

# Advanced Information Communication Technologies for Delivering Education: A Review

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## Abstract

Education plays a key role in the economic, social and cultural development of developed and developing nations. It cannot be denied that drastic changes in the world economy led by latest Information Technologies. ICT driven education overcomes barriers of time and place for providing anytime or from anywhere access for learning. The benefits of ICT for students includes - Increased access, Flexibility of content and delivery, Combination of work and education, Learner-centered approach, Higher quality of education and new ways of interaction. Education is the basic source of human capital and poor quality of education can create income disparities. As return on human capital is directly dependent upon good quality of education so government has developed policies and accordingly plans for initiating efforts to improve education system, so as to reduce such income inequalities for economic growth of the country. In this paper the impact of EDUSAT on education system and other methods used for e-learning at international/national level is discussed taking into various research studies conducted in previous years.

## Keywords

ICT, E-learning, EDUSAT, Digital Divide etc.

## I. Introduction

Education is the basic indispensable need for the citizens of developing countries like India, and educating future generations is required for economic growth and development of the country. It is the duty of government to ensure that all children have equal access to schools and quality education. All the schools should have proper infrastructure and trained teaching staff so that gap is minimized between students due to lack of these facilities. If such gaps exist then it will affect the economic growth of country. Education is the basic source of human capital and poor quality of education can create income disparities. As return on human capital is directly dependent upon good quality of education so government has developed policies and accordingly plans for initiating efforts to improve education system, so as to reduce such income inequalities for economic growth of the country.

Government aided schools are run by governments funding and assert that the primary education a fundamental right of every Indian citizen. Quality of student learning and performance largely depends upon the classroom teaching and that varies from one school to another and the system fails in producing employment opportunities and thus is responsible for economic inequalities in society. Most government schools in rural and remote areas lack basic facilities, infrastructure and shortage of trained staff. The country launched a satellite for spreading education related materials and reserved a dedicated band for this purpose. EDUSAT (Educational Satellite) is the first Indian Satellite launched to broadcast quality education content to schools, colleges and universities with a total investment of Rs 549.09 crore. It opened a new dimension in the education scenario. It has made possible to provide access to uniform good quality of teaching curriculum for far flung and rural remote locations of the country. When it

comes to audit the value for money invested in education related projects, the sorry state of affair appears. Various studies have been conducted to evaluate this project to spread education to the rural and backward areas of the country.

## II. Experiences from Various Studies

**Krithivasan and Iyer (2005)** discussed various models for efficient dissemination of multimedia content along with advantages, problems and challenges in implementing the different models. The study focused mainly on –Satellite based models, Models for Streaming over the Internet and Hybrid Models. The scholars identified the various user groups of distance education such as- Educational institutions catering to higher educational needs, Schools, Governmental agencies, Business organizations and industry. Satellite based network models would work fine where the focus was on the community at large rather than individual users. Flexibility of space and time was absolutely essential for users in a business organization or an individual industry professional for allowing access to knowledge on their desktops. The streaming models satisfied the requirements of working professionals but major hurdle was guaranteeing quality. By deploying the hybrid models quality guarantees could be made within a local area. A satellite-based model for an application such as distance education would restrict its reach to institutions and organizations within the country. Internet based streaming would open up the program to participants anywhere in the globe. It was concluded that the choice of the model changed on basis of the objectives of the program, targeting a community or an individual user or whether it caters to national or international students. The researchers mapped the objectives to the models proposed with a view to provide the basis for choosing one model over the other. With the launch of EDUSAT, the proposed models that use the satellite network as the primary infrastructure can be considered for reaching the masses.

**Bhandigadi (2006)** conducted an evaluative study to find out the impact of EDUSAT on the academic achievements of students and opinion of teachers. The primary data of 2000 students and 200 teachers was statistically analyzed by following experimental and control design at schools level in the Karnataka state. The researcher found out that 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 programmes. It was suggested that teacher involvement during the broadcast as facilitator and conduct of Pre- and Post- broadcast activity be made compulsory despite other efforts to ensure the delivery of services.

**Sife et al. (2007)** discussed the application of ICT's in teaching and learning by reviewing the e-learning context and explained the pedagogical, cost and technical implications of different ICT's that can be used for e-learning purposes. The researcher analyzed the implementation of e-learning system in various universities of Tanzania and identified the challenges faced by these universities such as lack of awareness, attitude, administrative support etc which would be critical to the successful integration of ICT's

into teaching and learning processes. The study concluded that most of the universities in developing countries possess basic ICT infrastructure such as Local Area Network (LAN), internet, computers, video, audio, CDs and DVDs and mobile technology facilities that form the basis for the establishment of e-learning. Pedagogical, technical and cost issues should be taken into account for each specific technology when integrating ICTs in teaching and learning practices.

**Rajpal et al. (2008)** presented in their study the current status of e-learning education in India. The authors discussed three reputed institutes in the country- Indian Institute of Management Ahmedabad (IIMA), Symbiosis Center for Health Care (SCHC) and AMRITA those had implemented e-learning and offered various online courses. The study concluded that there was increase in number of higher education institutes in India and the number of students enrolled was high and expected to increase in future. With such increased enrollment numbers it would then be difficult to provide the infrastructure for education. All the challenges that India was facing in education and training, e-Learning provides many answers and needs to be addressed seriously by the planners, developers and the private industry players. Further the study suggested that many sectors like Education, Banking, Medical, Agriculture or even the entertainment industry could use e-learning to lure students and offer introductory courses that could explain the varied opportunities that those fields offer.

**Desai et al. (2009)** studied the enhancement of primary education using EDUSAT and found out that due to the non-availability of required number of trained and expert teachers' knowledge-divide exists between students from urban and rural/remote areas. Distance Learning or Tele-education was chosen as best option to bridge this gap. In the study it was decided to provide a Tele-education network in and around the Sidhi district of Madhya Pradesh, with uplink and studio facility (Hub) at Jabalpur (MP) and around 700 receive only terminals (ROTs) in various schools and it was found that it enhanced achievement of primary school learners.

**Chaudhary and Garg (2010)** discussed a case study of Rajiv Gandhi Project for EDUSAT-Supported Elementary Education (RGPEEE) project for imparting value added ICT enabled education for improving the quality of education and professional development of in-service teachers. Initially, the project focused mainly on Sidhi district in Madhya Pradesh which is predominantly inhabited by tribal people, who have remained on the margins of development, and 700 schools, the District Institute of Education and Trainings (DIETs) and Block Resource Centers (BRCs) were connected. For the achievement of this project's objectives, multi-pronged strategy to identify hard spots, develop e-content and beam programmes at pre-decided schedules, train school teachers from within the district in presentation skills was adopted. Feedback studies revealed that with the launch of the program, EDUSAT supported education helped to increase attendance of students in schools and their retention for more time, apart from empowering teachers in teaching hard spots and motivating them to make their teaching more effective using innovative methods and aids.

**Nayak and Kalyankar (2010)** discussed problems, considerations, issues and approaches to e-learning in India with giving stress on important features of e-learning and benefit of e-learning for rural child development. The researchers concluded that strategies should be developed and implemented to solve rural areas problems. Along with traditional education, policies should be developed and implemented for IT education. The IT subjects should be incorporated in curriculum at school level. The web based

education at school level for rural children and youngsters would increased their knowledge level. It would enhance the quality of education in the country at all levels i.e. primary, secondary and higher education. E-learning technology had great potential to spread learning to reach the rural masses of India otherwise they would be one of the causes of digital divide. Government's strong support and full dedication could solve all the problems.

**Kakoty et al. (2011)** analyzed the current e-learning procedure and discussed the prospects and promising research areas of e-learning domain. The authors concluded that the security of services, the encryption of messages and the common taxonomies to describe services and service access points in e-learning systems environments were key challenging research areas. By employing the new technology in e-learning environment, one could make the system more attractive and interactive for learner that might help to build a learner centric platform in this environment.

**Gupta (2012)** conducted comparative study about the various methodologies with their problems and constraints available to support the impact studies of the Satellite Enabled Educational Receive Only Terminals (ROTs).

The study concluded the benefits of the integration of 'People Meter' and 'Picture Matching People Meter' devices at the receiving end. With the integration of suggested technology, the authorities would be able to get periodic information regarding viewership data for the purpose of effective monitoring, control and optimum return of the investment. The mechanism would provide quick, authentic, instant information about viewership whenever required without visits to the receiving locations. It was possible to shift the device to other places after stipulated time intervals. It was suggested that the integration of 'People Meter' and 'Picture Matching People Meter' technology enabled audience measurement system, the policy makers and authorities may get more authentic information for the purpose of effective monitoring and control of the project/scheme.

**Kumar and Kaur (2012)** conducted an evaluative study of EDUSAT program in schools of the Haryana state of India. The aim of the study was to find out the opinion and difficulties faced by teachers, students and principals; facilities provided by schools; subjects and classes covered by EDUSAT program. The primary data of 10 principles, 50 teachers and 150 students from all the government schools of Hisar district having the EDUSAT facilities was taken. The analysis was done using simple percentage method. The study concluded that all the subjects were not given equal importance and subjects like Hindi, Commerce, Economics were not covered through EDUSAT. Only the curriculum of XIth and XIIth standards were taught through EDUSAT. The major areas where the Principals faced the difficulties were: time table adjustment, maintaining discipline, maintaining technical equipment, maintaining coordination with teachers, whereas 90% teachers complain that the syllabus was not completed in the time through EDUSAT teaching. Moreover, according to teachers, expert teachers fail to understand that how much the students had learnt from EDUSAT lectures. The difficulties faced by students were speed of lesson delivered by EDUSAT teacher, fluctuation in volume or picture, electricity failure and timing of telecast of lecture. Further the study suggested that Conferences and Seminars for Teachers and Principals must be organized from time to time to sort problems related to curriculum, methodology, physical facilities, technical problems. The mutual efforts of the Principals, Teachers, Students and the Government could generate a knowledge based nation and society with the help of EDUSAT.

Pallai (2013) discussed various projects initiated by ISRO to cater to the country's need for education, training, and general awareness among the rural poor. The institutions which play a vital role in the implementation of EDUSAT-based programmes are described like . The researcher concluded that for the successful use of EDUSAT satellite a rigorous planning is needed and collaborative efforts are essential for designing of the software and its utilization for achieving goals of education.

### III. Challenges Ahead

EDUSAT program utilization for students is only possible within the school premises or institutions having devices that support for satellite communication receipt and broadcast and it depends on the schedule of the broadcast too. All such learning facilities are not availed by the students at any other place or home. As education is one of basic needs of human beings and should be provided as facility to be accessed by anyone at anytime but presently EDUSAT is not able to cater to these facilities. The benefits of this facility are not being used optimally due to one factor or the other. There is need to explore other alternatives that prove the worth in this program. Internet and ICT technologies can be used to teach India's huge population, majority of which is located in rural and remote areas. According to India Country Report (2013) the Internet subscriber base in the country is steadily increasing which promotes to invest in technological infrastructure for easy access to knowledge. So there is need to develop educational delivery mechanisms for dissemination of knowledge to masses. Therefore the possible alternative to make available education facilities round the clock without costly hardware can be with the use of latest information technology tools like Tablets, Smart phones etc. with internet connection.

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