mobile services, voice and electronic mail services, audio and video conferencing services, radio paging and videotext.

INSAT, the national satellite communications system, represents India's first step towards implementing a space system for articulated national needs. The multi-purpose INSAT system caters to domestic long-distance telecommunication, meteorological observation and data relay, nationwide direct satellite TV broadcasting as well as nationwide radio and TV programme distribution for rebroadcasting through terrestrial transmitters from various locations. The launch and operation of INSAT satellites 2A, 2B, 2C, 2D and 2E are envisaged during the Eighth Five Year Plan. Additionally, GRAMSAT satellites, low earth orbiting communication and mobile satellite systems, are also to be introduced. In addition to conventional use, these satellite systems have a considerable potential to support distance education, and its library services in particular.

In networking, several important initiatives were made during the Seventh Five Year Plan. Data networks such as NICNET (for government departments) and INDONET (for public and commercial use) became operational. Information networks such as DELNET (for the libraries of New Delhi) and CALIBNET (for the libraries of Calcutta) were implemented. Networks such as INFLIBNET (for all the university and specialised research and development institution libraries), DESINET (for defence science laboratories), SIRNET (for the laboratories of the Council for Scientific and Industrial Research) were also conceived. Under the ERNET project, scientific and industrial institutions were connected through E-mail. With the establishment of the gateway system in Bombay, and the digital facilities between the major cities, users in India can now get easy access to databases outside the country.

While the development of IT in India is past the nascent state there is still considerable developmental and enhancement work to be done. What is required is the utilisation of these technologies by distance education institutions to strengthen the learning process of distance learners. The National Policy on Education (1986) stressed the need for the use of media and other educational technologies so that the most distant and deprived section of the population can have access to education. In India, the instructional system of the open universities is quite different from that in the conventional universities. Open universities have adopted a multi-media approach in instruction delivery, utilising different media such as self-instructional study materials, audio and videocassettes, radio and television broadcasting and counselling sessions. The use of audiovisual materials is quite common in the open universities. For example, IGNOU has produced over 390 video and 530 audio programmes for its courses of study. These audio programmes are broadcast by selected stations of All India Radio around the country. Half hour slots are provided thrice weekly on the National Network for video programmes.

IGNOU, with the cooperation of Indian Space Research Organisation (ISRO), has installed an audio teleconferencing facility which connects the headquarters of the university with its regional centres and the other open universities in the country. This facility however, is in its experimental stage of development and will take some time to be fully operational. Another important experiment conducted recently was the cable TV interactive network system at the Modasa Study Centre. In this experiment, the educational programmes of IGNOU were distributed through a cable TV network. Regular telephone lines are used to provide an audio link that supports student/counsellor interaction: this is another role in which technology is used for distance education purposes. The experience gained through these experiments and other activities will go a long way in developing satellite-based interactive systems for the distance education process in India.

A look at the library services provided by the spectrum of distance teaching institutions in India indicates that such services at the Correspondence Directorates are negligible. On the other hand open universities have established libraries at their headquarters, regional and study centre facilities. The basic services provided by the open universities are reference services and listening to and viewing audio and video cassettes. Some sites have a photocopying facility. The ability to network IGNOU's regional and study centres as well as the other open universities with the main library at IGNOU would be a useful development and is eagerly anticipated.

Overall, progress in the automation of the library system of the open universities is limited. To date, IGNOU has made the greatest strides in this regard. The library at the headquarters of IGNOU has procured a multi-user PC486 system with 16 terminals. The 16 terminals are to be installed in various divisions of the library and also at various schools of studies making a local area network. In order to support the automation of the system it has acquired a UNIX-based library software package produced by the LYBSYS corporation in New Delhi. The library has also purchased a CD-ROM drive and has subscribed to some important databases, e.g., *LISA*, *ERIC*, *Social Sciences Index*, *Books in Print* and *Whitaker's Book Bank*. The International Centre for Distance Learning donates its database on distance education. IGNOU's library is also a member of DELNET and INFLIBNET which are University Grants Commission (UGC) projects. These memberships have made access to the information of and resources in other libraries in the country possible. E-mail is also available. All these facilities at IGNOU are in their fledgling stage and it will take some time for them to be fully operational.

The intent to increase higher education enrollments, especially in the open universities, will increase substantially the need for reading materials and library services. One implication of this development is a need to expand the resources provided for all aspects of library and information services. Increased student numbers without a concomitant increase in library and information provision may reduce the overall level of access to library materials and services. Supply will not be able to satisfy an ever-increasing demand. Already considerable pressure exists to support such needs, as the constantly rising prices of books and periodicals are making it difficult for libraries to cope with demands. Faced with such a predicament, it may be difficult for the libraries to be fully effective unless alternative arrangements are instituted to access information.

IT can play a vital role in solving such difficulties. Once the system is in place and students have access to the services that the system can provide, it will no longer be necessary to have all multiple dedicated library and information facilities around the country. Through the use of electronic and telecommunications devices limited resources can be used to supply the demands of a large clientele.

India has already made progress in its IT development and application. In order to make the distance education system successful in India, such technologies should be utilised to the fullest for both instructional and document delivery. Cost-effective technologies such as fax should be used to greater advantage. The widening of the E-mail network for document delivery should also be undertaken. The use of such strategies will not only extend the availability of library services to the dispersed population of students, distance and conventional, but also ultimately it will be cost effective.

CONCLUSION

It is essential that all technologies are systematically adopted in the educational process, especially in distance education which caters to vast populations. The libraries of the distance teaching institutions in India are not yet properly equipped to incorporate some of these technologies which can enhance the quality of their functions. IGNOU's placement at the apex of distance teaching institutions in India enables it to play a leading role in the provision of guidance to other institutions in the use of technology in distance education. A well-developed library and information service at all Indian distance teaching institutions will strengthen the distance education process. The availability of well planned library and information services to support distance education will also ensure that distance learners will enjoy the opportunity to pursue a learning programme of quality.

BIBLIOGRAPHY

- Garrison, D. R. (1985). "Three generations of technological innovations." *Distance education* 6, (2) 235-241.
- India. Ministry of Human Resource Development. Department of Education (1986). *National Policy on education 1986: programme of action*. New Delhi: Ministry of Human Resource Development Department of Education.
- India. Planning Commission. (1992). *Eighth Five Year Plan 1992-97*. New Delhi: Planning Commission.
- International Centre for Distance Learning (April, 1995). *CD-ROM database on distance teaching institutions*. Milton Keynes: ICDL.
- Kanjilal, Uma (In press). *Multimedia resource centres: role of libraries in distance education*. Paper presented at the 13th Annual Convention of Society for Information Science (India) held at INSDOC, New Delhi on 27th-29th January, 1994.