

COMMUNICATION TECHNOLOGY FOR ENHANCEMENT AND TRANSFORMATION OF OPEN EDUCATION : THE EXPERIENCE AT THE INDIRA GANDHI NATIONAL OPEN UNIVERSITY IN INDIA

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Introduction

IGNOU is one of the ten mega universities in the world, and one among the five open universities. Its objective is to cater to the ever changing and increasing educational needs of the people within and outside India. It disseminates knowledge using a diversity of means, and encourages distance/open learning system in the country. The university performs diverse roles and functions as an open university, as a national resource centre as well as an apex body. Empowerment of people is the main concern of the University and therefore its policies, programmes and methods have been recognised and appreciated by the people of the country. In order to meet continuing education needs of various sectors, a policy has been adopted to offer short-term, self-contained knowledge and skill based modules for those who want professional and technical development (IGNOU, 1988a). The programmes, such as tannery workers' training, construction workers' skill standardization, training of rural youth and *Panchayati Raj* functionaries, training of functionaries associated with primary schools, etc. are undertaken as extension activities. In the last 12 years of its operation, IGNOU has 39 academic programmes and 486 courses for 4,30,832 students on roll (IGNOU, 1998). It has a huge networks of 21 regional centres and 315 learning centres to coordinate student support services all over the country and a team of 17,991 academic coordinators to help the students resolve the problems related to their study.

There exists a sophisticated, state-of-the-art media centre, which has audio and video studios, post-production and duplication facilities. The centre is equipped with satellite-based communication system and is being used for live interaction with learners. The University owns an electronic media library equipped with 692 audio and 695 video programmes.

Besides catering to the needs of Indian learners, currently the IGNOU programmes are on offer in Bahrain, Doha, Dubai, Abu Dhabi, Kuwait and Sultanate of Oman in the Middle East Asia. A proposal to offer its programmes in Seychelles, Maldives, Nepal and Caribbean countries is underway. With these operations, IGNOU is trying to change its form and functions in response to the modern communication technologies, to cope up with the immense pressure of learners from all over the country (Takwale, 1995). IGNOU can rightly be proud of its innovations and expertise in distance education and is becoming a major innovator in the use of communication technology in teaching-learning at a distance.

Application of Communication Technology

Distance/open learning system consists of three parts: learning materials, student support services and management of its operations. IGNOU uses communication technology in all these parts, i.e. producing learning materials, their delivery to the students, and coordination and monitoring of various operations. From its inception, it adopted the multiple media approach in its operations and delivery of the courses. In the beginning it used audio and video components in the supplementary mode, the print being the prime medium of delivery. The increased and affordable access to a variety of communication technology, either at home (arranged by the learners) or at learning centres (created by the University) gave the authorities and academics of the University confidence to go for complementary and/or integrated mode of technology integration/application. Technologies like computer (manipulation of text and graphics), printers, scanners, optical mark reader (OMR), etc. are being used to design and produce learning materials. For ensuring efficient management, the headquarters and regional centres are electronically linked and equipped with latest computers and server based LAN facilities. They all are connected with each other through e-mail. Communication

technology infrastructure is being created through LAN and WAN to facilitate communication amongst staff at IGNOU campuses, and ultimately it will link all the campuses of IGNOU with study centres, partner institutions and students (IGNOU, 1998a).

From instructional point of view, two types of communication technologies are being used by IGNOU. Telecommunication system such as broadcast (radio and TV), cable TV, internet, and teleconferencing,

Electronically stored media system, such as cassette technology, video disc, etc.

Radio has wide reach, is easily accessible, mobile and comparatively cheap. In 1947, the All India Radio (AIR) had six transmitters, and 1997 AIR could proudly claim to have a network comprising 194 radio stations broadcasting 17,000 programme hours daily, in 18 main languages and 126 dialects through 299 transmitters. Due to its expansion radio covers 97.5 percent of the Indian population and 90 percent of the geographical area, and there are an estimated 180 million radio sets in the country (GOI, 1998).

Television India, known as *Doordarshan*, is one of the largest broadcasting organizations in the world in terms of the infrastructure of studios and transmitters. It started in India four decades ago on September 15, 1959, on experimental basis on a modest way with only 21 community TV sets installed in select villages in Delhi, the national capital of India. It started regular transmission in 1965. Today there are nine channels, 34 programme production centres and 868 terrestrial transmitters of varying powers scattered all over the country. With this huge network television covers approximately 87 percent of the population of the country. During these years TV viewership has increased phenomenally and now estimated 46 million homes have TV sets which account 300 million primary viewers (GOI, 1998). Community TV sets have been installed under various schemes operated by the central and state governments for viewing by those who do not have direct access to TV. TV is being used for educational purpose in the country from its inception. Various projects such as SITE (1975), INSAT (1982), Jhabua (1996) etc., have been launched in utilising potential of TV for education and development.

IGNOU broadcasts radio programmes (three days a week) from two radio stations: Bombay and Hyderabad for students in and around these cities. The video programmes, however, are telecast five days a week (two and half hours per week), Monday through Friday, on the national TV channel which covers most part of the country's population. Due to such factors such as non-availability of appropriate time slot suited to most students, lack of easy access to broadcast (particularly to TV in rural and remote areas), fixed broadcast schedule and socio-cultural bias against learning from radio and TV the audio and video programmes could not become popular among the students and hence remained underutilised.

To overcome these problems and make the audio-video components more popular and accessible to learners, the university has depended more on the cassette mode. The audio and video cassettes are made available at the regional and study centres where the students can use them on mutually agreed upon time schedule fixed by the study centre coordinators. Moreover, the learners can discuss the contents of audio-video programmes with the academic counsellors (usually subject experts) and among the peer group. Some of the study centres include audio and video programmes in the regular counselling sessions. In addition, the audio and video programmes (cassettes) are available on sale to those who have access to audio and/or video tape recorders. This included, besides IGNOU students, university teachers and students enrolled with other universities or those preparing for competitive examinations. Due to various factors IGNOU did not allow its students to borrow the audio-video cassettes for home use. Nevertheless, majority of the learners who have used these programmes have found them quite useful for enriching their knowledge and competence.

Yet another effort being made by IGNOU is the use of local radio broadcast for two-way communication, thus giving distance learning a local touch. A pilot project using the phone-in facilities available at AIR, Bhopal, for the students of undergraduate Arts and Management Studies located in and around the Bhopal city, i.e. within the effective range of the AIR transmitter, Bhopal has recently been undertaken. The interim study has shown encouraging results: the students observed that this was a right decision in making their study decentralised, based on the local environment: and they welcomed the interactive radio counselling as they got opportunity to discuss their problems in their own language with the experts, sitting at home or work place. The long-term impact and sustainability of the interactive radio counselling sessions will be assessed once it is well established, say after one year. In the meanwhile, negotiations for replicating the project in other regions/parts of the country is on with the All India Radio.

The growth of cable TV network in India has been at a very fast pace. In the last one and a half decade, it has reached from 100 to more than 75,000 cable TV households. Like other countries, the cable network in India also is primarily used for entertainment. Some efforts have been made to use

cable TV for both the broadcast and the two-way interactive communication, using the same cable for talk-back or transfer of data. Internet service providers are in the process of designing appropriate technology to facilitate cable TV subscribers to access internet through their TV. Satellite systems (INSAT series) have also enhanced communication capability of the country. The new generations of satellite will provide Ku band facilities which would make satellite-based cable TV more accessible to people.

To exploit the potential of audio and video media and make them further accessible and useful, other delivery methods were employed. IGNOU in collaboration with Indian Space Research Organisation conducted a zero-cost experiment using the cable network of private cable operator in Modasa town of the Gujarat State (Chaudhary and Behari, 1994). Though the experiment gave encouraging experience, even then cable TV could not become popular in IGNOU's course delivery or student support services. Regional Centre, Cochin is however using cable TV network for transmitting IGNOU programmes for students of four cities: Cochin, Trivandrum, Trichur and Calicut. An impact study has been planned to assess the pedagogic effectiveness of the network and efforts are being made to convince cable TV operators to use their networks for interactive telecounselling. Though cable network is an urban phenomenon, its use will make distance learning more flexible and accessible, suited to the local environment of the students.

Liberalization policy of the Indian Government gave a new dimension to telecommunication technology in the country. India operates one of the largest telecommunication networks in the world. In 1947 (the year of independence) the number of telephone connections was 86,000. Now there are 21,328 telephone exchanges with a capacity for 15.16 million lines and 12.61 million working connections. In the next five years 23.7 million telephones would be added. India's goal is to raise the telephone density to about four telephones per 100 persons by the year 2000. A significant development in telecommunication market has been the proliferation of wireless technology, especially mobile telephone. Paging and mobile telephone service is growing steadily. There would be six million pagers and three to four million cellular phones by the end of the year 2000. Because of the lack of affordable access and high tariff, the use of telephone is very limited. It, however, is being used by the learners in interacting with the resource persons in the teleconferencing sessions.

The success of teleconferencing experiment conducted in 1993, led to the establishment of a teleconferencing facility on a regular basis in 1995. The network, known as Training and Development Communication Channel (TDCC), carries live telecounselling presentations on a regular basis, through the extended C-band of INSAT system (IGNOU, 1998b). TDCC is an infrastructure system for one-way video and two-way audio interactive distance education, training and conferencing. The learners participate in the telecounselling sessions by means of public telephone (PSTN) and fax. Through 1164 down-link terminals (learning centres) scattered all over the country, at present the up-link facilities are available at IGNOU Campus, New Delhi, and Space Applications Centre, ISRO, Ahmedabad. In the near future, more uplink facilities are to be established and maintained by the various educational institutions, such as IGNOU, All India Management Association (AIMA), Governments of Gujarat and Madhya Pradesh, and the like. The TDCC has been used by various agencies for 374.30, 790.00 and 727.30 hours respectively in 1995, 1996 and 1997 (Rao and Khan, 1998). The experience has revealed that teleconferencing, holds great promises for future of distance/open education in India. In most cases, the participation and response was found to be encouraging. The sessions were quite effective in terms of learning outcomes and motivational level of the learners. Better planning and better pedagogic strategies are some of the key determinants of the success of TDCC (Rao and Khan, 1998). At present the technology used for one-way video and two-way audio is analog. New technologies like, digital broadcasting, video compression, Ku-band, etc., will be incorporated as soon as these become economically and technologically viable (Gade, 1997). Establishment of Indian Training and Education Network (INTEND) is an effort being made by IGNOU and some other educational institutions, under the Ministry of Human Resource Development (such as UGC, NOS, NCERT, AICTE and NOS) to pool their resources and expand the reach and scope of TDCC. INTEND will create virtual classrooms and virtual institutions in the country and it would provide a coherent, coordinated network for offering different types of communication and interaction appropriate and essential for education and training. The member institutions would share the hardware, software/courseware and expertise at the national and regional levels.

The computer industry in India has been steadily growing these years. It is estimated, that there are 1.5 million computers in the country and the number would grow to 5.29 million by the year 2000. According to the target fixed by the IT Task Force appointed by the Prime Minister of India, there would be one computer for every ten persons in the country. The use of e-mail in India is also slowly catching up and there are estimated 50,000 e-mail users in the country. Value-added services attached

with e-mail would add to its popularity and utility. And since Internet services have been auctioned to private vendor, its access and use are expected to increase in immediate future.

The growth of the Internet is unprecedented. India is no exception in this regard. It is no longer debatable that Internet presence in the next few years will increase exponentially in India also (Pant, 1998). The Internet which started in 1995 has subscribers rate grown to 15-20 percent during a short span of three years. It is estimated that by the year 2002, the number of internet subscribers would grow to 1.0 million. Given the low PC penetration in the country, some information technology companies are making efforts to offer the access to internet through cable TV. By doing so, internet can be accessed by existing TV sets hooked to cable networks with the help of set-top box which will reduce the cost as well.

In order to use Internet, IGNOU has already taken initiative on two fronts: one, it has created a home page on Internet which can be accessed by users for any information about IGNOU's course and operations. Two, IGNOU home page also has linkages to course materials of all programmes: certificate, diploma, degree programmes in computer, are available in internet. In the academic year of 1998, a large number of learners have enrolled themselves with IGNOU's BCA programme to be delivered through internet. The learners interact with their academic counsellors through computer-based counselling at a pre-scheduled time.

Access, Cost and Pedagogy

The use of modern technologies can be justified if they meet the following criteria:

Increased accessibility to learners

Greater productivity in terms of learning outcomes

Lower cost.

All the three criteria which are interrelated and overlapping each other, influence the applications of the technologies in IGNOU. Lack of affordable access to the communication technology is an important factor for its under-utilisation. In IGNOU all the regional centres have been electronically linked with headquarters and efforts are being made to link all the study centres. But the fact remains that many learners have to travel hundreds of kilometers to reach the regional and/or learning centre they are attached to. For example, to attend a teleconferencing session, the learners have to reach the regional centre and make lodge and boarding arrangements as all the regional centres are located in cities. The problem is more acute in areas with difficult terrain and hilly tracts. Similarly, a large chunk of the learners do not have easy access to either telephone or computers, and hence to internet. Therefore, telephone-tutorials, internet and computer-based courses have limitations in the Indian context. To overcome this problem, technological infrastructure need to be created in each village or in a cluster of villages, in collaboration with agencies involved in education and rural development. The learner support services created by agencies such as state open universities, national and state open schools, directorate of adult education, department of rural development and non-government organisations can be shared by the learners. For example, there are about 50,000 community viewing centres in the rural areas in the country where a community television set each has been provided in each village by the central and state governments. A village-level-worker or a school teacher has been engaged to operate the television set and organise group discussion among viewers (including school children). This scheme can be strengthened and made operative by converting them into virtual classrooms, equipped with modern technologies. A definite utilisation plan needs to be worked out by the user agencies.

Sharing of infrastructure and cost is crucial for optimum utilization of the resources. If the technology is fully utilised, it becomes easy to sustain on a long term basis. For example, the IGNOU uses full extended C-band of INSAT-2C for its teleconferencing system. The channel is available round the clock for a variety of communications. Any single institution, including IGNOU, cannot fully utilise the system. To have optimum utilisation of the system, appropriate collaboration among educational institutions can be worked out at various levels, such as sharing of software-courseware, designing common curriculum, organising courses jointly, etc., and the cost of designing, production and delivery can be shared by them.

The cost is the most important factor in making technology-driven education and training accessible to the learners. The audio component (radio broadcast and audio cassettes) is found as a cheaper and effective medium for highly motivated adult learners. Two-way audio, to a great extent, and one-way video and two-way audio communication system, to some extent are suitable for a developing country like India. Interaction (talk-back) through telephone is a variable cost; more the interaction, more is the cost. It is therefore essential that interaction must have a definite pedagogic function to perform. Yet another issue discussed in this paper is that the technology should be used selectively. Experiences show that the participation in the teleconferencing sessions by the learners of professional courses

(such as management, health sciences, mass communication, etc.) was higher than the learners of the conventional courses (such as history, political science, etc.) as the professionals found the sessions directly related to the field of their work. Similarly, the teleconferencing sessions were found more effective for residential courses, skill/competency-based workshops, and business meetings. This suggests that the technology to be selected should be pedagogically effective. Costlier technologies may be considered provided these are suitable to the course objectives. Thus, IGNOU preferred one-way video and two-way audio teleconferencing system keeping in view the cost and pedagogic factors.

Needless to emphasise that development of quality software/courseware is critical to the successful implementation of the technology in education and training. The courseware should be learner-oriented and should facilitate their learning. The periodical assessment of courseware, its access, standard, extent of use and impact on teaching-learning, can be planned to reap the benefits that these technologies can offer. The faculty is being encouraged to undertake formative evaluation of the learning materials being developed: audio-video programmes, teleconferencing sessions or computer software.

The attitude of administrators, teachers and learners towards the use of communication technology-based education and training is another important factor. It has been observed that some teachers and learners perceive it as a means of entertainment or that they treat the use of technology as an extra activity, and as an add-on burden. Print being the master medium in most of the courses in IGNOU, they do not pay much attention to the use audio-video components. Some of them may lack direction as to how to integrate the use of technology with curriculum. To overcome this problem IGNOU has been organising various orientation/training programmes for its faculty, academic counsellors and learning centre coordinators periodically. The faculty is being motivated to apply innovative methods of production and distribution of learning materials.

This is a transition phase for IGNOU which is trying to keep abreast with, and anticipate the media and technology for future having major influence on the development of distance education. With the help of existing and emerging communication technologies in the country, it is possible to impart lifelong education and training particularly to those living in rural and remote locations. The conventional education system can be complemented/supplemented by technology-driven open education system. During this period, print-based physical delivery system and network-based electronic delivery system will co-exist. The transformation has to be gradual with the participation of all distance education functionaries of IGNOU, including the distance learners. With constant efforts, IGNOU will be able to use modern communication technologies to offer best expertise and experiences to all the learners irrespective of distances (IGNOU, 1998a).

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