Teacher Orientations through Satellite Communication

Some Experiences

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Abstract

The teacher training through distance mode is now an established system in India, especially after launching of dedicated satellite for education "EduSat". National and state level agencies have been organising various training programs for teachers through EduSat. It has solved the problems of non availability of large number of competent resource persons, quality dilution and transmission loss during training and inability to cover large number of teachers at different locations. This paper is an attempt to review the history of teleconferencing in India and its various attempts with in the country including shift from one way video to two way video-conferencing through EduSat. The paper also highlights the research studies related to teleconferencing with special reference to programs and researches with EduSat. This paper is also an effort to describe the major programs conducted by CIET through EduSat for orientation of teachers of KVs, NVs and other CBSE affiliated schools for newly developed text books based on NCF, 2005.

Introduction

The level and quality of education is one of the most significant parameters for development. In our country the total literacy has gone up over the years but the quality needs tremendous improvement. The pivotal role of education as an instrument of social change by altering the human perspective and transforming the traditional mindset of society is well recognised. The universalisation of education has become the top priority, especially for the developing countries like India. However, the extension of quality education to remote and rural regions becomes a Herculean task for a large country like India with multi-lingual and multi-cultural population separated

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by vast geographical distances. Since independence, India has seen substantial increase in the number of educational institutions at primary, secondary and higher levels as well as the student enrolment. However, the lack of adequate rural educational infrastructure and non-availability of good teachers in sufficient numbers adversely affect the efforts made in education. In the conventional cascade model when large numbers of teachers have to be trained through face-to face mode, information loss is a major concern by the time information and skills are passed on to those for whom training was really meant.

Satellites can establish the connectivity between urban educational institutions with adequate infrastructure imparting quality education and the large number of rural and semi-urban educational institutions that lack the necessary infrastructure. Besides supporting formal education, a satellite system can facilitate the dissemination of knowledge to the rural and remote population about important aspects like health, hygiene and personality development and allow professionals to update their knowledge base as well. Thus, in spite of limited trained and skilled teachers, the aspirations of the growing student population at all levels can be met through the concept of tele-education.

The first attempt toward satellite instructions

The concept of beaming educational programs through satellites was effectively demonstrated for the first time in India in 1975-76 through the Satellite Instructional Television Experiment (SITE) conducted using the American Application Technology Satellite (ATS-6). During this unique experiment, which is hailed as the largest sociological experiment conducted anywhere in the world, programs pertaining to health, hygiene and family planning were telecast directly to about 2400 Indian villages spread over six states. Later, with the commissioning of INSAT system in 1983, varieties of educational programs are being telecast. In the 90s, Jhabua Developmental Communications Project (JDCP), Training and Developmental Communication Channel (TDCC) further demonstrated the efficacy of tele-education.

The History of Teleconferencing in India

The origin of teleconferencing can be traced back to the development of satellite technology by the Indian Space Research Organisation (ISRO). The most important development occurred in 1975, with the beginning of a project called Satellite Instructional Television Experiment (SITE), the first of its kind in the history of development communication. The SITE project was a joint effort of an Indo-US Agreement, under which the United States loaned its Application Technology Satellite-6

(ATS-6) to India for a period of one year. Except for the satellite, all the hardware ground system was the responsibility of the ISRO. The SITE programmes were received simultaneously in 2,400 villages for

target audiences who had no prior exposure to television. Apart from acquiring the technical competence of developing, testing, and managing satellite based television infrastructure, the major objectives of the project were to improve primary education, provide teacher training and create awareness in the areas of health and nutrition, population control, agriculture, general improvement in quality of life (Agarwal, 1978). The success of this experiment demonstrated the feasibility of satellite communication and opened new outlook for satellite application for education and development and interactive television ('teleconferencing' being one of them).Teleconferencing over the years has evolved as a unique delivery system to emancipate education from within the four walls of conventional classroom.

1979 - ISRO and the Post and Telegraph Department, Government of India jointly organised a national seminar in teleconferencing mode for professionals assembled at Ahmedabad, Delhi, Mumbai, Kolkata and Chennai during Satellite Telecommunication Experiment Project (STEP) using Franco-German satellite SYMPHONIE's transponder (Chaudhary, 1999).

1983 - Teleconferencing technology was tested exclusively for education with ISRO's course on satellite communications for engineering students using APPLE. Apart from testing the system efficacy, the experiment also investigated the impact of teleteaching in terms of knowledge gain, which was found to be significant (Agarwal and Pande, 1992).

1983 - Indian National Satellite System (INSAT), India's first geostationery satellite, was launched. The indigenous satellite facilitated broadcast of University Grants Commission's enrichment program for undergraduate level students (CWCR) and NCERT's programmes for children (ETV).

1991 – A three-day training program for trainers of adult education in Gujarat was conducted in collaboration with Gujarat Vidhyapeeth through INSAT-1B. Trainees from rural background viewed programmes through teleconferencing as an effective approach and used talk back facility with ease. UGC conducted talk-back experiment for undergraduate students in Science, Arts, and Commerce for a six-day period in the same year involving eight receiving ends: Ahmedabad, Kolkata, Hyderabad, Imphal, Jodhpur, Madurai, Patiala and Roorkee. The question-answer sessions conducted after each program were found to facilitate comprehension of the content. Many educational institutions showed enthusiasm to use the system (Agrawal and Pande, 1992).

1992 - Skill development training on maintenance engineering for the supervisory staff of the industries at eight locations, followed by Bhiwani Experiment for development functionaries, and Institution of Electronics and Telecommunication Engineers (IETE) experiment involving 11 locations were conducted. These experiments repeatedly endorsed the potential of teleconferencing as a "distance neutral" technology, which could be used to great advantage in formal and non-formal education (Agrawal and Pande, 1992).

1993 - The ten-day long first IGNOU-ISRO teleconferencing experiment covered 525 participants. The transmission was carried out for five hours every day. It became a major landmark in the extensive and continuous use of teleconferencing for distance education and provided useful insights in organisational, managerial and technical aspects involved in the teleconferencing system. Ten regional centres were chosen as receiving ends. The success of the experiment prompted the university to include teleconferencing as a regular component of IGNOU's student support system (Chaudhary, 1999).

1995 - The Training and Development Communication Channel (TDCC) of ISRO became operational using the transponder of INSAT 2-C earmarked for the purpose to implement one-way video and two-way audio teleconferencing network on a regular basis for IGNOU and other user agencies for tele-teaching, tele-counselling, tele-training, academic seminars, and other related activities. The teaching-end facilities including studio and uplink were provided at IGNOU campus at New Delhi and at Space Application Centre (SAC) campus in ISRO, Ahmedabad. Gradually several users such as AIMA, NCERT, NIPCCD, State governments of Gujarat, Karnataka, Madhya Pradesh, Orissa and Rajasthan, NGO's like SEWA joined in to take advantage of this powerful technology on a regular basis. Later, four more teaching ends were established in Bhopal, Mysore, Gandhi Nagar and Cuttack (DECU, 2003).

2001 – Initiation of *Gyan Darshan 2* (GD-2) at IGNOU, a digital channel devoted to one-way-video and two-way audio teleconferencing enabled the University to serve its teleconferencing needs more effectively. GD-2 also extends tele-conferencing service to other user agencies: NIEPA, ICAI, NCERT, RCI, National Trust, and other user agencies.

Various attempts of Tele-conferencing

In any ODL system, tele-teaching is a boon for its students who can see, listen and more importantly, interact with their teachers and other experts drawn from the field**.** For students of conventional colleges and universities, particularly those living in small towns, rural and remote areas, teleconferencing provides a rare opportunity to be benefited by the expertise drawn from different fields. Dr. B.R. Ambedkar Open University (BRAOU), Hyderabad, Andhra Pradesh, Yashwantrao Chauhan Maharashtra Open University, Nashik, Maharashtra; M.P. Bhoj (Open) University, Bhopal, Madhya Pradesh; Goa University and several other government and privately run institutions are delivering their courseware partially through teleconferencing mode. For IACI, and some other institutions, teleconferencing is an important mode for extending their reach to their enrolled students.

Jhabua Development Communication Project, a major initiative of ISRO was implemented in the tribal belt of Madhya Pradesh, from 1996 where even STD lines were not easily available. To facilitate talkback, a custom made computer called Demand Assigned Multiple Access (DAMA) was installed at each receiving node. DAMA used the

same satellite link for real time talk back. Further, it overcame some other barriers to communication, such as holding time of telephone call by registering a centre in the beginning and processing the sequential asking of questions later from each centre (Trivedi, 2004). TDCC's expansion as Gramsat Pilot Projects for different states in the country is a good example of effective use of teleconferencing for rural development. It is primarily concerned with establishment of communications networks at the state level connecting state capital to district and blocks in order to reach the villages, providing computer connectivity, data broadcasting and TV-broadcasting facilities for applications like e-governence, besides other utilities. The GPP networks are operational in Gujarat, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Andaman and Nicobar, Goa, and Himachal Pradesh (DECU, 2003). GRASAT–Northeast Region has been the recent addition, run by North east Space Application Centre, Shillong for effective e-governance of seven states of the region characterised by its difficult terrain and tribal prominence.

For IGNOU, teleconferencing is a round the year activity for its academic programs, facilitated by a strong network of downlinks at its 57 Regional Centers 4, Sub-Regional Centers and about 1300 Study Centers, all over India. For MBA, CEMPA, MCA, Nursing, Health Care, Intellectual Property Rights, and other professional programs, teleconferencing has been integrated as a complementary component of the learning package. The induction programs for new students, important announcements, review meetings, orientation of staff at Regional Centers, and convocation are other major activities of IGNOU, which are carried out in teleconferencing mode.

The District Primary Education Project - Distance Education Program (DPEP-DEP), a comprehensive national program aimed at attaining Universal Elementary Education, is an ideal example of judicious mix of teleconferencing with other media and face-to-face components for the purpose of orientation, sensitisation and training. Teleconferencing played a pivotal role in successful implementation of the project in reaching out to more than 23,000 primary school teachers, teacher educators, and other functionaries associated with primary education in 18 states. In all, 112 teleconferences were organised at the national and state levels (DEP-DPEP, 2003). Presently DEP-SSA (Distance Education Program – Sarva Shiksha Abhiyan) is using teleconferencing as a cost effective intervention on a much larger scale. According to DEP-SSA annual report for the period 2004-2005, DRS (Direct Reception Sets) have been installed at all DIETs (District Institutes of Education and Training) and other concerned centers to provide maximum teleconferencing connectivity. During 2004-2005, 31 teleconferences at national level and state level have been organised. In a single teleconference, "Teaching of Science through experiments" conducted for SSA in Rajasthan, approximately 1800 teachers participated. This bears testimony to the magnitude of the tasks being

accomplished through this interactive technology in SSA program.

Research studies in Tele-conferencing

Research studies in the area of Teleconference indicate positive impact of this methodology used in training of in service teachers. Phalachandra (1997) narrates his experience of using tele-training methodology for special orientation program for in-service primary school teachers on the subject of hard spots in Mathematics. The evaluation of the program revealed not only significant gains in knowledge but also a high level of satisfaction and motivation among participants, who indicated their preference for interactive teleconferencing compared to conventional means.

Phutela (1998) underneath a pilot project experiment on the use of teleconference to orient 850 primary school teachers in the state of Karnataka in India. The evaluation indicated significant gains on the learning of concepts and practices relating to the large number of themes covered in the program. The teachers welcomed the technology, but bemoaned the lack of opportunities to interact with the experts because of limited telephone lines. The experiment demonstrated the potential of the technology in meeting the training requirements of large groups, such as teachers, at a distance.

Parkash and Lal (1998) studied presentation and production aspects in relation to the effectiveness of teleconferencing for orientation of primary school teachers. They found that language, presentation style, pace of presentation, clarity of graphs/charts/ text used and the teaching aids had a direct bearing on effectiveness of teleconferencing. They suggested that the design of the sessions should be learner oriented and spontaneous to ensure active participation of the learners, for which the experts/ presenters must be trained in teaching/ learning through interactive technologies.

Taleem Research Foundation (1999) assessed the effectiveness of the teleconferencing system of the Distance Education Program of District Primary Education Program (DEP-DPEP) in the state of Tamil Nadu. The study found that the participants were in favours of teleconferencing because of its novel nature and perceived benefits, technology was user-friendly in nature, and the interest level was high among the participants on the first day and kept on increasing day after day.

The problems and concerns discussed above are one way or the other linked with managerial and organisational issues. Trivedi (2004) identifies: ad-hoc planning, deficient management practices, and lack of training to facilitators, inadequate monitoring documentation and evaluation processes as factors impeding the optimum utilisation of such a powerful technology. Such issues can only be redressed at policy level before they manifest in a multitude of small problems creating chaos for small setup which have limited means. Smaller issues such as appropriate placement of telephone for students to ask questions need to be attended to; the onus of trouble shooting lies with the

management of respective learning ends. Attention to details in planning, facilitating comfortable viewing conditions, proper talk back links with the teaching-end enhances the quality and effectiveness of teleconferencing.

Shift from one-way video to two-way video-conferencing

After launching of Edusat, teleconferencing is in a state of rapid transition, from one-way video and two-way audio to two-way video and two-way audio mode. A learning-end can not only be heard but also be seen at the teaching-end as well as other learning-ends. This has induced equivalence between teaching-end and learning-ends.

Edusat objectives include providing support to formal and non formal education and teachers' training programs, increasing access to quality resource persons, enhancing community participation, taking education to remotest corner of the country, strengthening the distance education efforts initiated by various agencies, providing access to new technologies. Teleconferencing is the crucial means for implementation of Edusat objectives. Edusat has a great deal to offer to teleconferencing. In order to understand this, it is imperative that we look at some specific features of Edusat in operational terms. Edusat supported teaching-ends has connectivity with central repository and databases, through intranet and internet. These resources including multimedia teaching aids, VCD/DVD clippings/graphics, illustrations, charts would be at the disposal of teacher in off-line or on-line mode for self-learning and enhancing the quality of teaching. The teaching-end has also provided storage facility for live lectures to reuse and editing. At the learning-end, besides two-way teleconferencing, the satellite Interactive Terminals (SITs) has given immense control to the student for asynchronous learning through automatic local storage of live lecture for reuse. A student is able to access teaching-end in off-line mode also. That is, Edusat supported networks has provided access to content (lectures, supplementary materials etc.) on demand.

Edusat user-friendly technology has an inbuilt rectify mechanism for many of the existing interrelated problems that teleconferencing is confronted today. For instance, 'time' is not remain a constraint anymore with the off-line access to tele-lectures and other supplementary materials. Interactivity, sense of participation, immediacy has definitely improved because the participants are also visible. Moreover, since audio link is through Edusat, the chances of signal break and poor audibility is minimised. Presentation of the teleconferencing has easily enhanced since teaching-end has access to all resources that a teacher need to improve her/his tele-teaching, i.e. updated information, interesting examples, visuals, graphics and so on.

EDUSAT: The first dedicated satellite for education

With the success of the INSAT-based educational services, a need was felt to launch satellite dedicated for

educational service. To meet the above demand ISRO conceived the EduSat project in October 2002 and launched on 20 September 2004, from the launch pad of the Satish Dhawan Space Centre, Sriharikota, AP exclusively for the educational sector. .It has a C- band national beam, a Ku band National beam and Five Ku Band regional beams. It was a collaborative project of MHRD, IGNOU, and ISRO. EduSat is designed to provide service for seven years.

EDUSAT is a technology network comprising:

- Uplink station in selected national and state locations (to act as teaching end)
- Downlink stations or facilities in various educational institutions (as learning end)
- Satellite

Programs and researches with EduSat

After establishment of teaching end at CIET along with 100 nods as learning ends around 30 programs of various kind and nature are organised. The approximate number of days for which the programs were conducted is 175. These programs were conducted by various constituents units of NCERT viz. Pundit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE), Curriculum Group, Department of Teacher Education and Extension (DTE&E), Department of Women's Studies (DWS), Department of Educational Psychology & Foundations of Education (DEPFE), Department of Education of Groups with Special Needs (DEGSN), Department of Science and Mathematics (DESM) and CIET. However, the focus of this article is limited to the three major programs of DTE&E regarding orientation of teachers on the use of new textbooks published by NCERT based on New Curriculum Framework, 2005

The orientation program for the teachers of KVS, NVS and CBSE affiliated independent schools on use of new textbooks developed by the NCERT for I, III, VI, IX and XI standards was organised through videoconferencing during 6 July to 20 August 2006 in 25 learning centers operationalised in the States/UTs of Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, Chandigarh, Chhattisgarh, Himachal Pradesh, Madhya Pradesh, Rajasthan, West Bengal, Orissa, Gujarat, Uttarakhand. Major themes of interaction includes highlights of National Curriculum Framework (NCF)-2005, syllabi and focus group reports, major changes in the textbooks, guidelines for using textbooks, suggested classroom activities and the evaluation strategies to be adopted by the teachers. The participants had opportunities to have live interaction with the experts to express their observations and to have experts' views on various queries from them. Over 10,000 teachers participated in the program extending a period of 36 days covering different subjects. This was the first time, when users (teachers) from all parts of the country interacted directly with the textbook writers/developers and experts in different subject areas and shared their, queries, observations and suggestions. Chairman, National Steering Committee (NCF-2005); Director, NCERT; Chief Advisors of various Textbook Committees, Chairman, CBSE;

Commissioner, KVS along with experts from Universities, other organisation, as well as faculty of NCERT and Commissioner NVS have also interacted with the teachers during the program and clarified many issues. This programme has been appreciated by our former President APJ Abdul Kalam and found spaced in his speech given on the eve of Independence day 14 August 2006.

Another orientation program was organised to orient the teachers of Kendriya Vidyalaya (KVs) Navodaya Vidyalaya (NVs) and CBSE affiliated schools. This program was organised for the teachers to orient them with the new textbooks of NCERT. The program was organised from 9th July to 21st August, 2007 by NCERT through two way video conferencing of EDUSAT network at CIET. The need to orient teachers on new textbooks of NCERT was generated with the development of the curriculum framework–2005 on school education. This time the books for Classes II, IV, VII, X and XII were published. This 36 days program was conducted in such a way that one textbook of a class was discussed with the teachers for one whole day. Around 15,000 teachers were oriented on 30 different centers of NCERT network across the country located at various SCERTs, RIEs, SIETs, KVs and other institutions. Approximately 30 teachers were invited to attend that program on each learning center. The teaching end was at CIET studio where panelists including textbook writers, coordinators, advisors and experts were present. The finding of the evaluation study (Pal Rajendra 2008) reveled that: (i) majority of respondents (29%) recommended that tele-conferencing program should be conducted three times a year; (ii) 31% experts observed that audio and video disturbances occurred during presentation; (iii) Some of the teacher respondents suggested that duration of the entire program should be increased; 65% of panelists expressed that they were getting advantage in answering question centre wise.

In the third Phase of EduSat training for textbook, NCERT has also organised orientation program for teachers of NVS, KVS and CBSE affiliated schools for newly published text books for Classes V and VIII. The program was organised for 11 days between 16th July to 2nd August, 2008. Around 25 centres were utilised to cover the teachers all over the country.

In the first phase the EduSat Project was implemented in all the primary schools and few selected secondary schools (Grade VIII) of Chamarajanagar districts and 14 schools of HD, kote of Mysore districts. The main objective of the program was to develop quality broadcast video materials in language and core subjects (Maths, EVS). RIE Mysore has taken of the evaluation component of this project. The four video films were identified for field testing and the finding shows that (i) though the topics had been taught in the schools, the initial level of performance was good. (ii) The increase in the mean achievement statistically significant with respect to two films of grade VI and one film of grade V. (iii) The achievement difference in Mathematics were not significant. This indicates that the films in Mathematics' should be handled with care (Phala Chandra 2006).

In a recent research review, Phalchandra (2007) found that the launch of EDUSAT has helped in providing quality instruction through video programs to students studying in the interior villages. The students have benefited from the video programs delivered through the Satellite. The benefit gained is in terms of gain in knowledge and understanding of the content, improvement in attendance and holding attention and interest in viewing programs. The teacher involvement during the broadcast as facilitator and conduct of Pre and Post broadcast activity is note worthy. A study of UGC, CEC, 2008 reveal that in some institutions, the numbers of viewers are more but in many, the number is very less. This in a way reflects under utilisations. One of major reasons for technology problem during telecast of lessons and in interactive sessions is low bandwidth. There is an urgent need to improve the quality of the telecast. In almost all centres EduSat program are looked after by faculty members who are given additional charges. This arrangement works well in some institutions and in some others due priority is not at all given. As it is an important program, it needs to be managed by persons dedicated for the work. Teaching aids, particularly PowerPoint is used in a limited way by most of the resource persons but the quality of which requires improvement.

A study of Haryana Government EduSat network, 2008 found that Majority of resource persons were of the opinion that presenters used PowerPoint presentations, photos and asked questions, video quality, largely, was found to be satisfactory or good but problems were experienced in audio. Around 61% of the coordinators opined that interaction was held during interaction. Most the resource persons found EduSat network effective for distance education.

Conclusion

It can be concluded that satellite communication for education in general and for teacher education with specific reference is very well established and utilised. It has contributed a lot to teacher education. Lots of teachers have been trained through EduSat. The launching of EDUSAT has already passed four years. We have experienced various activities and functions related to this network. However, the researchers feel that all the possible functions of EDUSAT network have not been fully explored for teacher education. Before the life span of EDUSAT expires, we should modify forthcoming programs on the basis of our experiences. All the possible ways to use this technologically innovative boon can be explored and tried for training, retraining and quality improvement of teacher education in the country.

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