CHAPTER 1

INTRODUCTION

1.1 GENERAL

In the pursuit of higher knowledge, education acts as a platform that helps an individual accrue both the basic and advanced skills that are necessary. Education acts as a revitaliser of our minds which it shapes and directs. In comparison to decades gone by, today’s education is more structured and conceptualized. While the primitive period had no established formal education system, in today’s day and age there are a variety of education systems.

Information Communication Technology (ICT) has widened the scope for educational resources, and latest tools to make the teaching learning process more comprehensive and didactic is the need of the hour. Globalization too has put enormous efforts in escalating the educational scenario. Students have the opportunity to access videos from all over the world apart from regular classroom lectures. Sometimes, the use of animation and demonstrations further enhances the learner’s intellectual behaviour and it helps in academic and cognitive developments.

Education and its imparting methods have grown leap and bounds. Formal education is no more restricted to practice in classrooms and it has been cordially supported with e-learning, virtual learning, on-line learning, CD and DVD, tapes, educational channels, websites, softwares, smart
classrooms and many more. The modus operandi for delivery of education has been continuously changing. Though the introductions of these gazettes and tools have been considered as a vigorous threat; surprisingly, the conventional teacher classroom technique is irreplaceable (Prema 2013).

The National Research Council’s research report, how people learn (NRC 1999) shows clearly that people learn by actively participating in observing, speaking, writing, listening, thinking, drawing and doing activities. This clearly states that the involvement and participation enhances in building up the knowledge level in every individual.

According to United Nations Educational Scientific and Cultural Organization (UNESCO) “education is the key to any human’s social and economic development.” They have identified that for any nation’s prosperity, knowledge and education are the core factors. Education for All (EFA) is an aided international programme of UNESCO, started in 1990, whose sole aim is to provide the benefits of education to every citizen in every society. It ensures the learning needs of all young people, trains them in life skills activities apart from developing national education action plans especially for primary and science education, family education, peace and environmental education. It has also developed partnerships with many UN agencies, e.g. ILO (International Labour Organization) to promote population education, WHO (World Health Organization) to develop health education, FAO (Food and Agriculture Organization) to advance education in rural areas.

1.2 EDUCATION

The word "Education" has been derived from the Latin term "Educatum" which means the act of teaching or training. A group of
educationists say that it has come from another Latin word "Educare" which means "to bring up" or "to raise". According to a few others, the word "Education" has originated from another Latin term "Educere" which means "to lead forth" or "to come out" (Daushi 2012).

Education has the potential which can give power to people to assume responsibility for creating a tenable future and builds stronger bridges between the classroom and business; and between schools and communities as described by Johnston (2008).

1.2.1 Types of Education

Education is classified into formal, non-formal, informal and special types of education (EC 2001).

![Figure 1.1 Types of Education](image)

- **Formal learning**: Education provided by an educational institution, structured within a fixed period of time and finally after completion leads in achieving a certificate for the course attained by the student. It’s the basic education that a person receives at school, college or university where after attaining it receives a credential which later helps him/her to enter a profession in future. Both academic and trade skills are given to
the student through formal education. It is the traditional form of education. While nursery, primary and secondary education are received by a student at a school, higher education, or post-secondary education; graduation and post-graduation is generally exposed at a college or university level.

- **Non-formal learning**: An educational or training institution which provides learning skills but usually doesn’t provide any certificates for attainment of the course. This can be also categorized under adult education. Basically it deals with the adults who have not attained school during childhood and are illiterate. Saakshar Bharat (Literate India) for Adult Education is one such example. Sometimes it aims towards educating an adult either on literacy, or various job skills. It can be divided into three categories: formal class based education, e-learning and self-directed learning. Non-formal education can be also provided in small classes or through self study.

- **Informal learning**: Education through informal communication and reading books. Basically, it deals with a training where no recognized institutions are involved or certificate is given to the person but he or she gains extra knowledge about a particular kind of work or action. In general, informal education is enriching someone outside the basic form of education in schools, and without the use of any learning methods.

- **Special Education**: Mentally and physically challenged children are educated through special learning methods, known as special education. It can be in the form of audio visual programmes or special kind of books engraved in the style of
braille for visually challenged students. Inclusive Education for the Disabled at Secondary Stage (IEDSS) is initiated by the Indian government.

Colley et al (2004), found a very thin line of separation which distinguishes between formal and informal learning as they intersect between each other quite often.

1.2.1.2 Higher education in India

As per the records given by University Grants Commission UGC, the below table represents the Indian higher education statistics (UGC 2011).

Table 1.1 Indian Higher Education Statistics

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Top Four Fields of Study</th>
<th>Students Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Arts</td>
<td>37%</td>
</tr>
<tr>
<td>2</td>
<td>Science</td>
<td>19%</td>
</tr>
<tr>
<td>3</td>
<td>Commerce and Management</td>
<td>18%</td>
</tr>
<tr>
<td>4</td>
<td>Engineering and Technology</td>
<td>16%</td>
</tr>
</tbody>
</table>

The numbers of degree granting institutions are 700 joined by almost 35,500 affiliated colleges which offer higher education to almost twenty million students who get enrolled every year.

1.2.1.3 Engineering education scenario in India

Technical education is one of the most significant components of human resources development spectrum in improving the quality of life of the people. The history of inculcating formal technical education in India started in the 19th century although it got momentum in 20th century with the onset
of Constitution of Technical Education Committee of Central Advisory Board of Education (CABE). After India achieved Independence in the year 1947, the head-start of technical education emerged as a major concern for the Indian Government in order to bring the country ahead. At present 222 degree and 203 diploma institutions, with intake capacity of 63,515 and 50,479 students respectively are buzzing with activity (Gupta and Dewanga 2012).

Table 1.2 Number of Engineering Colleges and Intake in India

<table>
<thead>
<tr>
<th>Year</th>
<th>1977–78</th>
<th>2008–09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colleges</td>
<td>562</td>
<td>2,388</td>
</tr>
<tr>
<td>Intake</td>
<td>134,894</td>
<td>820,000</td>
</tr>
</tbody>
</table>

Source: http://www.currentscience.ac.in

With the number of engineering colleges available in India being 2,388 and intake being more than eight lakhs, one can easily get the picture of the institutions providing engineering education and the demand that has to fit into the available scale. A recent study done by Subbarao (2013) shows that the total percentage of under-graduate engineering students in India is dismally low when compared with China. The study highlights the need for well-trained, motivated teachers and researchers; innovative research for societal needs to lead in global knowledge economy.

Table 1.3 Engineering UG/PG Students Ratio in the Universities

<table>
<thead>
<tr>
<th>Country</th>
<th>UG Engg. students</th>
<th>Total UG students</th>
<th>Percentage</th>
<th>PG Engg. students</th>
<th>Total PG students</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>696,609</td>
<td>11,777,246</td>
<td>6</td>
<td>28,000</td>
<td>872,161</td>
<td>3.4</td>
</tr>
<tr>
<td>China</td>
<td>4,376,167</td>
<td>13,334,969</td>
<td>34</td>
<td>302,296</td>
<td>779,408</td>
<td>39</td>
</tr>
</tbody>
</table>

Source: http://www.currentscience.ac.in
The shortage of faculty both in numbers and in quality is the most serious problem facing higher engineering education system and is the most difficult, but at the same time, most urgent challenge to be tackled. Even premier institutions such as the IITs have faculty shortages of 25% or more and the situation has persisted for a long time. The other institutions face a grimmer problem (Subbarao 2013). He has pointed out that for an annual student intake greater than 1,500,000, there is a faculty shortage of about 80,000 (for a faculty: student ratio of 1:15). Of these, about 60,000 persons are needed with a Ph.D and another about 25,000 with a Master’s Degree. The increased student intake and a large number of new colleges being opened make the faculty shortage even more serious, having a direct effect on the quality of education. The shortage of an adequate number of qualified teachers is so serious that a multi-pronged attack on several fronts has to be mounted on an urgent basis before the technical education system collapses.

As per the reports of South Asia Human Development Sector (SAHDS 2013) the government of India and state governments has undertaken reforms in higher education. In particular, the engineering education sector has launched reform initiatives within the current legislative framework through the Technical Education Quality Improvement Program (TEQIP). Subbarao (2013) has similar views and he has recommended that a major step in this direction is a more imaginative use of ICT to make good lecture and course ware more widely available to the technical education system. The National Programme on Technology Enhanced Learning (NPTEL) courses started by 7 IITs, use of National Knowledge Network (NKN), MIT Open Course ware are some of the mediums available to improve the quality of technical education in India.
1.3 EDUCATIONAL TECHNOLOGY

Cuban (1986) defines “only about a decade ago, a history of technology in education, since 1920 placed the emphasis on radio and television, with computers as an afterthought.” However, Saettler (1990) urges “The historical function of educational technology is a process rather than a product.” Any useful definition of educational technology, therefore, must focus on the process of applying tools for educational purposes, and the materials used.

Computers, which began to be used in classrooms in 1960s until 1990 was known as educational computing. By the mid-1990s, educational computing became as educational technology. Audiovisual communications: the “branch of educational theory and practice concerned primarily with the design and use of messages which control the learning process” (Saettler 1990).

![Figure 1.2 Educational Technology](image)

Educational or Instructional technology has the following three basic applications: Instructional software, Interactive video-based materials, Courses through distance learning. When technology is merged with teaching then there will be a change the way a teacher teaches, interaction with
students differs, gives more options to present ideas in the classroom and brings changes in students’ expectations.

1.3.1 Television

Since the TV was invented, the broadcasting machine has been used for many purposes including entertainment and education. There are many television programmes that are designed to educate people, keep the viewers aware of what is happening in the wide world.

1.3.2 Education and Television

Television, as an important mass medium disseminates education through formal and informational methods. It is a source of teaching etiquettes, language skills, social relation, etc. Television is basically considered to be an entertainment oriented medium. Of late, many institutions have started using it as a source and a tool of teaching. Television is adaptable and can follow different approaches when used in the different educational situations (Ilagan 2013).

Media has been playing a dynamic role in bringing cultural and social changes to our society through the help of newspaper, television, radio and the internet (Hjarvard 2008). In today’s digital era, where the civil society is continuously exposed to new technologies and gadgets; it has become highly intricate to maintain the same stature.

A glimpse at history shows that though newspaper or the print media was accessible only by a handful of literates, radio had been liked by all for being a catalyst in disseminating messages in quite a simpler way. But television easily surpassed the other mediums and established itself as one of the prominent fanatics in catering enrichment, entertainment, information to
the public through the audio visual aid. The visuals captures every movement in a more lucid manner, e.g. even the smallest details of a human reaction like the expression of an eye movement or raising the eyebrows were caught live in the screen effortlessly. This was one of the prominent factors that made television to have such a wide reach.

Earlier studies show that television can be utilized as a great educational tool. “Television has the potential to inform the public and influence attitudes” as quoted by Albertson & Lawrence (2009). Television helps to educate the general public through entertainment programmes. Sometimes it also assists to boost up the smartness in children, and helps in contributing enhanced education to everyone no matter where they are located. It is considered to be one of the best modes which provide excellent learning opportunity to the students’ community. Students are the back bone for bringing development in Indian economy and if more attention is given in providing suitable and higher quality education, definitely there will be more shining results. This also means that the students who are termed as the curious minds can surely acquire more knowledge within a shortest period of time through the television programmes.

Greenberg and Zanetis (2012) stated that “television gives a chance to the instructor to follow up procedures and perform demonstrations along with illustrations and graphics to clarify student’s queries.” The authors emphasizes that this kind of television course work is also gaining massive popularity as it helps to educate students in remote areas for those who are not in a position to have access to higher quality education.

The delivery of education in today’s world has been promising more with technical gazettes. Teletext is a communication system where text and graphics are transmitted through air broadcasting or cable channel. Here digitized signals are used for display on a television set.
1.3.3 Evolution of Educational Television

Using television for educational purpose had started in 1930 itself. As television was started on an experimental basis in 1932, for the first time by State University of Iowa in USA, as an instructional medium, it was later followed up by more number of educational institutions. After World War II, the United States government encouraged the implementation of technology of instruction for military training programs like micro teaching, language laboratories, computer-assisted instruction, etc. as described by Wright (1991). This gave buoyancy to the Federal Communication Commission in USA to utilize television for educational purpose. In 1952, around 242 frequencies were used for educational broadcast free of cost (Vyas et al 2002).

1.3.3.1 Educational video formats

As the quote of McGivney (1999) is mentioned, there are a lot of crossovers. Most of the mentioned criteria can be fitted into the following clusters:

![Figure 1.3 Educational Video Formats](image)

The process interprets the learning activity, educational assessment patterns and the relationship between the students and the teachers. The setting of the place decides where and how the educational content will be received and with what motto. All the above four factors decides about the educational structure.
Regarding to the television content, various formats are available. As quoted by Lucido & Borado (1997) the word format is applicable to all sorts of mass media. The format is the physical form or manner in which a medium is displayed e.g. a variety show on a television may use the song-dance-game format; Magazines use the verbal format; Radio uses the audio format. As suggested by McGivney (1999), the following educational video formats can be implied for broadcasting:

- **Formal**: Programmes that are developed inconsideration to a formal syllabus that’s practiced by school and colleges. The developers get ideas from prominent academicians while developing the audio/video content and are basically produced with the coordination and guidance of a teaching staff.

- **Non-formal**: Audio/ video programmes which are broadcasted to develop the skills of people in general. Does not follow any curriculum patterns, but is usually produced to give extra knowledge to an individual. The viewers are able to gain more ideas by watching such programmes.

- **Informal**: The programmes either through the mode of a play, serial, fictional or factual news programmes delivers ideas and knowledge to the viewers indirectly. The common person watches the programme and certain pivotal issues related messages are conveyed through the depiction of daily life instances.
1.3.3.2 Benefits of educational television

Due to new technological advances and satellites, classroom television has reached into unreachable locations. Teleconferencing from these remote locations is also now possible. These teleconferences make it possible for interactions between the students and instructors. Thus it allows students to ask questions and gain a deeper understanding of the subject matter. As the interaction between student and content continues to grow, educational television begins to become more individualized and more beneficial for society.

1.3.5 Growth of Educational Television in India

Television slowly proved as an effective tool of distance education over the years. Educational Programmes are of the following types:

- Open university and distance learning programmes (UGC and IGNOU)
- Social and development programmes: Health and Science, fitness and hygiene, agriculture and rural development programmes, public service telecasts, literacy campaigns, family planning and welfare.
- Culture and gender studies programmes: literature, arts, theatre, cultural heritage and gender sensitisation.

(i) Secondary School television project (1961)

According to Vyas et al (2002) the secondary school television project was designed for the class IX students of Delhi with an aim to improve the standard of teaching. As there were shortage of laboratories, space, equipment and lack of qualified teachers in Delhi, the lectures shown
on TV filled in the problems. The lectures were syllabus-based and were telecasted in school hours covering the subjects Physics, Chemistry, English and Hindi.

(ii) **Delhi Agriculture Television (DATV) Project (1966)**

This was started on January 26, 1966 and was confined to 8 selected villages in New Delhi. This programme still continues in Doordarshan till date. Krishi Darshan is the other name given for this project. Its sole aim was to communicate to the farmers on various aspects of agriculture, poultry, soil, weather, etc for abundance cultivation and upgrading agricultural practices. Kaliyadan (2012) has said that communicating agricultural information to the farmers was the paramount target of this project.

(iii) **SITE**

According to Agarwal (1977) one of the pioneering projects taken by India in 1975 which completely revolutionized the technological scenario was SITE. It stands for The Satellite Instructional Television Experiment which was an experimental satellite communications project, designed jointly by NASA and the Indian Space Research Organization (ISRO). This experiment prompted important research and development activities for village audiences, by promoting innovative and low-cost production. The project made available informational television programmes to rural India. The main objectives of the experiment were to educate the poor people of India on various issues via satellite broadcasting. It enhanced the usage of satellite communications (UNESCO 2013).
The experiment covered up to 3000 villages from six different states Rajasthan, Karnataka, Orissa, Bihar, Andhra Pradesh and Madhya Pradesh in India, most of them targeting the rural audiences. It ran successfully from 1 August, 1975 to 31 July, 1976. All India Radio was assigned to prepare and produce the content for the broadcast purposes which were delivered via NASA's ATS-6 satellite stationed above India for the duration of the project. This prompted later for India to think and produce their own satellites called the INSAT (Indian National Satellite System) where the most important role was to contribute towards education for the mass. Various international funding agencies like the UNDP, UNESCO, UNICEF and ITU wholeheartedly supported the SITE project.

The initial idea was not to provide formal education. The target audience was the general citizens most of them from the remote and interior places of India, where civilization and basic human needs were not seen. Hence the social objective was to educate the people of India about social issues that had entangled the society in the 1970’s. Some of the common problems like family planning, agricultural practices and national integration were covered. The secondary objectives were to impart general school and adult education, train the teachers, and improve other occupational skills and to improve general health and hygiene through the medium of satellite broadcasts (ISRO 2013).

Developmental educational programmes targeting to cover the areas of agriculture, health, family planning, hygiene, and social education were broadcasted to the audience. Simultaneously, the school programmes of 22½ minutes duration each in Hindi, Kannada, Oriya and Telugu were telecast on each school day for rural primary school children of 5-12 years age group to make the children realize the importance of science in their day to day life. As quoted by Vyas et al (2002) SITE experiment was appreciated and was accepted in rural primary schools as an educational force.
iv) **Kheda Communications Project**

The Kheda Communications Project (KCP) was a field laboratory in development and local communication which was conducted between 1975 and 1990 in Kheda district in Gujarat. This was started as part of Satellite Instructional Television Experiment (SITE). It demonstrated how participatory, and people orientation can contribute to a local TV system. Indian Space Research Organisation (ISRO) shared these experiences with the operational agency through a series of training programmes. These efforts were followed by the application of one way video two way audio teleconferencing for education and development training.

v) **Jhabua Development Communication Project**

The Jhabua Development Communication Project (JDCP) was launched in the mid 1990’s. The main motto was to experiment with the utilization of an interactive satellite based broadcasting network to support development and education in remote and pastoral areas of India. It was introduced to address the needs of the rural illiterate population and provide support to communication and development efforts.

![Figure 1.4 Jhabua Development Communication Project](www.indianetzone.in)
vi) Country Wide Class Room Project (CWCR 1984)

The ‘University Grants Commission’ (UGC) in collaboration with ‘INSAT’ started educational television project, popularly known as ‘Country wide Classroom’ on August 15, 1984. It was first project which targeted the under-graduates in India. The aim of this project was to update, upgrade and enrich the quality of education while extending the programmes’ reach (Rao 1996). The content covered a wide variety of subjects where the one hour lectures were delivered in English language. UGC had set up seventeen centres of Audio Visual Research Centres (AVRC) all over India who catered the production works and submitted to inter-university ‘Consortium for Education Communication’ (CEC). Apart from this, a few documentaries and educational films were also telecasted on the channels which had been edited to suit the requirements of the Indian students (IGNOU 2000).

vii) Ignou-Doordarshan Telecast (1991)

After successful attainment of higher education project, Consortium for Educational Communication (CEC) along with Indira Gandhi National Open University IGNOU and Doordarshan started telecasting educational programmes, designed mainly for Distance learners started in May 1991. Just to start with, it was transmitted in the national network of Doordarshan. After having good response from all over India the CEC decided to invest and come up with specialty educational Channels for different educational branches.

viii) Gyan-Darshan Educational Channel (2000)

In 26th January 2000, Republic Day of India witnessed another milestone. Ministry of Human Resource Development, Information & Broadcasting, the Prasar Bharti and IGNOU launched Gyan Darshan (GD) as the exclusive Educational TV Channel of India. IGNOU was given the
responsibility to be the nodal agency for uplinking/ transmission. India’s government owned national television channel Doordarshan, in association with Indira Gandhi National Open University (IGNOU), launched Gyan Darshan. In the earlier years it was telecasting varieties of educational programmes for schools based on NCERT syllabus, teacher enrichment education, open and distance learning, vocational courses and courses for disadvantaged sections of India. In initial stage it used to broadcast programmes for sixteen hours daily. The first time broadcast of 8 hours of original programming (on career guidance, computer education, preparation for competitive exams, edutainment, arts, culture, tourism and other developmental themes, and an educational current affairs programme) and 8 hours of repeats every day. It broadcasts one interactive hour daily in which teachers and experts will clarify issues for listeners through telephone contact. After one year, it became 24 hours transmission channel for educational programmes. Transmission was focused on curriculum based and enrichment programmes for the learners.

According to Mishra et al (2002) “The programmes of IGNOU CIET-NCERT including NOS were telecast for four hours each, IIT programmes for three hours, CEC-UGC programmes for two and a half hours and one hour each for Adult Education.” According to their study, Gyan Darshan through cable transmission covers about 90% in Kerala, most parts of Tamil Nadu, a few places in the North East, Nashik, Ahmedabad and Pune.

Special audience programmes include children’s programmes, women’s programmes, youth programmes and educational /school telecasts. Keeping the target audience in mind, these special programmes are planned, fulfilling the desires of specific groups.
ix) **Eklavaya**

On 26th January, 2003 with the grand success of Gyan-Darshan another feather was added, called Eklavya. This is a joint initiative of IIT’s and IGNOU and is monitored by Ministry of Human Resource Development. It is a channel dedicated to technical education and runs programmes generated at different IITs.

The motto was to make the knowledge sharing from experts and to bring engineering education across all boundaries. The students pursuing the degrees in various disciplines in the area of technology and engineering are highly benefitted from this channel. The channel is designed to carry video courses in different disciplines generated at various IITs on weekdays and special interest programmes on Sundays. Currently, eight complete courses are being run in parallel, contributed by IIT Delhi, IIT Kharagpur and IIT Madras and are repeated in the same sequence without a break.

x) **Topper**

Topperlearning.com, the official website of Topper channel sources that Topper is a comprehensive education service, which uses the visual and interactive nature of the internet medium to deconstruct textbook concepts for students. The pictorial and graphical depiction of concepts, allow children to relate to real life situations easily and grasp fundamentals, faster. Topper study modules supplement school education for Class IX, X, XI, XII students.

Course material is designed as per the CBSE syllabus, which is the benchmark for most state education boards in India. There’s an overall fit of 85-100% for all state boards syllabus with the Topper content they air. They offer Mathematics and Science for Class 9, & 10; and Mathematics, Physics
and Chemistry for Classes 11, & 12, respectively. As of now, Toppers is providing the following facilities: Video Lessons-on-Demand: 30-minute videos extensively use 2D/3D animation and real-life examples to simplify textbook concepts, and help students understand better by creating ‘visual impact’. Online Tests: Students can test their knowledge on every topic in the syllabus. With a database of over 20,000 questions, students can take unlimited tests and keep track of progress with the topper report card. Ask the Expert: Students can post their queries online, and these are answered within three working days by Topper’s Maths and science gurus. Exam Special Videos: These video lessons include practice questions, model answers, step-by-step solutions, and serve as a comprehensive, and value-added revision tool for students.

vi) Indian National Satellite Project (INSAT) (1982)

Just like SITE experiment this project had similar aim but it concentrated more on health and hygiene aspects only. School going children were initially targeted from selected villages of Orissa, Andhra Pradesh, Bihar, Gujarat, Maharastra and Uttar Pradesh. As per the references cited by Martin (2010) apart from weather reports circulation it was also dedicated to serve the society with developmental programmes for community viewing. Educational programmes (ETV) for two different age groups of school children (5-8 years and 9-11 years) were used to be telecast daily as mentioned by the annual report drafted by IGNOU, 2000.

1.4 INDIAN SPACE RESEARCH ORGANIZATION

The prime objective of ISRO, a Government of India organization, has been to develop space technology and its application to various national tasks. Apart from weather and metrological issues
monitoring, ICT, satellites are used for educational purposes too. ISRO has also developed the satellite launch vehicles PSLV and GSLV to place these satellites in the required orbits. The development and Educational Communication Unit (DECU) of ISRO has involved in implementation of space application projects including production and transmission of programmes for education and socio-economic development. (www.isro.org)

1.4.1 Educational Satellite (EDUSAT)

EDUSAT is considered as one of the best projects of ISRO. It is also known as – “The Indian Satellite for Education.” India had the triumphant launch of EDUSAT On 20th September, 2004 from Satish Dhawan Space Centre, Sriharikota, Andhra Pradesh. EDUSAT (name coined with the first three letters from the terms education and satellite) is the satellite, which was solely meant to contribute its role in the field of education. With this, transmission of educational programmes got a zest and this lead to a path-breaking effort in the concept of tele-education.

The main idea of launching such a satellite was to create a link between the urban with the remote areas of India, where educational institutions are deprived of providing quality education to the students either in the form of infrastructure or well-trained academics. Though imparting formal education through EDUSAT was the sole idea, even programmes on health, hygiene and personality development were also showcased which was helpful to many students and teachers as well. Thus, inspite of limited number of trained and skilled teachers, the aspirations of the growing student population can be met through the concept of tele-education.
Figure 1.5 Facilities of Edusat

The major advantage of satellite-based education includes:

- Simultaneous delivery of lecture sessions to a large number of dispersed people in the shortest time
- Uniformity of the lecture content
- Access to the subject expert and his/her lecture material
- Repeatability of delivery of lectures from the archives
- Capability to share the same network by different user groups
- Significant savings in expenditure due to economies in travel, logistic and replication of teaching infrastructure
1.4.2 Educational Projects Supported by EDUSAT

Over the last few years, distance education has come into its own as the mainstay in the field of education. The integration of satellite technology and education has yielded rich rewards socially, culturally and economically, to name just a few. It being a truism that education has its own reward for any society, distance education has also been a boon in a more specific sense to educational institutions themselves as it allows extremely useful contact across national and international borders.

1.4.2.1 VTU-EDUSAT Project

The Visvesvaraya Technological University VTU e-Learning Centre was established in August 2003 at the SJCE Campus in Mysore with the main aim of facilitating distance education and training to the students and faculty members of VTU through satellite (EDUSAT programme) and web. It is the first university to implement EDUSAT-based e-classes for technical education. The satellite-based education comes under the ambit of the prestigious EDUSAT project of ISRO, Government of India. All the engineering colleges affiliated to VTU have been networked thereby making VTU as single largest connected University in India. Currently the lecture sessions are being transmitted using Channel-2, which is DTH-based network with one-way video and one-way audio. VTU has been extended two more channels: VSAT-based Channel-1, which is interactive with one-way video and two-way audio and Data Channel for transfer of data. The main purpose of the project is to introduce newer techniques of distance education using interactive multimedia system and to gain experience in multicasting with satellite return channel.
1.4.2.2 VICTERS (Virtual Classroom Technology on EDUSAT for Rural Schools)

VICTERS is initiated by the Education Department of Kerala (another southern state of India) which has launched four separate EDUSAT based education channels. All the four are specialty based channels which are solely catering educational contents for primary, secondary, high school and higher secondary classes in order to extend the reach of ICT (Information Communication Technology) education in the State. IT@School project was launched on 2001, by the Kerala government along with Indian Space Research Organisation (ISRO). The Kerala government is trying to set up district-level resource centres to foster the spread of ICT enabled education in the state. They have plans to create a common state wide internet network so that students can watch the educational contents even from home.

1.3.3 The Anna EDUSAT

Anna University launched the “Training and Development Communication Channel” (TDCC) jointly with the Development and Educational Communication Unit, Indian Space Research Organization (ISRO) on September 5, 2004 and has since then been telecasting live, interactive lectures on engineering subjects by experienced teachers in the field. The lectures are telecast from the studio in the Anna University campus. These lectures are being received by 52 affiliated engineering colleges in Tamil Nadu through a dedicated ‘receiver facility’.

The students of various affiliated colleges watching the programmes through television can interact with the expert and clarify their doubts via telephone. The TDCC was renamed Anna EDUSAT in January 2007 and the band was changed from C to Ku band. The Anna EDUSAT works on a two-way video and two-way audio facility. Anna EDUSAT
provides a platform for students to interact with experienced teachers and gain subject knowledge.

The Centre for Faculty Development is responsible for content creation, production and telecast of programmes using facilities available in the EMMRC. However the ultimate aim is to create its own up linking and studio facilities in an exclusive building. The lectures are telecasted from Anna University studios from Monday to Friday. These lectures are only a supplement to what has been already taught by the teachers of the respective institution.

Figure 1.6 Uplink and Downlink System of EDUSAT from Anna University to other Colleges

The students and teachers interact live with the experts. These lectures are recorded as audio-visual aids in CD by the colleges for use at later date. The students are encouraged to ask questions.
This two way interactive teaching has been appreciated and the teaching learning process seems to have gained acceptance by the students. Efforts are on the anvil to augment this facility so that majority of colleges became participants of this unique scheme. The AUTDCC facility was also extended to the department of school education to train teachers at various District Institute of Education and Training (DIET) centre.

Already 24 Engineering colleges and 29 DIET Centres (District Institute for Education and Training centre) were provided with SITs and they become operational in December, 2005. The schedule is finalized after getting the feedback from the colleges on the subjects to be covered at the convenient time slots.

Accordingly, fourth semester subjects are scheduled in the morning and sixth semester subject in the afternoon. Teachers not only from Anna University, but also from, other neighbouring repute institutions like IIT, NITTTR (National Institutes of Technical Teachers' Training and Research) are also engaged for these lecture programmes.

Presently, the experts are using either the white board or power point slides for their presentation. It is similar to a conventional class room except that the students are sitting in a remote place. In future it is proposed to develop and use animations graphs and more video clippings to self explain a system instead of oral explanations. In other words, more of visuals and less of the teacher will be seen. The teacher will come to the fore only when they have to answer for the questions from students.
Even senior teachers are finding it difficult to present the subject in front of a camera. Therefore necessary training on lecturing in a virtual classroom has to be given to all the chosen teachers.

It is also proposed to show operation of industries to the students in the remote places using the services of an OB Van. The ultimate objective can be achieved by properly integrating all the teaching ends and giving the student the option of choosing the subject not only from the college but also from his hostel/room or home. The required funds for these activities can be mobilized by bringing all the colleges under academic partnership programme by collecting a nominal membership fee. Now there are 52 colleges which are being part of the Anna Edusat. From January 2008 the timing was changed to 9 to 10.30 and 11 to 12.30. A sample programme schedule of Anna EDUSAT is shown below:

Table 1.5 Weekly Subjectwise Telecast in Anna EDUSAT

<table>
<thead>
<tr>
<th>Days</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>General (Maths B.E. ECE)</td>
</tr>
<tr>
<td>Tuesday</td>
<td>B.E. Mechanical engineering</td>
</tr>
<tr>
<td>Wednesday</td>
<td>B.E. ECE</td>
</tr>
<tr>
<td>Thursday</td>
<td>B.E. EEE</td>
</tr>
<tr>
<td>Friday</td>
<td>B.E. Computer science</td>
</tr>
</tbody>
</table>
Table 1.6 Telecast Schedule of Anna EDUSAT

<table>
<thead>
<tr>
<th>DATE</th>
<th>STREAM</th>
<th>SESSION I</th>
<th>SESSION II</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.08.2013</td>
<td>B.E. Electrical and Electronics Engineering</td>
<td>EE 2204 Data Structures &amp; Algorithms (III Sem)</td>
<td>EC 2314 Digital Signal Processing (V Sem) Dr.K.Udayakumar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mr.N.Radhakrishnan</td>
<td></td>
</tr>
<tr>
<td>02.08.2013</td>
<td>B.E. Computer Science and Engineering</td>
<td>IT 2401 Service Oriented Architecture (VII Sem)</td>
<td>CS 2304 System Software (V Sem) Dr.A.Kannan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dr.S.Swamynathan</td>
<td></td>
</tr>
<tr>
<td>07.08.2013</td>
<td>B.E. Electronics and Communication Engineering</td>
<td>EC 2305 Transmission Lines &amp; Wave guides (V Sem) Dr.N.Gunasekaran</td>
<td>ME 2301 Thermal Engineering (V Sem) Dr.Mr.R.Swaminathan</td>
</tr>
<tr>
<td>08.08.2013</td>
<td>B.E. Electrical and Electronics Engineering</td>
<td>EE 2204 Data Structures &amp; Algorithms (III Sem) Mr.N.Radhakrishnan</td>
<td>EC 2314 Digital Signal Processing (V Sem) Dr.K.Udayakumar</td>
</tr>
<tr>
<td>14.08.2013</td>
<td>B.E. Electronics and Communication Engineering</td>
<td>EC 2305 Transmission Lines &amp; Wave guides (V Sem) Dr.N.Gunasekaran</td>
<td>ME 2301 Thermal Engineering (V Sem) Dr.Mr.R.Swaminathan</td>
</tr>
<tr>
<td>16.08.2013</td>
<td>B.E. Computer Science and Engineering</td>
<td>IT 2401 Service Oriented Architecture (VII Sem) Mr.N.Radhakrishnan</td>
<td>CS 2304 System Software (V Sem) Dr.A.Kannan</td>
</tr>
<tr>
<td>21.08.2013</td>
<td>B.E. Electronics and Communication Engineering</td>
<td>EC 2305 Transmission Lines &amp; Wave guides (V Sem) Dr.N.Gunasekaran</td>
<td>ME 2301 Thermal Engineering (V Sem) Dr.Mr.R.Swaminathan</td>
</tr>
<tr>
<td>22.08.2013</td>
<td>B.E. Electrical and Electronics Engineering</td>
<td>EE 2204 Data Structures &amp; Algorithms (III Sem) Mr.N.Radhakrishnan</td>
<td>EC 2314 Digital Signal Processing (V Sem) Dr.K.Udayakumar</td>
</tr>
<tr>
<td>23.08.2013</td>
<td>B.E. Computer Science and Engineering</td>
<td>IT 2401 Service Oriented Architecture (VII Sem) Dr.S.Swamynathan</td>
<td>CS 2304 System Software (V Sem) Dr.A.Kannan</td>
</tr>
<tr>
<td>29.08.2013</td>
<td>B.E. Electrical and Electronics Engineering</td>
<td>EE 2204 Data Structures &amp; Algorithms (III Sem) Mr.N.Radhakrishnan</td>
<td>EC 2314 Digital Signal Processing (V Sem) Dr.K.Udayakumar</td>
</tr>
<tr>
<td>30.08.2013</td>
<td>B.E. Computer Science and Engineering</td>
<td>IT 2401 Service Oriented Architecture (VII Sem) Dr.S.Swamynathan</td>
<td>CS 2304 System Software (V Sem) Dr.A.Kannan</td>
</tr>
</tbody>
</table>
1.5 THEORETICAL PERSPECTIVE

Educational TV programmes are mainly designed for students where the pedagogy is transferred into visual format for better understanding. This study tries to find out if the new trends can be a substitute for classroom teaching should and their reception among the intended target audience. The study uses Cognitive Theory of Multimedia Learning.

According to Richard E. Mayer (2001), a cognitive theory of multimedia learning is based on three main assumptions: there are two separate channels (auditory and visual) for processing information; there is limited channel capacity; and that learning is an active process of filtering, selecting, organizing and integrating information.

According to Mayer “people learn more deeply from words and pictures than from words alone”. However, simply adding words to pictures is not an effective way to achieve multimedia learning. The goal is to instructional media in the light of how human mind works. This is the basis for Mayer’s cognitive theory of multimedia learning. This theory proposes the two main assumptions when it comes to learning with multimedia: there are two separate channels (auditory and visual) for processing information (sometimes referred to as Dual-Coding theory). Learning is an active process of filtering, selecting, organizing and integrating information based upon prior knowledge.

Humans can only process a finite amount of information in a channel at a time and they make sense of incoming information by actively creating mental representations. Mayer’s cognitive theory of multimedia learning presents the idea that the brain does not interpret a multimedia presentation of words, pictures and auditory information in a mutually exclusive fashion; rather, these elements are selected and organized
dynamically to produce logical mental constructs. Design principles including providing coherent verbal, pictorial information, guiding the learners to select relevant words and images and reducing the load for a single processing channel etc. can be entailed from this theory.

1.6 STATEMENT OF THE RESEARCH PROBLEM AND NEED FOR THE STUDY

The broadcasting style of educational videos available on television channels and on internet are undergoing changes due to new technical developments. Even the delivery of teaching is no longer confined to the classrooms. With the intervention of ICT, the availability of educational content is no more inclined to books itself. As plenty of educational channels are mushrooming out; the challenge to maintain its stature and be in the competition is a continuous threat for the broadcasters. Educational videos are creating impact among students and teachers alike. Still the aim of the educational television is not attained. A large number of students not able to understand the subject and failure rate is also high. When multiple sources of educational contents are available, the format where the dependency is more needs to be checked.

Anna University has more than 500 engineering colleges affiliated to it. The programmes that are telecast on Anna EDUSAT are lectures based on the prescribed syllabus and thus the effectiveness of the programmes needs to be evaluated. Even though Anna University is investing more to create these video lecture series, still it is not able to meet the requirements of all colleges. Current situation tries to understand the awareness level, reach and effectiveness of Anna EDUSAT among the engineering students. The first year of engineering is perceived as a tough time by most students, and many of them fail in mathematics. The mathematics videos of Anna EDUSAT impact has to be studied as it will help in finding the fallacies which might
help in reducing the failure ratio. More number of students and learners are dependant on these videos. It is hoped that this study would help in improving any aspect(s) of the programmes which is/are a stumbling block to the programme reaching the students and teachers. Though the Anna EDUSAT has been running successfully for the last eight years, there are issues that need to be sorted out and addressed if the channel is to retain its relevance and continue its role of being an effective value addition to classroom lectures in engineering colleges affiliated to Anna University.

1.7 AIM AND OBJECTIVES OF THE RESEARCH STUDY

This study aims to evaluate the reach and effectiveness of Anna EDUSAT’s educational video programmes that are telecast to the engineering students of affiliated colleges of Anna University across Tamil Nadu.

The following specific objectives are to study the usage and impact of Anna EDUSAT educational videos on the engineering students with respect to their academic enhancement.

1. To study the extent of the reach of Anna EDUSAT programmes among the engineering students.
2. To understand the structure and format of the Anna EDUSAT videos.
3. To study the effectiveness of Anna EDUSAT programmes among the engineering students.
4. To understand the problems, disadvantages and to find out the ways to improve the programmes.
1.8 CHAPTERIZATION

1. The study has been presented in five chapters including the introductory chapter. The first chapter discusses on education, its types, formats, Indian educational scenario, various successful educational television projects, brief history about the functioning of Anna EDUSAT, need for the present study and its importance, statement of the problem and objectives of the study.

2. The second chapter presents the “Review of Literature” with special reference to the studies related to educational broadcasting, educational technology, and the role, impact and effectiveness of educational television in higher education.

3. The third chapter explains the methodology and the statistical tools adopted for doing the study.

4. The fourth chapter presents data analysis of the results obtained and discussion related to it. It also tries to critically evaluate all the objectives that are aimed to find through this study. The description analyses sample structure that deals with the viewing pattern of Anna EDUSAT, the preferences for watching it and the aspects that need improvisation as denoted from the respondents.

5. The fifth chapter presents, the major findings, suggestions and recommendations based on the findings of the study for further research.