A Correlational Study of Communication Effectiveness of ETV Programme, Classroom Environment and Performance in Science and Social Studies of Class X Students in Delhi

Dissertation submitted to the Jawaharlal Nehru University
in partial fulfilment of the requirements
for the award of the Degree of
MASTER OF PHILOSOPHY
IN
PSYCHOLOGY OF EDUCATION

MAMTA DAS

ZAKIR HUSAIN CENTRE FOR EDUCATIONAL STUDIES
SCHOOL OF SOCIAL SCIENCES
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI - 110067
1987

JAWAHARLAL NEHRU UNIVERSITY
ZAKIR HUSAIN CENTRE FOR
EDUCATIONAL STUDIES,
SCHOOL OF SOCIAL SCIENCES

Telegram : **JAYENU**
Telephones : **652282**
661444
661351
New Delhi-110 067

DECLARATION

Certified that the dissertation entitled " A Correlational Study of Communication Effectiveness of ETV Programme, Classroom Environment and Performance in Science and Social Studies of Class X Students in Delhi", submitted by Mamata Das is in partial fulfilment of eight credits out of a total requirement of twenty-four credits for the degree of Master of Philosophy of this University. This dissertation has not been submitted for any other degree of this University, or any other University, and is her own work.

We recommend that this dissertation may be placed before the examiners for evaluation.

Suresh C. Ghosh
Prof. SURESH CHANDRA GHOSH
CHAIRMAN
Chairman
Zakir Husain Centre
for Educational Studies

Sushila Singhal
Dr. (Mrs.) SUSHILA SINGHAL
SUPERVISOR

To my teachers
with reverence

A_C_K_N_O_W_L_E_D_G_E_M_E_N_T

I am deeply submerged with the debt of gratitude for the contributions of others to complete this dissertation.

First and foremost, I extend my sincere gratitude to my supervisor, Dr.(Mrs.) Sushila Singhal, for her provocative discussion and critical comments. I am honestly acknowledging her painstaking effort in checking the first draft.

Thanks are due to the Principals, teachers and students of Government Boys' Senior Secondary School and Government Girls' Senior Secondary School, R.K.Puram, New Delhi.

I am grateful to Mr. R.P.Verma, for typing this dissertation carefully.

Finally I wish to acknowledge the encouragement and unconditional support given to me by my parents, teachers and friends.

Mamata Das.
(CANDIDATE)

ABSTRACT

Since the inception of School Television Programme (STV) in Delhi, a widespread concern has been experienced about the impact of television content on children's learning and behaviour.

The present study was undertaken to ascertain the relationships among different (mediating) variables namely, communication effectiveness of ETV programme, psychosocial characteristics of classroom environment and student's performance in science and social studies.

110 boys of Government Boys' Senior Secondary School and 110 girls of Government Girls' Senior Secondary School were chosen as the sample subjects. The selection of the sample was made on the basis of quota method of sampling. Three types of variables were included in the study. The matching variables included were type of schools (Government); level of education (class X); subject for comparison (Science and Social Studies); and gender (Boys and Girls). The exploratory variables employed were the communication effectiveness of ETV programme and classroom environment. The criteria variables used were two (Science and Social Studies) sets of examination marks obtained by boys and girls separately.

The instruments included the communication efficacy scale and classroom environment inventory to assess the psychosocial characteristics of the classroom environment.

Following a pre-post design, the data were collected and then codified. The data were analysed by use t-test analysis, correlational analysis and regressional analysis.

The major findings of the study revealed that (i) regular exposure to ETV programme results in higher post-ETV scores both by boys and girls in science and social studies; (ii) boys' ratings show low but positive association between the perceptions of communication effectiveness of ETV programme and classroom environment in science and social studies; (iii) girls' ratings show moderate but positive association between the perceptions of communication effectiveness of ETV programme and classroom environment in science and social studies; (iv) the predictability of student's performance in science and social studies by using communication efficacy and classroom environment scores in science and social studies do not reveal positive results.

Besides, the home tv environment contributes directly/indirectly to the perception of communication

effectiveness of ETV programme and classroom environment in science and social studies. It does not directly relate to student's performance in different academic subject.

The findings show positive association between the perception of communication effectiveness of ETV programme and classroom environment. This in turn, is expected to contribute to academic performance. The implication for producers is to maintain clarity and proper pacing, cueing, modelling and transformation of the television presentation. It would maximise the comprehensibility of televised material. The implication for educators is to place students in active doer position and prepare them for learning from television. They should stimulate the habit of critical TV viewing, develop the receivership skill among students. The findings have implications for students in the sense that they should accept the content of ETV programme as resourseful and enriched. They should develop a positive attitude towards learning via television.

C_O_N_T_E_N_T_S

LIST OF TABLES

CHAPTER - I

I N T R O D U C T I O N

Human race is living at a time in which countries are competing ruthlessly to congratulate themselves on technological developments and actualizations of potentials. India is also trying hard to realise her ever-expanding potentials in numerous fields inclusive of education. In the process, she is said to be experiencing the euphoria of 'communication revolution'.

An offshoot of communication revolution is the rapid development of mass media and its extensive use for educational/instructional purposes. The belief in 'medium is the message' is receiving the wider currency from educationists, administrators, policy makers and so on.

1.1 Use of Mass Media for Educational purposes :

The miraculous developments and promises of mass media have emerged as unalloyed bliss in the field of education. Several attempts are being made to utilise the enormous potentialities of mass media for imparting relevant and culturally compatible education. It is being used not only as medium to change the content of education, but the behaviour of those involved in teaching-learning process.

The objectives of using mass media in education are :

1. to advance and disseminate learning and knowledge by diversity of means including the use of communication technology;

2. to provide educational opportunities to a larger segment of population to promote educational well being of the community;

3. to provide quality education of uniform standard to all students at the School/College level; and

4. to incorporate Open University and distance education as integral aspects of education system in the educational pattern of the country.

Mass Media has the inherent potential to disseminate educational information to a large number of people on the one hand and make the greater exposure of the masses to these media on the other. The viability of mass media can be exploited by educationists, administrators, policy-makers, and behavioral scientists to help the people, which now stands on the grip of electronic revolution, prepare scientifically to enter the 21st century. Such use of mass media would fulfill the dream of Kothari Commission (1966) that "India's destiny is now being shaped in her classrooms".

Mass media can be used in education as support model in two basic but overlapping ways. Firstly, this can be made a part of the environment, into which learning activities are designed as in distance teaching institutions. Secondly, these can be brought into the environment as indirect partners by using for additional or supportive information, that is educationally important and useful (Shivarudrappa, 1986). This second aspect is, infact, all the more important in the present context of knowledge explosion.

In the words of Schramm:(1977); "the corner, where the media intersect education is a location, where every informed passer-by moves cautiously. And it should be described less as a street corner than as a point on the ocean, directly above one of the deeps". He categorized these media which almost occupy vantage point in the educational system, into big and little media in relation to their technology either simple or complex. Filmstrips, audio-cassettes, overhead projectors and so on are called the 'little' media as distinct from (television, computers, video etc.) 'big' media.

To put media's educational uses into right perspective, it is necessary to consider the three important communication functions, classroom teachers fulfill. First, they present information corresponding to the educational

profiles, goals, and competence of the learner (age, sex, personality, previous experiences, readiness etc.). Second, they observe, receive, acknowledge and diagnose the learner's responses and learner's progress and then evaluate them in relation to the educational goals. Finally, they present cognitive and effective feedback to learners.

In all three of these functions, the medium operates as a mediator that helps a teacher to expand his/her capacity to present material in a more comprehensive way. For example, the television can show what a teacher wants to emphasize more clearly than a gesture or the voice can. Mass media are being widely used to cater mainly the first communication function, that of presenting information. While teachers in most cases undertake the second and third communication activities quite unaided.[1] Thus, the media in education should be seen as supplementing the teachers by increasing their effectiveness in the classroom rather than replacing them.

1.2 Educational Television as a Tool of Mass Media.

The most dynamic and versatile tool of mass media in the field of education is the educational television

---

1. The Educational use of mass media, World Bank Staff Working Paper, 1981.

(ETV). ETV is a broader term which covers up many educational activities.in U.K. It encompasses programmes either planned and produced focusing on the syllabi or otherwise; but aimed at enriching the general knowledge of the school children, college students and grown-ups watching TV at home.

ETV is not a self-contained educational entity, but an instrument which is significant only in the particular setting in which it is employed. It provides new and better ways of relating the activities of pupils, teachers and parents and demands a continuous appraisal of the ways in which it is or may be utilised.

1.3 Educational Television in India :

Television made a beginning in India, that too in Delhi on 15th September 1959 as a medium of imparting 'social education'. Shortly, it moved on to 'school education' in 1961. With the expansion of TV networks by mid-seventies, education programmes were also transmitted in Bombay, Madras and Srinagar.

The Satellite Instructional Television Experiment (SITE) during 1st August 1975 to 31st July 1976, remains a landmark in the history of mass communication and mass education. The television programmes produced by All

India Radio (AIR), Indian Space Research Centre (ISRO) were made accessible to the residents of 2,400 remote village of six states, having four linguistic groups. The educational programmes were of enrichment type. These were acceptable to the target viewers. An evaluation of its impact on villagers indicated that the programmes bridged the information gap that existed and there was evidence that it triggered a process of change in many areas for adults and children. In the words of a SITE Social Evaluation report : 'collective interest, common goals of TV viewing, and continuous exposure to TV was found a mysterious symbol for breaking barriers unthinkable earlier' (Agarwal, 1980).

Presently, syllabus-based lessons are telecast by Doordarshan Kendra (DDK), Delhi, Bombay and Madras. The enrichment type of programmes are also televised by these kendras as well as Srinagar and Six SITE continuing transmitters (Jaipur, Raipur, Muzaffarpur, Sambalpur, Hyderabad and Gulbarg).

A second breakthrough in the field of ETV has been the launching of Indian National Satellite (INSAT - IB) on August 30, 1983. The INSAT - IB became operative on October 15, 1983 and this satellite is used to telecast the educational programmes now. Children in rural areas in the age group 6-12 years who do not attend school are

the prime targets of INSAT-1B, INSAT-1C (July 1986) and the second generation of INSAT (1990).

1.4 Status of Educational Television Programmes for School Children in Delhi :

As mentioned earlier the curriculum-based School Television (STV) programmes were introduced in Delhi schools on an experimental basis in October 1961. It started with three lessons per week in Physics and Chemistry and one lesson each in English and Hindi for Class XI. The STV project started in 140 schools with 360 sets, covering about 20,000 students. To-day more than 600 middle and senior secondary schools are using about 900 TV sets - covering nearly 4 lakhs of students.[2]

At present the frequency of TV programmes shown to school children are 13 per week out of which 9 lessons are meant for class VI, VII and VIII in Mathematics, Science and English respectively. Remaining 4 lessons are telecast for class X students in Geography, Physics, Chemistry and Biology. Each TV period is of 40 minutes duration and this time is provided invariably in the school time table.

A separate TV Branch in the Directorate of Education was established in 1967 to meet the expanding needs

---

2. School Television Mannual, TV Branch of Education, New Delhi, 1986.

of the STV project and to ensure better liasion between the Department of Education and the TV Unit at DDK, Delhi, in the preparation and production of the programmes. The TV Branch distributes printed guide books in each subject to the various TV schools. Besides, it conducts orientation programmes for user teachers. It also undertakes the responsibility of evaluating the STV programmes on a regular basis in order to implement improvements in scripts and in the presentation of lessons.

1.5 Expected learning effects of Educational Television Programmes :

It is necessary to keep in mind the probable learning effects of ETV programmes while implementing them, because the planned efforts can be enhanced, reversed, vitiated, compromised or led astray by the marauding bands of extraneous forces. The expected learning effects of ETV programmes may be listed as follows :

1. Intentional content-related effects such as a laboratory unit demonstrating the properties of light.

2. Intended structural and compositional effects of the material - the laboratory demonstration of an experiment in Physics may be so structured so as to allow the students to do it accurately afterwards.

3. Portrayal of casual and interpersonal relationships - In a broader sense, portraying is used by Kuhler for "the casual texture of the environment". The relationships being portrayed (like a lesson on Democracy may indirectly impress upon students or viewers the present Democracy at work, accentuating its good side etc.), may not be accurate but they may be designed so to be believed by the audience for good or bad reasons.

4. Educational material portrays casual relationships among people and objects. However, objective and value free materials used may be, it communicate about the way the world operates and about the way the world ought to operate.

5. Unintended and contrary impacts-these may also be produced.

6. Second order effects - the development and introduction of educational television may unintentionally bring about changes in the relationships among teachers, students, and materials in which they participate.

It may be added though that so far, there are not many methods available that can predict or even anticipate the first and second order effects and impacts of interventions.

Some information is contained in experiments popularly known 'Seasame Street', and 'The Electric Company'. A series of 23 case studies are compiled by Schramm et al. (1967) about the major uses of ETV in 18 countries that offers a range of experience and information.

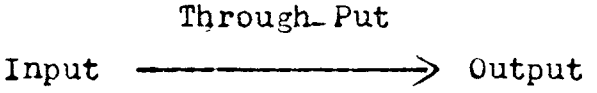
Chu and Schramm (1968) made an overall evaluation of the evidence "Learning from TV - What the Research Says". They concluded that there is no longer any reason to raise the question whether Instructional Television can serve as an efficient tool of learning. The questions worth asking are no longer whether students learn from it, but rather (1) does the situation call for it ? and (2) how, in the given situation can it be used effedtively ? While this statement confirms that TV can promote efficient learning, it leaves the question open how to accomplish this goal ?

1.6 A Theoretical Framework for Studying the Effects of Educational Television Programmes :

Learning involves higher order psychological functioning which is a hypothetical construct and can only be inferred from the behaviour. Due to this intricacy, the concept does not enjoy the luxury of either a well accepted definition or a sound theory. A number of learning theories are available. Nevertheless, there is a consensus

growing around a cognitive or information-processing model of learning (Greeno, 1980; Mc Keachie, 1976).

The information-processing approach formalizes the operation of cognition by examining the succession of events from the moment of stimulation to the production of a response outcome. But it avoids much of the S-R terminology in favour of concept drawn from communication theory and computer technology. Both treat the sequence of events by reference to the input of information, with subsequent processes of arousing activities in the system, followed by the organization and direction of those activities, and eventualizing in the output of new information.



The information-processing model is based on three major assumptions.

(a) A perceptual response is not the immediate result of stimulus but involves a succession of stages each requiring some time for organization to take place. The total time involved can be divided into intervals during each of which some different operation occurs.

(b) The information-processing system has limited capacities. This means that activities depend on how much information is imposed, what kind it is, and what mechanisms exist for selecting and organizing information.

(c) Perception and memory are not wholly distinct but, in fact, have important commonalities. For what is perceived depends upon what is already stored.

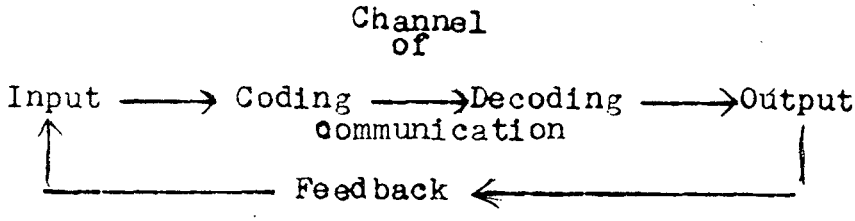
The view of human learning as information processing, storage and utilisation is readily understandable to educators. Indeed, it is a much more comprehensible view of learning than that of school learning as conditioning of pupils. The analogous model developed for studying the learning effects of ETV programmes, places emphasis on the role of intervening variables that influence the throughout. In this model the input variable is ETV programmes and the output variable is student's performance. There could be number of intermediate variables affecting student's performance directly/indirectly. Two variables are singled out. These are Communication effectiveness of ETV programmes and Classroom environment. This is shown below -

ETV Programmes (Input)	Communication Effectiveness	Student's Performance (Output)
	Classroom Environment	
(Model No.1)	(Intervening variables)	

1.7 Communication Effectiveness of ETV Programmes

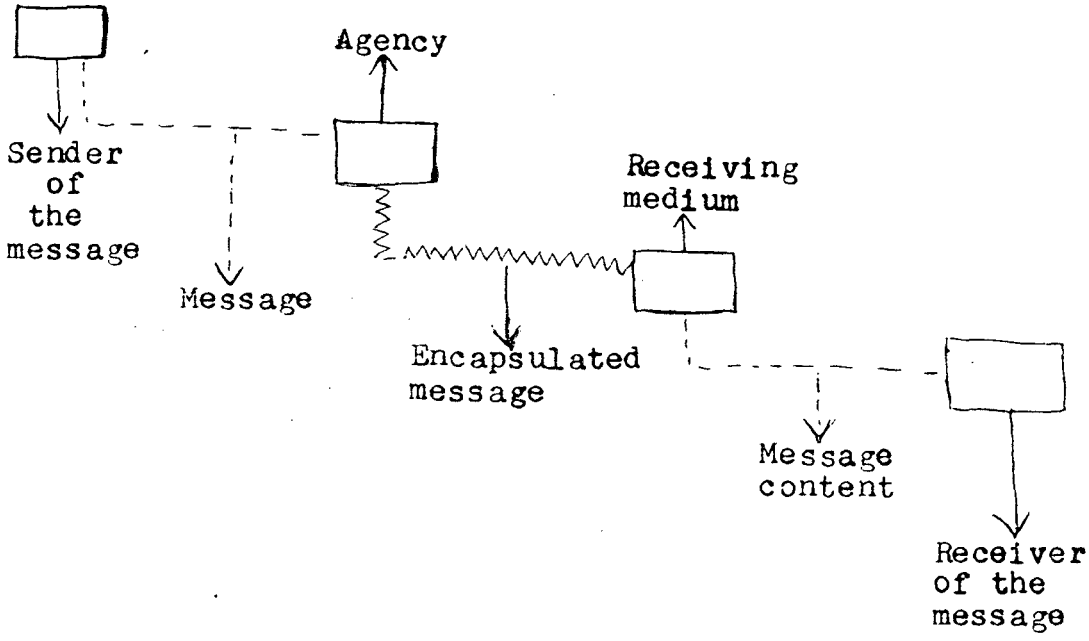
To the extent that educational instruction involves communication, it is expected that the mediated instruction (through ETVP) would make the communication more effective (that is more comprehensive, lucid and meaningful).

Effective communication requires two parties. The sender who formulates, encodes and transmits the signals, and the receiver who decodes, interprets and transmits back to the source (See the Model No.2). Thus, communication is the transferring of a mesaage to another party so that it can be understood and acted upon. The comprehensibility of the structural and functional components of the message which enable the receiver to understand and act upon,is the indicator of communication effectiveness.



Model No. 2.0
The Cycle of Effective Communication

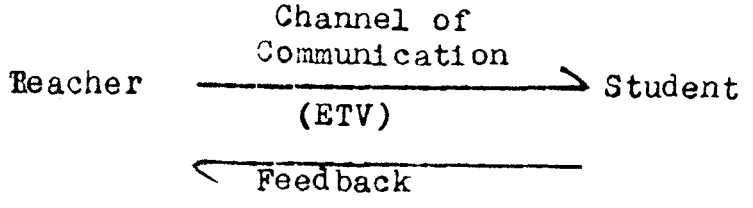
Communication through ETV is one-dimensional in nature. It emphasises the linear transmission of message content. This (Stimulus-centered nature) deprives of the sender to receive feedback from or to interact with the receiver (See Model No. 2.1).



Model No. 2.1
Communication Model for TV

Source: Narayana, A. 1983.

However, the presence of teacher in TV class who gives/receives feedback from the students (receivers) ensures effectiveness of ETV programme (see Model No.2.2).



Model No.2.2
Effective Communication through ETV.

The communication effectiveness of Educational Television (ETV) depends on a number of factors, like; instructional goals (cognitive, conative, and psychomotor); the development level of students; cogitive styles of students; student's satisfaction with the communication system and the accuracy of student learning and so on. Moreover some of the key factors like style of presentation, rate of presentation, attention, comprehension, yielding, retention, etc. also play a determining role.

Barrow (1961) on the basis of review of the relevant empirical and theoretical literature has presented a limited and tentative theory of the effectiveness of ETV. The theory states that the communication effectiveness of ETV depends upon coping with interferences which distract attention and interferences which mask messages. The communicator copes with the former by maximizing the relative potency of the message and with the latter by maximizing the relative comprehensibility of the message.

Relative potency is the degree to which a message is capable of attracting and holding attention. Relative comprehensibility is the degree to which a message is understandable to the receiver. These concepts are treated as interdependent. However, relative potency is taken to be a necessary condition for relative comprehensibility

(some degree of attention is necessary to any degree of understanding), and not the vice-versa.

Relative comprehensibility may be influenced by three factors, such as; (a) differences in semantic level between the code used by the communicator and the code, the receiver can understand; (ii) the ambiguity or lack of a clear structure in the message; (iii) external stimuli in the classroom which conceal or distort the meaning of the message.

1.8 Classroom Environment :

Instruction may be thought of as the institution and arrangement of the external conditions of learning in ways which will optimally interact with the interal capabilites of the learner (Gagné, 1972).

Instruction through ETV could be seen as an enriched external condition that contributes to the differential perception of classroom environment. As said earlier, the perception and memory are intimately related. It is therefore, logical to discuss the perceptions of the classroom environment where ETV is installed.

The classroom environment has been conceptualized by many researchers as the social and psychological forces that influence the functioning of the whole group and

subgroups within the class (Walberg, 1979). These social and psychological forces are seen comprising of three distinct but interacting dimensions. First dimension is the relationships that develop in class room context. The second dimension is the goal orientation and personal development features of environments, which are generally thought of as the task or academic orientation that exist in classroom. The third dimension is the system maintenance and change dimension. It indicates the degree to which the classrooms are orderly and organized; how control is maintained in them; how much students are involved in classroom planning; and the amount of unusual and varying activities that occur (Moos, 1979).

In sum, classroom environment can be conceived as the resultant interaction among external learning conditions; personality characteristics of individual learners; and the institutionalized norms, values and culture.

During the last two decades, considerable interest has been displayed in the conceptualization, and measurement of psychosocial characteristics of the environment of primary and secondary schools. The use of perceptual approach has some advantages over classroom interaction analysis that involves observations and systematic coding of classroom communication and events according to a predetermined category system. Paper and Pencil measures

are economical and are based on student's experiences over many lessons. Moreover, perceptual measures involve the pooled judgements of all students in a class and it can account for considerably more variance in student learning outcomes than the interaction variables.

Classroom environment instruments have been used as predictors and criterion variables in a variety of research studies in primary and secondary schools. Use of student perceptions of classroom environment as predictor variable has demonstrated consistent relationships between the nature of the classroom environment and various cognitive and affective outcomes (Haert et al.,1981).

Studies involving use of the classroom environment scales as criterion variables have revealed that classroom psychosocial climate varies between different types of schools (Trickett, 1978), between co-educational and single-sex schools (Tricket et al., 1982), between classes of different sizes (Walbery, 1969), and between classes following different subject matter (Kuert, 1979).

Although some work has focused on the school level environment, classroom level studies are found conspicuously missing in India. This has prompted the present investigator to examine the relationship between the perceptions of classroom environment and students' perfor-

mance in different subjects. An attempt is also made to study the nature of relationship between the communication effectiveness of ETV programmes and perceptions of classroom environment in different subjects.

1.9 Need of the present study :

As mentioned earlier, ETV has the inherent quality of serving as a powerful communication tool and of providing enriched condition for classroom learning. It is considered worth questioning that, how far students (the receiving end) are able to perceive these dual qualities of ETV, so that efforts can be made towards the full utilisation of ETV. Lack of well documented studies and empirical findings have delimited the scope of the research to establish relationship between communication effectiveness of ETV programmes and student's performance; between the perception of classroom environment and student's performance; between communication effectiveness and classroom environment.

The present investigation is an attempt to measure the communication effectiveness of ETV programmes and to find out its relationships with other variables namely, psychosocial characteristics of classroom environment and performance in subjects taught.

The need of the present attempt is felt in the area of educational television learning. It is hoped, that the findings of this attempt would be relevant for proper planning and monitoring of educational television programmes. Additionally, it would focus on the nexus of mediating factors in learning via television.

CHAPTER - 2

REVIEW OF RELATED LITERATURE

This chapter includes the review of related literature. For convenience the chapter is divided into three sub-sections, namely; (i) Educational Television programme and School performance, (ii) Communication Effectiveness of Educational Television Programme and School Performance, and (iii) Classroom Environment and School performance.

2.1 Educational Television Programmes and School Performance :

Educators in most countries who employ ETV on a large scale for instructional purposes do necessarily conduct evaluative research studies. In trying to do that, invariably they take recourse to use normative methodologies based on traditional methods of teaching. Research studies using such methodology compare television instruction with classroom instruction in various school subjects and at different educational levels. Three sets of results emerge out of these studies showing either positive, negative or no (neutral) differences.

Some of the studies are reported below:

Kumata (1956) summarized 74 television research studies by focusing on retention of learning, methods of teaching by television, value of feedback, attitude towards

television, amount of viewing, and use of colour and visual materials. He concluded that television students usually do as well as other students and at times do better.

Twyford (1956) summarized Army and Navy research studies and listed findings in support of procedures employed in television instruction.

Herminghaus (1957) conducted a study in which high school students were taught by television - English and General Science for one semester. He found the average gain made by students on two standardized tests of language skills as 25 per cent and on two standardized tests of science as 60 per cent.

Holmes (1959) analyzed television research and concluded that television was better for teaching science. Students learning science by television usually scored higher than the non-TV students.

In his study, Peerson (1961) took 173 Alabama adults, both blacks and whites, and showed them a TV course in adult literacy in supervised groups. He found in 33 weeks average gain between one and one-half grades as measured by a standardized test.

In 1962, Schramm reviewed the research done till that date on the effectiveness of instructional television.

Of the 393 comparisons between instructional television and 'live' instruction it was found that in case of 65 per cent comparisons, there were no significant differences. In 21 per cent cases, students learnt significantly more by television; in 14 per cent cases they learnt from television significantly less.

Thirty-three per cent of above studies were done on children in grades 3-9. Students who underwent television instruction did better than those in conventional classes. A small proportion (eleven per cent) did not do well. The proportion of studies showing no significant differences was fifty-six per cent.

For high school students 63 per cent of the studies showed no differences between television and conventional teaching. The television group who did well was confined to 13 per cent, while the per cent of those who found television less effective rose to 24 per cent.

At the college level only 3 per cent of studies reported television more effective; 13 per cent found it less effective; and 84 per cent showed no significant differences.

In sum, improvement over conventional teaching by televised instruction appeared most frequently in the primary groups, less frequently in the high school groups, and least frequently in college and university groups.

There were variations noted in the effectiveness of television teaching according to subject matter area. An overview of the data showed that mathematics, science and geography had outstanding success for the groups tested. However, language skills, health and safety education had shown a fair amount of effectiveness on television, while history, humanities and literature had the smallest measure of success (Schramm, 1962).

Sindhi (1963) studied the uses of television in teaching Hindi to class X students of Delhi. He concluded that televised instruction can motivate, enrich, or demonstrate pupils' experience only on behalf of the teacher. He emphasised, the need for changing the curriculum and integrating television lessons with school syllabus.

Brish (1964) reported that pupil achievement can improve significantly when television is used consistently for the whole instructional programmes over the academic year.

Neurath (1966) conducted a study covering a sample of more than 132,000 students viewing television both in the middle and higher secondary schools. Observations in 24 television and 24 non-television schools were recorded. The results indicated that (i) television schools did better in the tests than the non-television

schools and (ii) the teaching process through television seemed to be slowly improving and the teachers and principals were taking interest in using television for teaching science in schools.

Corle (1967) used an experimental design and assigned 32 teachers to two categories one of which viewed a televised course on teaching mathematics while the other did not. It was observed that the experimental groups made highly significant gains on standardized test on mathematics and showed significantly greater gains than controls on 2 of the 8 measures of teaching performance.

Mangal (1967) found significant differences between the achievement of class X chemistry students of television and non-television schools.

Swami's (1967) results were also in line with Mangal. He studied the physics programme for class IX students and found that students were benefitted by the Physics lessons on television.

In their study, Ball and Bogatz (1970) measured learning from 'Seasame Street' seen by large sample of young children in different geographical areas of United States of America. Their results showed that the more the children watched the programme, the more they learned of what it was intended to teach: numbers, forms, sorting, classification, etc.

Rao (1972) reported in his doctoral thesis that in terms of immediate student achievement, the teaching technique employing the motion picture film was 20.5 per cent more effective from the instructional standpoint than the usual unaided presentation. The mediated instruction helped in retaining more factual information.

Aghi's (1977) study on the impact of science programme on children under Satellite Instructional Television Experiment in Rajasthan proved to be landmark in ETV research in India. The major objectives of this programme were: To measure the effects of science programmes in terms of knowledge, acquisition of an inquiring attitude and application of information gained to solve every day problems; (ii) to indirectly see its effects on the overall development of the child; (iii) to deduce guidelines for future educational programmes for children. The study selected 8-9 years old Hindi-speaking children from five villages as the sample. A pre-post research design was adopted to measure the impact of the programmes.

Results showed that the programmes stimulated adequate interest, children designated as low performers became high performers and the programmes seemed to facilitate the formation of scientific attitude.

Agarwal (1978) conducted a study which aimed at providing a micro level, indepth, qualitative under-

standing of the process of socio-cultural triggered by the introduction of Satellite Instructional Television Experiment(SITE) programme during the one year project conducted from August 1, 1975 to July 31, 1976 in six states of India. The results were based on the studies conducted in 7 villages, one each from six SITE states and Kheda of Gujarat.

The study analysed the educational role of television on school going children in the age group of 5-12 years. The results indicated that (i) the television programmes in general were above the comprehension level of young children, especially the science programmes. The higher the age group, the higher was the level of comprehension; (ii) the programme related to creative ability or "Do it yourself" were enjoyed and children tried to make the objects; (iii) teacher-student interaction increased but no pre-post viewing discussions were observed; (iv) the impact of health and nutrition programmes was observed and no behavioural changes were noted; (v) television did not significantly affect school attendance.

Samboornam (1980) conducted a study in Madras to assess the effects of television on the classroom achievement. 112 secondary school children were stratified into senior viewers, junior viewers, senior non-viewers and

Junior non-viewers. Each consisted of 28 sample subjects. In an experimental design framework the post-test results of the control group (non-viewers) were compared with those of the experimental (viewer) group. Though no discernible differences was noted between these two groups, the longer duration of viewing was found to have positive effect than those viewing for a short time. The different age groups showed different score patterns.

In his doctoral thesis Kanade ('82) had discussed at length the impact of instructional television on the behaviour of rural elementary school children. The objectives of his study were to find out the impact of instructional television (ITV) on curiosity behaviour, creative behaviour, language and attitude towards school. Sample included 216 children, randomly drawn from 9 TV and non-TV schools. The post-test only control group design was followed.

Kanade used nine tools to collect data on numerous variables. Five tests were specially constructed for the study, namely, Curiosity Box, Curiosity Cards, Inquiry Cards, Language Fluency Test, and Language Refinement Test. Two creativity tests were adapted namely, Procedure Test and Picture Construction Test. The other instruments used were attitude towards School Inventory and Raven's coloured progressive matrices.

valued television as having rich audio-visual qualities.

(b) Another group of research studies designed and controlled indicated that the more carefully were the television-classroom comparisons, the more likely they were to show no significant difference in learning from the two sources. Stickell (1963) reviewed 250 experimental studies of this kind and examined them from the point of scientific compatibility of their design. He found only ten studies (conducted at Penn University) interpretable, that had met the requirements of a standard research. Stickell found 23 partly interpretable studies. Rest of the studies were faulty in methodology and research design.

Of the 33 studies which Stickell felt constituted the cream of the experimental comparisons, 30 studies showed no significant differences in results. None of the "interpretable tens"infact, showed statistically significant differences (Carpenter and Greenhill, 1955; 1958).

Stickell's findings were confirmed in a later review by Chu and Schramm (1967) in which 308 studies showed no significant differences; 63 studies were found in favour of television and 50 studies in favour of classroom teaching.

The following were the major findings :

(i) Creative behaviour of the elementary school children in the rural setting was positively influenced by their exposure to ITV.

(ii) Children did not show any improvement on those aspects of curiosity which involved exploration. The inquisitive aspect of curiosity was enhanced.

(iii) There was improvement in language fluency. The language refinement remained unaffected.

(iv) Children showed more positive attitude towards school, though this was not reflected in their motivation to learn.

Misra et al. (1983) in their report of Kheda communication Project discussed the impact of text book based formal educational television programmes. The study used experimental and control group research design. Informations were collected from teachers, parents and children from experimental and control villages.

The study indicated that television helped children in gaining knowledge in Gujarati, Science and Social Studies, although the gains were statistically non-significant. There was a definite trend towards higher performance of experimental groups. Both teachers and parents

Dubin and Hedley (1969) examined 381 studies including many in the Chu-Schramm list. They found that 191 studies showed no differences, 102 were in favour of television and 89 were in favour of classroom instruction. The differences were not statistically significant.

Shukla and Kumar (1977) conducted a study to evaluate the impact of Satellite Instructional Television Experiment (SITE) on primary school children. The sample consisted of 200 children from classes III and V from experimental schools and an equal number of children from non-television schools. Data were collected in four different languages with the help of observation schedules, opinionaires and questionnaires.

Results showed minimum gains in language development and interest in acquiring knowledge. The two hypotheses, namely; that of higher school attendance and improved achievement in school subjects were not all supported.

The findings were not conclusive to say that students learn more from television instruction than from classroom teaching or the vice versa.

The available evidence does help in identifying certain factors that seem to affect student learning in

instructional television (Carpenter, 1963). These are -

1. The quality of resources used;
2. The manner of presentation of materials;
3. The way in which materials are selected and organized;
4. The surroundings of the television viewing condition in which these materials are presented to viewers;
5. The characteristics of students in terms of aspirations, motives, abilities, previous training and state of physical and mental health;
6. The nature of students' responses to the materials on television;
7. The rewards, penalties, or reinforcements which occur with or during televised instructions; and
8. The evaluations and comparisons of achievement rates and performance levels to which the students are subjected.

2.2 Communication Effectiveness of Educational Television Programmes and School Performance.

Few researches were available which throw light on the degree of comprehensibility of television programmes and its contribution to school performance. These researches emphasize the clarity of television programme and attempt to find out how far and how effectively students were able to grasp the televised message.

Jaspen (1950,b) found a curvilinear relationship between the audio density and comprehensibility the message.

Rimland et al.(1955) presented high vs medium vs low number of words per unit time to the subjects and found that medium level was more effective than either high or low.

Vincent et al.'s (1959) data suggested that as more and more information is presented, interferences are set up and resulted in less efficient learning of any particular parts.

Barrow (in Schramm's "Impact of Educational Television", 1961) hypothesized that the relative comprehensibility of televised instruction is a nonlinear function of the number of relevant cues in the message. This hypothesis was supported by Hart et al., 1947; Kurtz et al., 1950; Jaspen, 1950; Lumsadaine et al.,1951, Miller et al., 1952; Kopstein et al., 1952; Northrop, 1952; Kimble & Wulfee, 1953; McInter, 1954; Wilgosh, 1975; Friederich & Stein, 1975 *etc.* These studies added titles, statements, participation questions, motivation questions, outlining review, verbal labeling etc. to the original message and found significant increase in the comprehensibility scores.

Barrow's another hypothesis stated that relative comprehensibility increases as the difference between the semantic level of the receiver and the semantic levels of the message decreases. This was not supported (Moldstad, 1955; Blain 1956; Jaspen, 1950, and so on).

The relative comprehensibility of the message was influenced by density or rate of transmission - the number of words, sentences, facts, concepts scenes etc. transmitted per unit of time; audience participation - an overt act performed by the subjects during the transmission of a message; realism - the degree of similarity between the communication and the reality it represented and so on.

The findings that greater realism leads to greater effectiveness in terms of information gain - was maintained. (Instructional Film Research, 1954; Rimland et al., 1955).

Rahman (1977) conducted a study to assess the impact, acceptance and appreciation of SITE programme among rural audience in Orissa. He observed variations in the levels of comprehension. He found the clear visuals and scripts are positively related to the level of comprehension.

Bhaskaran (1977) also conducted a study on impact of SITE programme on children. He obtained data regarding children's level of attention, comprehension rating and

their opinion of programmes were collected. He found out that comprehension was 40 per cent for children of grades 1-3 and 58-90 per cent for children of 4-5 grades. General programmes were comprehended best and most children irrespective of their comprehension level liked the programmes.

Attentional factors play important role in the comprehension of televised programmes. Several research studies has shown that the relationship between attention and comprehension is complex (Krull & Hussan, 1979; Wright & Huston, 1982, Anderson et al. 1981).

Vagreche et al. (1981) conducted indepth interviews to collect inputs for the modification and improvement of ETV programmes. The comprehension level of specific programme was pretested and remedial action was suggested to the programme producers. They suggested that ETV programmes should be separate for classes I,3,4 and 5 respectively. They should be in simple hindi and regular pre and post telecast activities should be conducted.

Agarwal and Chaudhary (1984) investigated the need assessment of ETV programmes in the rural areas of Jaipur. They interviewed 129 children, 22 parents and 22 teachers in 11 villages of rural Jaipur and assessed the awareness, perception and informational needs of school going children met by television programmes.

The findings made available to programme producers included the following : (i) peer group activities took up a good deal of time of boys in the 9-11 age group; (ii) children of 9-11 years comprehended educational television programmes better than the children of lower age group; (iii) as the general awareness was poor among children of lower age group the explanation of concepts shown added comprehension level; (iv) scientific expere-mentation, oceanography, historical places, national and international festivals, sports etc. were most suitable subject areas to be taught by using television.

Not many research attempts are made to examine the relationship between relative comprehensibility and student performance. Phutella (1984) conducted a case study "into utilization and comprehensibility of school television programmes in Delhi". Among several objectives, one was related to study the level of comprehension of the STV programmes by students of different classes. For this purpose five lessons for each class (VI,VII,VIII & X) were selected. The main objectives of lessons were to pass information and to clarify certain concepts. Five tests, based on final scripts of the lessons on different classes, were prepared and administered to the students at the beginning and at the end of telecast. Mean differences on comprehension tests was significant. It was found TV lessons caused marked differences between the pre and post

telecast knowledge of the students on the topics and thus were effective and comprehensive.

The above study attempted to single out ETV's impact on students level of comprehension. It showed that the extent of comprehensibility of a televised message contributes to improvement in learning. However, the findings do not extend to the comulative effects on the acquisition of knowledge in a particular/different subject(s) Also these do not indicate the differential utility of ETV to a particular class and for boys/girls separately.

2.3 Classroom Environment and School Performance :

Although environmental factors are acknowledge to be central to the theories of learning and cognitive development, relatively little detailed work has been done to examine the interrelationships between the environment of the school and the classroom specifically and their influence on the achievement of the child at school. Bloom (1964) had surveyed the evidence from longitudinal studies about the effects of environmental conditions on the development of human characteristics and had found nothing to contradict the proposition that "the environment is a determiner of the extent and kind of change taking place in a particular characteristic" (p.209).

Studies by Campbell (1952); Kemp (1955); Klausmeir (1958); Dugan (1962); Watson (1955); and many others have focussed more on environmental variables than intelligence and ability factors as they influence the performance.

Considerable interest has been shown internationally in the conceptualisation, measurement and investigation of perceptions of psycholosocial characteristics of the learning environment of primary and secondary schools. Becker et al. (1971) argued that early environment may be less important than the academic environment in determining an individual's success. The relevance of classroom environment is firmly acknowledge in recent key publications including several books (Moos, 1979; Walbery, 1979; Fraser 1985 a), Monographs (Frazer, 1981a; Fraser & Fisher, 1983), a meta-analysis (Haertel et al. 1981) several reviews (Walberg, 1976; Walberg & Haertel, 1980; Fraser, 1981 b, 1985 b; Fraser & Walberg, 1981; Chavez, 1984) and a guest edited journal issue (Fraser, 1980).

Classroom environment affects most student outcomes, including cognitive and affective behaviour (Barker, 1963; Weber, 1971; Duke & Perry, 1978); Values (Taba, 1955; Vyskocil & Goens, 1979) and personal growth and satisfaction (Bailey, 1979; Vyskocil & Goens, 1979; Cox, 1978; Coyne, 1975; Beelick, 1973).

Jackson and Getzel (1959) summarized their findings on the differences in psychological functioning and classroom effectiveness of two groups of adolescents - those who are satisfied with their recent school experiences and those who are disatisfied - These were as follows:

i. Contrary to popular expectations the satisfied and the disatisfied students did not differ from each other in either general intellectual ability or in scholastic achievement.

ii. The satisfied group attained higher scores.

iii. The satisfied and dissatisfied boys were perceived differentially by their teachers.

Allpert et al. (1963) suggested that interests and attitudes influence achievement and are in turn modified and changed by achievement. Furthermore, student achievement and attitudes towards school learning are influenced by their personality characteristics, particularly the self-concept and expectancy of success.

Feldrebel (1964) conducted a study which focused upon the organization's efficiency as measured by the ratio between selected inputs and the organization's output. Academic achievement was used as the criterion of effectiveness. He found that "production emphasis" was significantly associated with achievement (0.40 and 0.39 respectively).

In his study Flagg (1964) used organisational climate description questionnaire (OCDQ) for measuring student achievement and climate type. He found climate type was related to school size, teacher turnover and principal characteristics and was not related to student achievement.

Herr (1965) employed High School Climate Inventory (HSCI) to measure climate dimension. 725 secondary students were served as subjects. He found significant differences in perception existed between grade levels, sex, ability, family background, and involvement.

Febel (1966) found that student teacher in an "open" climate school teacher perceive the efficacy of the student teaching situation more favourably than student teachers in a "closed" climate school.

Anthony (1967) explored the relationship between the process variables of the classroom environment and academic achievement. In this study, the classroom was considered as a system involving not only the teacher, but also the students, materials and experiences provided for the students. Observations and interview schedules were constructed to measure the educational environments of 21 fifth grade classrooms in ten schools.

Anthony identified the process variables as : opportunities for self-involvement, stimulation, and

individual differentiation. Measurements on these three variables were combined to give classroom environment measures which correlated 0.64 with final achievement scores when controlled for initial achievement scores.

This study provided strong evidence in favour of the contribution of aspects of the classroom environment to learning.

McDill et al. (1967,1969) indicated that while the dimension of the school climate did not account for a large proportion of the variance in achievement, they did make some contribution than accounted by ability, father's education and academic values. Furthermore, they showed that the degree of the parents' commitment to and involvement in the school could be considered as a source of influence on the climate of the school.

Sharma's (1969) research supported the findings that schools having "open" and "autonomous" climate were found to have significantly higher achievement index as compared with "closed" climate schools. The coefficient of correlation between school achievement index and 'Disengagement', 'Hindrance', 'Espirit' 'Consideration' were 0.67, 0.59 and 0.44 respectively. The nature of the coefficient of correlation showed that 'Espirit and 'Consideration' added to high achievement index of the school while 'Disengagement' and 'Hindrance' affected school achievement adversely.

The earlier version of Learning Environment Inventory was used in a number of multivariate studies conducted to determine the relationship between the students' perceptions of the classroom environment and class learning (Anderson & Walberg, 1968, Walberg 1969 a b), individual learning (Walberg & Anderson 1969 a), student pretest scores (Walberg & Anderson 1969 a) and teacher personality measures (Walberg, 1968).

Significant relationship between the rating scale scores and the criterion variable (s) were found in each study.

Walberg (1969) attempted to explore the influence of the social environment on classroom learning. In this research six post-tests were cononically correlated with 14 environment scales derived from student ratings in a national sample of 144 high school physics classes.

It was shown that measures of the social environment of learning as perceived by students, predicted learning criteria before and after relevant control variables were statistically removed from the criteria. The cognitive and non-cognitive criteria appeared to be separate dimensions of learning. The classes seen as more difficult gained more on physics achievement and science understanding. The classes seen as more satisfying and without friction, apathy, and cliques gained more on reported

science interest and activities.

Keeve's (1970) concluded in a study on educational environment and student achievement that the school environment made relatively larger contribution to both achievement and attitudes towards science and mathematics in comparison to home and peer group variables. The sex of the student influenced the attitudes. It made a smaller contribution to attitudes towards mathematics as compared to science.

In a comprehensive study of secondary classrooms in several subject areas (including Physics, Chemistry, Biology, Geography, Mathematics, English, History and French) found that even when the measured intelligence of students was controlled, more learning took place in class with a greater degree of intimacy among the classroom participants. It was accompanied by lack of cliques feelings and friction among them. Also important to student learning were the lack of perceived teacher favouritism and the existence of democratic atmosphere. Additionally, students in the classes where more learning occurred were considerably less apathetic about their class experiences.

Brookover et al. (1970) conducted a study in which the independent variables included school composition, school social structure, climate dimension etc. and the dependent variables were: school achievement, student self-concept and student self-reliance respectively. They

concluded that the climate accounted for a significant amount of variance in all dependent variables for black samples when race and SES were controlled. (B) Some of the school's social structure variables were associated with achievement; instructional programme; student responsibility; teacher expectations; and principal leadership.

McDill and Rigsby (1973) found that the climate accounts for significant amount of variance in student achievement and aspirations if the student background was controlled.

Brookover and Scheneider (1975) showed that (i) student futility and teacher expectations accounted for most of the achievement variance, (ii) student futility is predicted largely by expectations and academic norms, (iii) high and low achieving schools differed on climate when composition and community were controlled.

Jackson and Lahaderne (1976) examined the accuracy of teacher's judgement of their students' satisfaction with school and the relationship between scholastic success and attitude towards school. They concluded that students satisfaction is at least partly visible to teachers and can be estimated with greater than chance accuracy. They also revealed that teachers tend to expect achievement and

satisfaction to be more closely related than, in fact, they are.

Ellett et al. (1977) conducted a study on climate dimensions and school achievement and attendance. They found that (a) the teacher and student perceptions of climate are relatively independent. (b) the achievement and attendance in elementary schools are negatively associated with difficulty. (c) the achievement in secondary schools is positively associated with difficulty while attendance is positively associated with diversity and intimacy.

Classroom psychosocial climate also varies between types of schools (Trickett,1978), between co-educational and single sex schools (Trikett, et al.(1982), between classes of different sizes (Walberg, 1969) and between classes followed different subject matter (Kuert, 1979).

Moos (1979) in the USA, and later of Fraser(1982b, 1984) in Australia compared student's and teacher's perceptions of the actual and preferred classroom environment. They reported two interesting findings:

First, both students and teachers preferred a more positive classroom environment than the perceived one. Second, teachers tend to perceive the classroom environment more positively than their students in the same classroom.

In an elaborate study, Wynne(1980) selected staff and students from 40 schools including Public/Private, Elementary/Secondary. He used staff and student interviews, observations, and school documents respectively for the collection of data on student's character, development, student achievement, climate and school discipline.

The following findings were reported.

(a) character development was associated with student's and staff attitudes.

(b) Achievement was associated with parent involvement, teacher attitudes, and the instructional programme.

(c) Climate was associated with discipline/rules, student and staff attitudes and activities.

(d) Discipline was associated with instructional programme.

Haertel, Walberg, Haertel (1981) reported consistent relationships between the nature of the classroom environment and various student cognitive and affective outcomes.

Fraser & Fisher's (1982) study involving 116 Australian science classes established sizeable associations between several inquiry skills and science related attitudes and classroom environment dimensions measured by the

Classroom Environment Scale (Rickett & Moos, 1973; Moos and Rickett 1984) and the Individualized Classroom Environment Questionnaire (Rentaul & Fraser, 1979; Fraser, 1985).

Fraser and Fisher (1983b,c) used the actual and preferred forms of scales together in exploring whether students achieve better when there is a higher similarity between the actual classroom environment and that is preferred by students. The use of regression surface analysis yielded support for the person - environment fit hypothesis but students achieved better in their prefe-rered classroom environment.

In his doctoral work Hamberlin (1983) studied the effects of classroom environment on academic achievement, classroom behaviour and attitudes of ninth grade students, in one public schools. He concluded that : (a) students instructed in the stimulating classroom environment in comparison to students instructed in the non-stimulating classroom environment performed better academically, prepared for class more frequently, completed more house-work assignments attended more classes and had fewer tardy cents. (b) Students instructed in the stimulating environment had more positive self-reported attitudes and perceptions than their counterparts.

Sharma (1985) found out that academic achievement and school satisfaction had a positive and significant

relationship. The differences between the academic achievement of the satisfied group and the dissatisfied group were significant.

Jonsson's (1986) study added another dimension that is TV use and TV environment to analyse school performance.

Jonsson's (1986) study was purported to examine the relationship between children's TV use and their TV environment on the one hand and their school performance on the other. The study was longitudinal with data on 194 children from the age group of 6 to 12. Children and their parents were asked about their viewing habits; Parents were also asked about their attitudes and actions as regards their children's viewing habits. Data about school achievement and marks were also collected.

Jonsson concluded that children who grew up in a more cognizant TV environment, coped better with the cognitive requirements of school. Cognizant TV environment refers to the environment where children are encouraged to watch TV programme to learn from it, and to adopt a critical attitude towards it. These children showed more inclination to use TV as a complement to school. They watched more programmes of an informative nature. On the other hand, relying on TV as the best way

to relax and spending time on programmes below one's own level of knowledge had direct and negative consequences for school results.

Certain children thus, had better opportunities for using TV as a resources among other things because of their environment.

To sum up the overall indications from the available evidence are that if the classroom environment is intellectually challenging and stimulating it has a beneficial and facilitating effect on students affective and behavioural learning. The changes in the external environment by the ETV in the classroom is supposed to have significant influence on student's cognitive as well as affective domain. It is not clear however, whether the classroom environment acts as a mediating variable in the effectiveness of televised instruction.

It is in the above context, that the present research has been conceived. Basing on the review of related literature on ETV, it attempts to ascertain the interrelationships among communication effectiveness of ETV programme, perceptions of classroom environment and student's performance by focussing on two subjects namely, the science and social studies. It is expected

that the findings of the study would be relevant for schools and educational administrators and planners. The changes in the classroom environment due to the institution of ETV are supposed to have significant influence on student's cognitive as well as affective domain.

CHAPTER - 3

M E T H O D O L O G Y

A review of literature in the previous chapter has discerned the fact that while some research work has been done about the utilization and impact of educational media, little is known about the effectiveness of Instructional or Educational Television (Dubin & Hedley, 1969; Ball & Bogatz, 1973; Chu & Schramm, 1974; Jamison et al., 1974; Cook et al., 1975 etc.). Studies on the extent of comprehensibility of educational TV programmes have been scanty. Only a handful of studies include factors related to the accuracy of students learning and comprehension of educational TV programmes. The present research has endeavoured to investigate the relationships among communication effectiveness of educational TV (ETV) programme, classroom environment and students performance in science and social studies.

This chapter includes problem statement, objectives of the study, hypotheses, sampling, research design, variables explored, tools used, pilot study, organisation of the final study, scoring procedures, and statistical analysis.

3.1 Problem Statement :

The specific research problem may be stated as below :

"Are there any significant relationships among

communication effectiveness of ETV programmes, classroom environment and performance in science and social studies of class X students in Delhi"?

3.2 Objectives of Study :

Certain primary objectives were laid down in order to provide direction to the formulation of testable hypotheses.

1. To find out gains in learning science and social studies because of exposure to ETV programmes.
2. To find out the gender differences on student's pre-ETV scores in science.
3. To find out the gender differences on students pre-ETV scores in social studies.
4. To find out the gender differences on students' post-ETV scores in science.
5. To find out the gender differences on students' post-ETV scores in social studies.
6. To find out the gender differences in ratings on communication effectiveness of ETV programmes in science.
7. To find out the gender differences in ratings on communication effectiveness of ETV programmes in social studies.

8. To find out the gender differences in students' ratings on classroom environment in science.

9. To find out the gender differences in students ratings on classroom environment in social studies.

10. To find out the mean differences between student's ratings on communication effectiveness of ETV programmes in science and social studies.

11. To find out the mean differences between student's ratings on classroom environment in relation to science and social studies.

12. To identify the intercorrelations among communication effectiveness of ETV programmes, classroom environment and performance in science and social studies for boys.

13. To identify the intercorrelations among communication effectiveness of ETV programmes, classroom environment and performance in science and social studies for girls.

14. To identify the relationship between student's ratings on communication effectiveness of ETV programmes in science and their performance in science.

15. To identify the relationship between student's ratings on communication effectiveness of ETV programmes in social studies and their performance in social studies.

16. To identify the relationship between student's ratings on classroom environment in science and their performance in science.

17. To identify the relationship between students ratings on classroom environment in relation to social studies and their performance in social studies.

3.3 Hypotheses :

The following testable hypotheses were laid down for the present study :

1. Pre-ETV and post-ETV scores in science are significantly different for boys.

2. Pre-ETV and post-ETV scores in science are significantly different for girls.

3. Pre-ETV and post-ETV scores in social studies are significantly different for boys.

4. Pre-ETV and post-ETV scores in social studies are significantly different for girls.

5. Boys and girls differ significantly from each other in their pre-ETV scores in science.

6. Boys and girls differ significantly from each other in their pre-ETV scores in social studies.

7. Boys and girls differ from each other in their post-ETV scores in science.

8. Boys and firls differ from each other in their post-ETV scores in social studies.

9. Boys and girls differ significantly from each other on their communication efficacy scores in science.

10. Boys and girls differ significantly from each other on classroom environment scores in science.

11. Boys and girls differ significantly from each other in their communication efficacy scores in social studies.

12. Boys and girls differ signficantly from each other on classroom environment scores in social studies.

13. Communication efficacy scores obtained in relation to science are significantly different than in social studies.

14. Classroom environment scores obtained in relation to science are significantly different than in social studies.

15. Boys ratings of the communication effectiveness of ETV programmes in science and social studies correlate significantly with their perceptions of classroom environment in science and social studies.

16. Girls ratings or communication effectiveness of ETV programmes in science and social studies correlate

significantly with their perceptions of classroom environment in science and social studies.

17. Boy's performance in science can reliably be predicted on the basis of their ratings of classtoom environment and communication efficacy.

18. Girls performance in science can reliably be predicted on the basis of their ratings of classroom environment and communication efficacy.

19. Boy's performance in social studies can reliably be predicted on the basis of their ratings of classroom environment and communication efficacy.

20. Girl's performance in social studies can reliably be predicted on the basis of their ratings of classroom environment and communication efficacy.

3.4 Sample :

The sample had been identified through a two-stage procedure, namely (i) identification of schools; (ii) identification of students.

(i) Preliminary Information on Schools

In a study Sandeep (1981) has pointed out four types of schools exist in India. These are :

(a) Public schools which are elitistic and draw students from upper class background.

(b) Central schools wherein the students are drawn largely from service class and middle class background and very often the composition is cosmopolitan.

(c) Private schools (aided and unaided) which draw students both from upper and middle class background and assure good standards of education.

(d) Government schools which largely draw students from the lower middle class and lower class background.

Though the curriculum in all types of the schools are expected to be the same, there has been perceptible disparity among these schools about the method of imparting education and the outcome. Public and private schools made use of new educational technology and communication tools immediately after their arrival on the educational frontier. In other words, various type of innovative methods of teaching are easily adapted and accepted by these schools. Methods of teaching in Central Schools approximate to some extent to that of public and private schools. On the other hand Government schools do not come forward/react immediately to new educational technology and to new teaching aids for that matter. The process of acquiring and adapting to the

new technology is rather slow. Besides the economic factors, the social factors dominate the scenario in the sense that resistance to innovation is a prime symptomatic of teachers and also of students. To them conservation and transmission of school culture seems to be much more desirable rather than the need to adapt and accept innovation.

(ii) Introduction of ETV in Government Schools:

Taking into consideration the specific needs and various aspects of the education, a big leap was made by Delhi Administration when the Television lessons were integrated with the school syllabus of TV technology. How well they are doing the job from the standpoint of learning-teaching process or managing the educational system was not known. The researcher thus, set to collect the necessary information about the schools using ETV from the Television Broadcasting Centre, New Delhi.

It was created in 1967. The main assignments of the TV branch are :

(i) To provide liasion between the Department of Education and Doordarshan Kendra.

(ii) To supervise and organise work pertaining to planning, preparation, utilisation and evaluation of the TV lessons.

(iii) To orient the classroom teachers to use Educational TV (ETV) effectively and also to supply and maintain TV sets in schools.

At present 412 schools under Delhi Administration are using Television.[1] ETV programme is integrated with the school time-table. Each TV period is of 40 minutes duration and the time is provided invariably in the school time table. The following table contains information about ETV programmes to be transmitted in 1986-87, as available with the office.

TABLE - I

TV Time-Table, 1986-87

Timings	1st transmission	IInd Transmission	IIIrd Transmission
Summer	8.35 AM 2.35 PM	9.15 AM 3.15 PM	10.50 AM 4.30 PM
Winter	9.00 AM 2.35 PM	9.40 AM 3.15 PM	11.10 AM 1.15 PM
Monday	Science VIII	English VIII	Maths VI
Tuesday	English VIII	Chemistry X	Maths VII
Wednesday	Maths IX	Biology X	Science VII
Thursday		Geology X	Science VI
Friday		Physics X	English VI

The information about school time-table is included in Table-2.

---

1. School Television, Mannual, TV Branch of Education, New Delhi, 1986.

TABLE - 2

School Time Table

	1st Shift		2nd Shift		3rd Shift	
	Summer	Winter	Summer	Winter	Summer	Winter
Prayer and Assembly	7.00	7.30	1.00	1.00	7.00	10.10
1st Period	7.15	7.45	1.15	1.15	7.15	10.20
2nd Period	7.50	8.20	1.50	1.50	7.50	11.00
3rd Period	T 8.25	T 8.50	T 2.25	T 2.25	T 8.25	11.40
4th Period	T 9,05	T 9.30	T 3.05	T 3.05	T 9.05	12.15
Recess	9.45	10.10	3.45	3.45	9.45	12.50
5th Period	10.05	10.30	4.05	4.05	10.05	1.10
6th Period	T 10.40	T 11.00	T 4.40	T 4.35	T 10.40	1.50
7th Period	11.20	11.40	3.20	T 5.15	11.20	T 2.75
8th Period	11.55	12.00	5.55	5.45	11.55	

All the schools having ETV programmes formed the universe of population for the study.

(iii) Final Selection of Schools

Since it was not possible to cover all the schools using ETV in order to test the hypotheses as laid down earlier in this chapter, for the present study two Government Schools viz., Government Boys Senior Secondary School and Government Girls Senior Secondary School were selected. The basis for the

selection of above two schools was that students of these schools did not have access to ETV programmes in the earlier year (s) due to some mechanical problems in TV sets, lack of proper viewing conditions or/and absence of subject teacher and so on. They are being exposed to the ETV programmes regularly in the current year. Thus, students who are in class X this year had not been exposed to ETV programmes on their previous year (class IX). This situation facilitated the researcher to employ a pre-post research design for testing the hypotheses.

The Deputy Director of Education[1] had on request given permission to administer questionnaires to the Boys and Girls of Senior Secondary Schools.

(b) Selection of Student Sample

The subjects chosen were students of class X. Observed data were based on a sample size of 110 boys of Government Boys Senior Secondary School and 110 girls of Girls Senior Secondary School in Delhi. The quota method of sampling was followed. All the students of one class were included in the study. Students were tested at two

---

1. Deputy Director of Education, South Block, New Delhi.

time periods. Thus, the same students themselves served as control group. It was believed that the growth and maturation processes were identical for all students in a particular age group (12-14).

The student samples were homogeneous in their social and economic background.

3.5 Research Design

In order to examine the relationships that might be existing among several variables like communication effectiveness of ETV programmes, classroom environment and performance in science and social studies, the pre-post design was considered to be a befitting one.

The used form of pre-post design may be shown as below -

PRE-POST DESIGN

Gender	Subjects	Pre-ETV Scores (X_1)	Post-ETV Scores (X_2)	Differences Scores (X_2-X_1)	Scores on CES	Scores on CE I
1	2	3	4	5	6	7
Boys	Science	N=110	N=110	$X_2 - X_1$	Rating Scores	Rating Scores
	Social Studies	N=110	N=110	$X_2 - X_1$	Rating Scores	Rating Scores
Girls	Science	N=110	N=110	$X_2 - X_1$	Rating Scores	Rating Scores
	Social Studies	N=110	N=110	$X_2 - X_1$	Rating Scores	Rating Scores

Explanation of Terms

Pre-ETV Scores - Examination marks obtained in science and social studies by boys and girls before exposure to ETV programmes in science and social studies.

Post-ETV scores - Examination marks obtained in science and social studies by boys and girls after their exposure to ETV programmes in science and social studies.

Difference scores - By subtracting pre-ETV marks from post-ETV marks in science and social studies a difference score was obtained.

Scores on CES - By summing up all the individual rating scores on different items of communication efficacy scale, a total score was obtained.

Scores on CET - By summing up all the individual rating scores on different items of classroom environment. Inventory, a total score was obtained.

3.6 Variables

The variables included in the study may be enumerated as below.

1. Matching variables
   a. Type of school - Government
   b. Level of Education - Class X

c. Subjects for comparison Science and social studies

d. Gender - Boys/Girls

2. Explanatory variables.

a. Communication Effectiveness of ETV lessons in science and social studies.

b. Classroom Environment in science and social studies.

3. Criteria variables.

a. Examination marks in science

b. Examination marks in social studies.

1. The inclusion on matching variables helped in minimising the possibility of external and internal variance. In the present context matching was done by using one type of schools (Government), one level of education (class X), two subjects for comparison (science and social studies) and the gender of students (boys and girls).

2. Explanatory variables helping in the understanding and analysing the dependent variable under investigation, namely performance in science and social studies. Communication effectiveness of ETV programmes and the classroom environment were employed as two explanatory variables in the present study.

Teaching itself is understood as communication and in consonance to this it is expected that mediated teaching should be more effective in communicating the lesson or instruction to students. The degree of communication effectiveness depends on a large number of factors, such as clear or unambiguous instructional goals (cognitive, conative or psychomotor), the developmental level of students, the cognitive style of students, the accuracy of student learning, student's satisfaction with the communication system etc. (Wheeles et al., 1979).

Communication involves the transferring of a message from one to another party so that it can be understood and acted upon well. The extent of comprehensibility of the structural and functional components of the message, which enable the receiver to understand and act upon, is the indicator of communication effectiveness. The communication effectiveness of ETV programmes is being assessed with a view to measure the effectiveness of student learning itself.

Classroom environment encompasses both external and internal learning conditions that contribute to the overall development of students. The classroom environment has been conceptualised as the totality of social and psychological forces that influence the functioning of the whole group and subgroups within the classes (Walberg, 1979).

These social and psychological forces comprise of three distinct but interacting dimensions. First, is the relationships that develop in classroom situation. Second is the goal-orientation and personal development related features of environments. Third is the system-maintenance and change dimension.

In brief, the classroom environment affecting a group could be thought of as a product of interactions among external learning conditions, personality characteristics of individual learners and the institutionalised norms, values and culture.

Students' perception of classroom environment have been explored with a view to enrich learning both quantitatively and qualitatively and also to ensure students satisfaction with the system. Criteria variables employed in this study were two sets of marks obtained by the students in the first terminal examination of IX class and in the first terminal examination of class X respectively. Examination marks in science and social studies were used in order to enunciate the impact of ETV programmes.

3.7 Tools Used :

The following tools were used for measuring the different explanatory variables.

1. Communication Efficacy Scale (It was used in science and social studies separately).
2. Classroom Environment Inventory. (It was used in science and social studies separately).
3. School register for examination marks in science and social studies.

3.8 Description of Tools

1. Communication Efficacy Scale

Taking ETV as a powerful medium of communication, the concept of communication effectiveness of ETV programme may be understood as "the extent of comprehending the structural and functional component of the message which enable the receiver (student) to understand and act upon it well". In other words, communication effectiveness of ETV programme is said to be achieved when what is taught is found worth teaching. To make it more lucid and simpler when the pre-supposed objectives as well the contents of the lesson are well understood by the receiver who in turn can react upon it, the communication effectiveness is said to have been achieved. Some of the desired objectives of ETV programmes in science and social studies are listed below:

A. Fostering quality learning (Information, Instruction, Enrichment).

B. Maintaining objectivity.

C. Arousing motivation, interest and curiosity.

D. Promoting appropriate attitude.

E. Improving retention capacity.

F. Easing or facilitating response feed-back.

Keeping the above objectives in mind, a five point scale was devised to measure the communication effectiveness of ETV programmes. The scale consisted of 20 items. Students were expected to indicate their ratings on the given scale by responding to each item.

Scoring Procedure

Except item numbers 8 and 20 which were scored 1,2,3,4 and 5 respectively for the response very much, much, neither much nor little, little, very little, all other items were scored in the reverse manner viz., 5,4,3,2 and 1 respectively for very much, much, neither much not little, little and very little responses. Omitted or invalidly answered items were scored as zero (0).

2. Classroom Environment Inventory

As said earlier the classroom environment is a product of interaction among a number of variables like the external conditions of learning, the personality characteristics of individual learner and the institutionalised norms, values and culture. Some of the aspects of classroom life like the feelings and mutual respect students shared among themselves and with teachers, students invol-

vement in classroom culture, and attitude towards the academic orientation etc. contribute to the understanding of classroom environment. Some of the specific dimensions of classroom environment were as follows :

1. Personallization-emphasis on opportunities for students to interact with the teacher and concern for student's welfare.

2. Involvement-extent to which students participate actively and attentively in class discussions and activities.

3. Student cohesiveness - extent to which students know, help and are friendly towards each other.

4. Satisfaction - extent of enjoyment of classes.

5. Task orientation - extent to which class activities are clear and well organised.

6. Innovation - extent to which teacher plans new, unusual class activities, teaching techniques and assignments.

7. Individuation - extent to which students are allowed to make decisions and are treated differentially according to ability, interest or rate of working.

Using the above seven dimensions of classroom

environment, an inventory was devised by Fraser (1986) to assess the characteristics of classroom environment. This inventory was modified to a small extent for the present study. The original inventory consisted of 49 items in total where as the modified one consist of 21 items.

The classroom Environment Inventory is a four-point scale and consisted of 21 items.

Scoring Procedure

Some items were underlined in the inventory (such as 1,2,5,6,7,9,13,15,16,18,20,21. These were scored 1,2,3 and 4 respectively for the responses strongly agree, agree, disagree, and strongly disagree. All other items (like 3,4,8,10,11,12,14,17 and 19) were scored in the reverse manner viz., 4,3,2 and 1 for the response strongly agree, agree, disagree and strongly disagree. Ommitted or invalidly answered items were scored as 0 (zero).

3. Examination marks in science and social studies

Two sets of examination marks were taken as the indicator of student's performance in science and social studies. One set of marks was related to the marks obtainednedned in the Ist terminal examination of class IX in

science and social studies and the other set of marks was related to the marks obtained in the Ist terminal examination of class X.

In other words two sets of marks (that is pre-ETV and post-ETV) in science were taken for each student sample. Similar was the case for social studies.

3.9 Pilot Study

Focussing on the above objectives of ETV programme, the researcher had devised a scale to measure the communication effectiveness of teacher-cum-TV oriented teaching method. The scale was a five-point scale consisting of 20 items. All the items were developed using key concepts like attention, retention, comprehension, discussion etc. In order to find out the appropriateness of this scale, it was administered to 50 students of class X. Students were instructed about the manner of marking the test items on the scale. After they finished up with the ratings on the scale, all the valid responses were scored according to above defined procedure. Except item number 8, all the items were scored as 5,4,3,2, and 1 respectively for the response very much, much, neither much nor little, little and very little. Iten number 8 was scored in the reverse manner like 1,2,3,4 and 5 respectively for the aforementioned responses. By summing up all the

rating scores on individual items of communication efficacy scale, a mean score was obtained for each item. In all, twenty mean scores on communication efficacy scale were obtained for science and social studies separately. The response scores on various alternatives in terms of percentages are included in Table-3 and 4 (see page74&75). The mean scores were also included. The computee coefficient correlation was 0.52.

The Pilot Study had two objectives. Firstly, to get an impression on the comprehensibility or understandability of the test items and secondly, to calculate the response differentiation on each item on the scale. After the statistical analysis of the test items, it was found necessary to change the terminology of one items in the scale. Like in the initial scale the item number i was read as "keeping interest alive in science". It was later replaced by "focussing attention on the TV lessons". Item No.2 "generating proper attitude towards science "was replaced by Edeveloping proper attitude towards the subject". Item No.3 "feeling confident in initiating discussion" was substituted by "discussing the learnt material confidently with others". Item No.4 "clear understanding of the subject matter" was kept unchanged. Item No.5 "perceiving inter-relations among different parts of the lesson" was changed to "seeing links among different parts of the lessons". Item No.6 "generating curiosity" remained

unchanged. Item No.7 "solving problems at ease" changed to finding solutions to problems easily. Item No.8 "feeling nervous and anxious" was cut down to "feeling nervous in the class". Item No.9 "reproducing the lesson after wards" remained unchanged. Item No.10 "relating classroom learning to other situation" remained unchanged. Item No.11 "asking more questions in the class" remained unmodified. Item No.12 "attending class regularly" was not changed. Item No.13 "illustrating a point by citing example" was substituted by "making a point by citing example". Item No.14 "analysing the subject matter" remained same. Item No.15 "integrating learning, thinking and feeling" was substituted by "keeping interest alive in the subject". Item No.16 "rearranging the given idea in an orderly manner" remained unchanged. Item No.17 "willingness to receive instruction was changed to " "raising willingness to receive instruction". Item No.18 "expressing the learnt material accurately in different ways" was previously "expressing accurately a communication from one form to another". Item No. 19 "willingness to put extra effort" was replaced by "promoting willingness to put extra effort". Item No. 20 "attentive towards the subject" was replaced by "facing difficulty in understanding the subject".

TABLE No. 3

Communication efficacy scale in science with percentage of ratings on each alternative and mean scores on each item.

Item No.	Percentage of N for response alternative					Mean score
	1	2	3	4	5	
1	4.08	10.20	44.90	30.61	10.20	3.22
2	6.00	12.00	40.00	24.00	18.00	3.36
3	4.00	16.00	38.00	24.00	18.00	3.25
4	0.00	14.00	40.00	20.00	16.00	3.40
5	2.04	6.12	42.85	30.61	18.37	3.53
6	4.00	20.00	40.00	20.00	12.00	2.88
7	4.00	12.00	38.00	24.00	22.00	3.33
8	0.00	16.33	38.78	24.49	20.40	3.58
9	0.00	10.20	46.94	22.45	20.40	3.54
10	6.00	12.00	40.00	26.00	16.00	3.36
11	4.16	16.66	43.75	22.92	10.42	3.02
12	4.00	12.00	40.00	26.00	18.00	3.36
13	0.00	23.40	40.43	19.15	17.02	3.34
14	0.00	10.00	44.00	28.00	18.00	3.54
15	0.00	15.55	40.00	37.77	6.66	3.33
16	2.00	14.00	50.00	20.00	14.00	3.43
17	4.08	12.24	38.78	26.53	18.38	3.38
18	0.00	12.00	44.00	26.00	18.00	3.55
19	2.00	12.00	40.00	26.00	20.00	3.53
20	2.08	14.58	39.58	27.08	16.33	3.48

Interpretation for response alternatives.

1 - Very much
2 - Much
3 - Neither much nor little
4 - Little
5 - Very little

TABLE No.4

Communication efficacy scale in social studies with percentage of ratings on each alternative and mean scores on each item.

Item No.	Response alternatives					Mean score
	1	2	3	4	5	
1	6.12	16.32	36.73	30.61	10.20	3.33
2	4.00	14.29	40.00	26.00	16.00	3.36
3	4.17	20.83	31.25	33.33	10.42	3.36
4	0.00	16.00	38.00	36.00	10.00	3.42
5	2.13	6.38	42.55	34.04	14.89	3.57
6	10.00	24.00	40.00	20.00	6.00	3.08
7	2.04	20.41	36.73	24.49	16.33	3.48
8	6.00	10.00	30.00	28.00	26.00	3.49
9	0.00	16.00	38.00	22.00	24.00	3.53
10	6.00	12.00	38.00	28.00	16.00	3.34
11	10.00	20.00	38.00	22.00	10.00	3.13
12	4.00	14.00	40.00	26.00	16.00	3.42
13	0.00	25.53	34.04	21.28	19.15	3.30
14	0.00	10.00	44.00	28.00	18.00	3.54
15	0.00	17.39	39.13	36.96	6.52	3.36
16	2.04	14.29	40.82	24.49	18.37	3.30
17	6.00	16.00	32.00	26.00	20.00	3.43
18	0.00	6.12	51.02	24.49	18.37	3.50
19	2.04	10.20	40.82	26.53	20.40	3.50
20	4.00	18.00	38.00	26.00	14.00	3.52

Interpretation for response alternatives

1 - Very much
2 - Much
3 - Neither much nor little
4 - Little
5 - Very little

3.10 Organisation of the final Study

To the extent it was possible, care was taken to follow the specified procedure in order to test the hypotheses. As indicated earlier, two Government Schools were selected.

As a first step the Deputy Director of Education was approached for permission to administer scales Afterwards, an appointment was made with the principals of the schools concerned,who permitted the researcher to go to the TV class. With the help of the classroom teacher, the researcher administered the scales to the students. The teacher in charge of classes helped the researcher in copying down the marks of tested boys and girls in science, and social studies.

Communication efficacy scale for science was given to the students in the TV class meant for physics. In a Second physics TV class, classroom environment inventory for science was given to the students. Similarly communication efficacy scale in social studies was administered to students in geography TV class. A second test was done in another geography TV class. Similarly, classroom environment inventory for social studies were administered. The same administering procedure was followed in case of boys and girls. There was no time limit fixed and the students were allowed to take their own time to respond to all the items.

The researcher was personally present in the classroom in order to administer the scale to the students. At first the communication efficacy scale in relation to science was administered to the students in Physics TV class. Before administering the scale the researcher gave a short discription about the nature of the scale and what it intended to measure. Taking example of one item on the scale, the students were shown how to respond to the item. Wherever necessary, explanation in Hindi was given. The students were imparted the following instruction.

"Given below are statements to measure the communication effectiveness of teacher cum TV oriented method of teaching in Science. Eash statement has five alternatives (1,2,3,4,5) for the responses very much, much, neither much nor little, little and very little respectively to indicate the degree of effectiveness of communication as judged by you. Tick (✓) mark the alternative in the box, provided on the right hand side of each statement which you think to be true against each item in the scale."

Similar were the instructions imparted to both boys and girls in TV class meant for Geography.

Classroom Environment Inventory was administered in physica TV class and geography TV class separately. After giving a brief summary description about the nature and purpose of the test, the inventory was administered to the students. The researcher was present all the time during the administration of the inventory and maintained a written record about the behaviour of the students in the TV class. These observations were made with a view to substantiate the quantified results. Whenever needed, necessary explanation in hindi was given to the students. The following instructions were given to the subjects.

"The purpose of this questionaire is to find out your opinion about the class you are attending right now. This questionaire esses your opinion about what this class is actually like. Indicate your opinion by responding to each questionnaire statement by circling the right response (e.g. ⓐ, ⓓ). You are requested to choose one out of the four alternative like SA, A, D and SD respectively for the response Strongly Agree, Agree, Disagree and Strongly Disagree."

The instructions were exactly alike for boys and girls and for science and social studies.

After finishing up the test the researcher than collected all the questionnaires given to the students, sorted them out and then scored.

3.13 Coding

Scoring was done individually for each questionnaires. The scoring was carried out in the manner as mentioned earlier. The data were then coded on scoring sheets.

3.14 Analysis of Data

Means, standard deviations and correlations were computed. Analysis of mean differences were done to test the significance of differences between means. Correlational analysis wad done to find out the relationships among different variables namely : Communication effectiveness of ETV programme in perceptions of classroom environment in science. Similarly the relationship between communication effectiveness of ETV programme and perceptions of classroom environment in social studies was also computed. Regression analysis was done for the variable number 2 (post ETV scores in science) with communication efficacy and classroom environment scores in science as independent variables respectively.

Regression analysis for variable number 4 (post-ETV scores in social studies) was performed by using communication efficacy and classroom environment scores in social studies as independent variables.

CHAPTER - 4

R E S U L T S

The following statistical analyses were carried out on the data collected for this research.

4.1 Analysis of the mean differences (t-test analysis).

4.2 Correlational analysis.

4.3 Multiple regression analysis.

The t-test analysis was performed to know subject-related and sex-related differences in ratings on communication effectiveness of ETV programmes, perceptions of classroom environment and performances in science and social studies. The t-test analysis was also done to know the differences between the performances of group one (TV) and group two (No TV) in science and social studies.

The correlations were computed separately for boys and girls to know the relationships among different variables.

The multiple regression analysis was done to find out the predictability of performance in science and social studies on the basis of communication efficacy and classroom environment scores in the same subject. It was done separately for boys and girls.

While computing the t-values, r's and regression coefficients, the figures were computed upto four decimal place and then rounded off to two decimal places.

4.1 Analysis of mean differences (t-test analysis)

The level of significance set for testing the obtained t-values were not determined apriori and were kept open. The following analysis of mean differences were carried out.

4.1.1 Analysis of mean differences between pre-ETV and post-ETV scores in science for boys.

4.1.2 Analysis of mean differences between pre-ETV and post-ETV scores in social studies for boys.

4.1.3 Analysis of mean differences between pre-ETV and post-ETV scores in science for girls.

4.1.4 Analysis of mean differences between pre-ETV and post-ETV scores in social studies for girls.

4.1.5 Analysis of mean differences between pre-ETV scores of boys and girls in science.

4.1.6 Analysis of mean differences between pre-ETV scores of boys and girls in social studies.

4.1.7 Analysis of mean differences between post-ETV scores of boys and girls in science.

4.1.8 Analysis of mean differences between post-ETV scores of boys and girls in social studies.

4.1.9 Analysis of mean differences between communication efficacy scores of boys and girls in science.

4.1.10 Analysis of mean differences between communication efficacy scores of boys and girls in social studies.

4.1.11 Analysis of mean differences between ratings of boys and girls on classroom environment in science.

4.1.12 Analysis of mean differences between ratings of boys and girls on classroom environment in social studies.

4.1.13 Analysis of mean differences between ratings on communication efficacy scale for science and social studies.

4.1.14 Analysis of mean differences between ratings on classroom environment inventory for science and social studies.

4.1.15 Analysis of mean differences between pre-ETV scores of group one (TV) and group two (NO TV) in science.

4.1.16 Analysis of mean differences between post-ETV scores of group one (TV) and group two (NO TV) in science.

4.1.17 Analysis of mean differences between pre-ETV scores of group one (TV) and group two (NO TV) in social studies.

4.1.18 Analysis of mean differences between post-ETV scores of group one (TV) and group two (NO TV) in social studies.

4.1.19 Analysis of mean differences in communication efficacy scores of group one (TV) and group two (NO TV) in science.

4.1.20 Analysis of mean differences between ratings of group one (TV) and group two (NO TV) on communication efficacy in social studies.

4.1.21 Analysis of mean differences in classroom environment scores of group one (TV) and group two (NO TV) on classroom environment in science.

4.1.22 Analysis of mean differences between the ratings of group one (TV) and group two (NO TV) on classroom environment in social studies.

4.1.1 Mean differences Between Pre_ETV and Post_ETV Scores in Science for Boys.

Results of t_test analysis and other related statistics are included in Table_5.

TABLE - 5

Mean Differences Between Pre_ETV and Post_ETV Scores in Science for Boys

Statistics Type	Pre_ETV Scores	Post_ETV Scores
Sample Size	110	110
Mean	12.87	14.82
SD	3.34	2.55
SD_x	0.35	
Minimum value	5.50	9.00
Maximum value	22.00	21.50
Tolerance of Range (0.10 0.05)	0.32	0.3[illegible]
Obtained t_value = 5.71 P 0.05		

Results revealed that over a sample of 110 boys, the mean Pre_ETV and Post_ETV scores were 12.87 and 14.82 respectively. The standard deviations were 3.34 and 2.55 respectively. The mean Post_ETV score was 1.95 greater than the mean Pre_ETV score.

The correlation coefficient between Pre-ETV scores was 0.79. The standard error of mean difference was 0.35.

The minimum values for Pre-ETV and Post-ETV scores were 5.50 and 9.00 respectively. The maximum values were 22.00 and 21.50 respectively. The minimum value of Post-ETV score was 3.50 points higher than the Pre-ETV score, whereas the maximum value was less than even one point.

The tolerance of range was 0.32. Entering into the t-table with 109 df, the t-value at 0.05 level was 1.98. The obtained t-value of 5.71 was significant above 5 per cent.

This indicate that differences between the mean Pre-ETV & Post-ETV scores of boys in science was significant.

4.1.2 Mean Differences Between Pre-ETV and Post-ETV Scores in Social Studies for Boys.

Results of t-test analysis and other related statistics are included in Table-6.

TABLE - 6
Mean Difference Between Pre-ETV and Post-ETV Scores in Social Studies for Boys

Statistics Type	Pre-ETV Scores	Post-ETV Scores
Sample size	110	110
Mean	13.73	15.73
SD	2.59	2.09
SD_x	0.21	
Minimum value	7.00	9.00
Maximum value	19.00	20.00
Tolerance of Range (α 0.10 α 0.05)	0.32	0.32
Obtained t-value = 9.52	P 0.05	

The mean Pre-ETV and Post-ETV scores of boys in social studies were 13.73 and 15.73 respectively. The standard deviations were 2.59 and 2.09 respectively. The mean Post-ETV score was 2 points higher than the mean Pre-ETV score. The difference between Pre-ETV and Post-ETV score was less than one point.

The correlation coefficient between the Pre-ETV and Post-ETV scores in social studies was 0.48. The standard error of mean differences was 0.21.

The minimum Pre-ETV and Post-ETV scores were 7.00 and 9.00 respectively. The maximum values were 19.00 and 20.00. The maximum vlaue of Post-ETV scores was one point higher and the minimum value was 2 point higher than Pre-ETV scores. Tolerance of range was 0,32.

The obtained t-value 9,52 was significant at 0.05 level.

This indicated significant mean differences between the Pre-ETV and Post-ETV scores in social studies for boys.

4.1.3 Mean Differences Between Pre-ETV and Post-ETV Scores in Science for Girls.

Results of t-test analysis and related statistics are included in Table - 7.

TABLE - 7

Mean Differences Between Pre-ETV and Post-ETV Scores in Science for Girls.

Statistics Type	Pre-ERV Scores	Post-ETV Scores
Small size	110	110
Mean	11.39	12.89
SD	3.66	3.95
SD_x	0.44	
Minimum value	6.50	5.50
Maximum value	21.50	22.00
Tolerance of range (α0.10 α0.05)	0.32	0.32
Obtained t-value = 3.40	P < .10 P < .05	

The mean Pre-ETV and Post-ETV scores for 110 girls were 11.39 and 12.89 respectively. The mean Post-ETV score was one and half points higher. The standard deviations were 3.66 and 3.95 respectively. It indicated less variance between Pre-ETV and Post-ETV scores in science.

The correlation coefficient Pre-ETV and Post-ETV scores was 0.79. The standard error of mean differences was 0.44.

The maximum values of Pre-ETV scores were 21.50 and 22.00 respectively. The mimimum values were 6.50 and 5.50 respectively. The minimum value of Post-ETV score was one point lower whereas the maximum value was 0.5 higher. The tolerance of range was 0.32.

The obtained t-value 3.40 was significant at 0.05 level.

4.1.4 Mean Differences Between Pre-ETV and Post-ETV Scores in Social Studies for Girls.

Results of t-test analysis and other related statistics are included in Table - 8.

TABLE - 8
Mean Differences Between Pre-ETV and Post-ETV Scores in Social Studies for Girls

Statistics Type	Pre-ETV Scores	Post-ETV Scores
Sample size	110	110
Mean	13.25	14.49
SD	2.93	2.91
SD_x	0.31	
Minimum value	7.00	9.00
Maximum value	20.00	21.00
Tolerance of Range (α 0.10 α 0.05)	0.32	0.32
Obtained t-value = 4.13	P $<$ .05	

The mean Pre-ETV and Post-ETV scores for girls were 13.25 and 14.49 respectively. The standard deviations were 2.93 and 2.91 respectively. The difference between the two mean scores was 1.24.

The correlation coefficient between Pre-ETV and Post-ETV scores was 0.60. The standard error of mean differences was 0.31.

The obtained minimum values of Pre-ETV and Post-ETV scores were 7.00 and 9.00 respectively. The maximum values were 20.00 and 21.00 respectively. The minimum value of Pre-ETV scores was 3 points lower and the maximum value of Post-ETV was one point higher. The tolerance of range was 0.32.

The obtained t-value of 4.13 was significant at 0.05 level.

4.1.5 Mean Differences in Pre_ETV Scores of Boys and Girls in Science.

Results of t_test analysis and other related statistics are included in Table - 9.

TABLE - 9

Mean Differences in Pre_ETV Scores of Boys and Girls in Science

Statistics Type	Boys	Girls
Sample size	110	110
Mean	12.87	11.39
SD	3.34	3.66
SD_x	0.40	
Minimum value	5.50	6.50
Maximum value	22.00	21.50
Tolerance of Range (α 0.10 α 0.05)	0.32	0.32
Obtained t_value is = 3.7	P $<$ .05	

The calculated means of Pre_ETV scores in science for boys and girls were 12.87 and 11.39 respectively. The standard deviations were 3.34 and 3.66 respectively. The difference between the means was 1.48. The variance was almost the same in Pre_ETV scores for boys and girls.

Standard error of mean difference was 0.40.

The minimum value of Pre-ETV scores in science for boys was one point less (5.50) than of girls (6.50). The maximum values were 22.00 for boys and 21.50 for girls. Tolerance of range was 0.32.

The obtained t-value 3.7 (P 0.05) implied a significant differences between the mean Pre-ETV scores of boys and girls in science.

4.1.6 Mean Differences Between Pre-ETV Scores of Boys and Girls in Social Studies.

Results of t-test analysis and other related statistics are included in Table-10.

TABLE - 10

Mean Differences Between Pre-ETV Scores of Boys and Girls in Social Studies

Statistics Type	Boys	Girls
Sample size	110	110
Mean	13.75	13.25
SD	2.59	2.93
SD_x	0.31	
Minimum value	7.00	7.00
Maximum value	19.00	20.00
Tolerance of range (α 0.10 α 0.05)	0.32	0.32
Obtained t-value is = 1.55	P $>$ .10 P $>$ .5	

The maximum value of Pre-ETV scores was 19.00 for boys and 20.00 for girls. Thus only there was a difference of one point. The minimum value was 7.00 in both the cases.

Tolerance of range was 0.32.

With 218df the obtained t-value 1.55 was not significant.

The implication of this non-significance was that the Pre-ETV scores in social studies for boys and girls did equally well.

4.1.7 Mean Differences Between Post-ETV Scores of Boys and Girls in Science.

Results of t-test analysis and other related statistics are included in Table-11.

TABLE - 11

Mean Differences in Post-ETV Scores of Boys and Girls in Science

Statistics Type	Boys	Girls
Sample size	110	110
Mean	14.82	12.89
SD	2.55	3.95
SD_x	0.41	
Minimum value	9.00	5.00
Maximum value	21.50	22.00
Tolerance of Range (α 0.10 α 0.05)	0.32	0.32
Obtained t-value is = 4.71	$P < .05$	

The mean Post-ETV score of boys was 14.82 and 12.89 for girls. The mean score of girls was 1.93 less than that of boys. The standard deviations were 2.55 and 3.95 respectively.

The standard error of mean difference was 0.41.

There was a difference of four points between the Post-ETV scores of boys 9.00 and girls 5.00 in science. The maximum scores for boys and girls were 21.50 and 22.00 respectively.

Tolerance of range was 0.32.

The calculated t-value 4.71 was significant at 0.05 level. This implied the existence of differences between Post-ETV scores of boys and girls in science.

4.1.8 Mean Differences Between Post-ETV Scores of Boys and Girls in Social Studies.

Results of t-test analysis and other related statistics are included in Table-12.

TABLE - 12
Mean Differences Between Post-ETV Scores of Boys and Girls in Social Studies.

Statistics Type	Boys	Girls
Sample size	110	110
Mean	15.73	14.49
SD	2.09	2.91
SD_x	0.30	
Minimum value	9.00	9.00
Maximum value	20.00	21.00
Tolerance of range (α 0.10 α 0.05)	0.32	0.32
Obtained t-value is = 4.13	P 0.10 P 0.05	

The mean Post-ETV scores for 110 boys and 110 girls were 15.73 and 14.49 respectively. The standard deviations were 2.09 and 2.91 respectively. There was also one point difference in mean scores and less than one point in standard deviations.

The standard error of mean difference was 0.30.

To obtained minimum value was 9.00 in both the cases and thus no difference, whereas the maximum value for girls (21.00) was higher for boys (20.00).

Tolerance of range was 0.32.

The calculated t-value of 4.13 was significant at 0.05 level.

The conclusion to be drawn was that there existed a significant differences between the mean Post-ETV scores of boys and girls in social studies.

4.1.9 Mean Differences Between the Ratings of Boys and Girls on Communication Efficacy in Science.

Results of t-test analysis and other related statistics are included in Table - 13.

TABLE - 13

Mean Differences Between the Ratings of Boys and Girls on Communication Efficacy in Science

Statistics Type	Boys	Girls
Sample size	110	110
Mean	67.99	68.35
SD	8.29	7.51
SD_x	0.98	
Minimum value	54.00	36.00
Maximum value	88.00	84.00
Tolerance of range (α 1.0 α 0.05)		
Obtained t-value is = 0.36	P	0.10
	P	0.05

With a sample of 11 boys and 110 girls, the mean communication efficacy score of science were 67.99 and 68.35 respectively. The standard deviations for boys and girls were 8.29 and 7.51. There was less than one point difference in mean scores and standard deviations.

The standard error of mean difference was 0.98,

The minimum value for boys and girls were 54.00 and 36.00 respectively. The maximum values were 88.00 and 84.00. The minimum value for boys was 18 points more than girls whereas the maximum value was only 4 points higher.

Tolerance of range was 0.32.

The calculated t value was 0.36 which was non-significant.

This implied a zero difference between the means of communication efficacy scores of boys and girls in science.

4.1.10 Mean Differences Between Ratings of Boys and Girls on Communication Efficacy in Social Studies.

Results of t-test analysis and other related statistics are included in Table - 14.

TABLE - 14
Mean Difference Between Ratings of Boys and Girls on Communication Efficacy in Social Studies

Statistics Type	Boys	Girls
Sample size	110	110
Mean	67.20	64.61
SD	8.39	10.49
SD_x	0.80	
Minimum value	40.00	45.00
Maximum value	92.00	84.00
Tolerance of range (α0.10 α0.05	0.32	0.32
Obtained t-value is = 3.25	P	0.05

The calculated mean communication efficacy scores in social studies for boys and girls were 67.20 and 64.61 respectively. The mean score for boys was two points more than that of girls. The standard deviations for boys and girls were 8.39 and 10.49 respectively. The variance in communication efficacy scores of girls was greater than boys.

The computed standard error of mean difference was 0.8.

Boys (40.00) got 5 points less than girls (45.00) and minimum value of communication efficacy scores in social studies. The maximum values for boys and girls were 92.00 and 84.00 respectively. Girls scored 8 points less than boys.

The tolerance of range was 0.32.

The obtained t value of 3.25 was significant at 0.05 level.

This showed that there was a significant difference between the means of communication efficacy scores of boys and girls in social studies.

4.1.11 Mean Differences Between Ratings of Boys and Girls on Classroom Environment in Science

Results of t test analysis and other related statistics are included in Table - 15.

TABLE - 15
Mean Difference Between Ratings of Boys and Girls on Classroom Environment in Science

Statistics Type	Boys	Girls
Sample size	110	110
Mean	59.58	56.25
SD	4.16	3.75
SD_x	0.43	
Minimum value	47.00	46.00
Maximum value	68.00	69.00
Tolerance of range (α 0.10 α0.05)	0.32	0.32
Obtained value of t = 7.74	P	0.05

The calculated mean classroom environment scores for boys and girls in science were 59.58 and 56.25 respectively. The mean score for boys was 3 points higher than girls. The standard deviations were 4.16 and 3.75 respectively. The variance was almost the same in both the cases.

The standard error of mean difference was 0.43.

The obtained maximum values for boys and girls were 68.00 and 69.00 respectively. The minimum values were 47.00 for boys and 46.00 for girls. There was one point difference in the minimum value as well in the maximum value for boys and girls.

Tolerance of range was 0.32.

The calculated t value of 7.74 was significant at 0.05 level.

This implied that the mean classroom environment scores of boys and girls in science was different.

4.1.12 Mean Differences Between Ratings of Boys and Girls on Classroom Environment in Social Studies.

Results of t-tests analysis and other related statistics are included in Table-16

TABLE - 16

Mean Differences Between Rations of Boys and Girls on Classroom Environment in Social studies

Statistics type	Boys	Girls
Sample size	110	110
Mean	60.16	55.55
SD	3.69	3.40
SD_x	0.38	
Minimum value	50.00	47.00
Maximum value	67.00	63.00
Tolerance of Range (α 0.05 α0.10)	0.32	0.32
Obtained t-value = 3.25	P $<$ .10 P $<$ .05	

The mean classroom environment score for boys was 60.16 and 55.55 for girls. The standard deviations for boys and girls were 3.69 and 3.40 respectively. The mean score for girls was five points less than that of boys.

The standard error of mean difference was 0.38.

The maximum value of classroom environment score for boys was 50.00 and 47.00 for girls. Thus, girls scored 3 points less than boys. The maximum value was 67.00 and 63.00 respectively. Hence boys scored 4 points higher than girls. The range of scores for boys and girls was comparable though.

Tolerance of range was 0.32.

The computed value of 3.25 was significant at 0.05 level.

The implication of this was that the mean difference in classroom environment scores in social studies was significant for boys and girls.

4.1.13 Mean Differences in Ratings of Communication Efficacy Scale for Science and Social Studies.

Results of t-test analysis and other related statistics are included in Table-17.

TABLE - 17

Mean Differences in Ratings of Communication Efficacy Scale for Science and Social Studies

Statistics type	Science	Social studies
Sample size	220	220
Mean	136.34	131.81
SD	15.8	18.88
SD_x	1.67	
Minimum value	36.00	40.00
Maximum value	88.00	92.00
Tolerance of Range (α 0.10 α0.05)	0.32	0.32
Obtained t-value is = 1.67	P $>$.05	

The boys and girls together had computed mean communication efficacy scores in science and social studies as 136.34 and 131.81 respectively. The mean score in social studies was 5 points less than the mean score in science. The standard deviations were 15.8 and 18.88 respectively. The variance in science

was 3 points less.

The standard error of mean difference was 1.67.

The minimum scores in science and social studies were 36.00 and 40.00 respectively. The maximum scores were 88.00 and 92.00 respectively. The minimum and maximum values of communication efficacy scores were 4 points more in case of social studies. This implied that more students in science clustered around mean scores.

Tolerance of range was 0.32.

The obtained t-value of 1.67 was not significant at 0.05 level. Evidently the communication was perceived only slightly more clear in social studies.

4.1.14 Mean Differences Between Ratings on Classroom Environment Inventory in Science and Social Studies.

Results of t-test analysis and other related statistics are included in Table-18.

TABLE - 18

Mean Differences Between Ratings on Classroom Environment Inventory in Science and Social Studies.

Statistics type	Science	Social Studies
Sample size	220	220
Mean	115.83	115.71
SD	7.91	7.09
SD_x	0.74	
Minimum value	46.00	47.00
Maximum value	69.00	67.00
Tolerance of Range (α0.10 α0.05)	0.32	0.32
Obtained t-value = 0.16	P >.10 P >.05	

The standard error of mean difference was 0.74.

The minimum values of classroom environment scores was 46.00 in science and 47.00 in social studies. Only one point difference existed between the science and social studies. The maximum values were 69.00 and 67.00 respectively. The difference was in favour of science.

Tolerance of range was 0.32.

Obtained t-value 0.16 was not significant either.

This implied no or zero differences in classroom environment scores between the means of science and social studies. The mean classroom environment scores obtained in science was not different than in social studies.

4.1.15 Mean Differences Between Pre-ETV Scores of Group I (TV) and Group II (NoTV) in Science.

Results of t-test analysis and other related statistics are included in Table-19.

TABLE - 19

Mean Differences Between Pre-ETV Scores of Group I (TV) and Group II (NoTV) in Science

Statistic type	Gr.I	Gr.II
Sample size	157	63
Mean	12.71	12.42
SD	3.48	3.59
SD_x	0.53	
Minimum value	9.00	5.50
Maximum value	22.00	21.50
Tolerance of Range (α 0.10 α 0.05)	0.32	0.32
Obtained t-value = 0.55	P $>$.05	

The mean score for those having TV at home, (N=157) was 12.71 against those who did not have TV at home (N=63) and score 12.42. The standard deviations were 3.48 and 3.59 respectively. The difference in each case was less than one point.

The standard error of mean difference was 0.53.

The minimum value of Pre_ETV scores in case of those having TV was 9.00 against those who did not have TV and scored 5.50. The maximum values were 22.00 and 21.50 respectively. Those who did not have TV scored 3 points lesser than those having TV.

Tolerance of range was 0.32.

Obtained t_value of 0.55 was not significant. The implication of this was that the mean Pre_ETV scores of those two groups in relation to science were not different.

4.1.16 Mean Differences Between Post-ETV Scores of Group I(TV) and Group II (NoTV) in Science.

Results of t-test analysis and other related statistics are included in Table-20.

TABLE - 20

Mean Differences Between Post-ETV Scores of Group I (TV) and Group II (NoTV) in Science.

Statistics type	Gr.I	Gr.II
Sample size	157	63
Mean	13.98	14.69
SD	3.76	3.85
SD_x	0.57	
Minimum value	9.00	7.00
Maximum value	19.00	20.00
Tolerance of Range ($\sim$0.10 $\sim$0.05)	0.32	0.32
Obtained t-value = 1.25	P $>$.05	

The mean Post-ETV scores in science for who have TV and those who did not have TV 13.98 and 14.69 respectively. The standard deviations were 3.76 and 3.85 respectively. There was less than one point difference in each case.

The standard error of mean difference was 0.32.

The minimum values of Post_ETV scores in science for Gr.I and Gr.II was 9.00 and 7.00 respectively. The maximum values were 19.00 and 20.00

Tolerance of range was 0.32.

Obtained t_value of 1.25 was not significant.

This implied no difference in mean Post_ETV scores between Group I and Group II in relation to science. This also meant that TV lessons did not require any specific training or habit to understand the same.

4.1.17 Mean Differences Between Pre-ETV Scores of Group I(TV) and Group II (NoTV) in Social Studies.

Results of t-test analysis and other related statistics are included in Table-21.

TABLE - 21

Mean Difference Between Pre-ETV Scores of Group I (TV) and Group II (NoTV) in Social Studies.

Statistics	Gr.I	Gr.II
Sample size	157	63
Mean	13.75	13.52
SD	2.95	3.24
SD_x	0.48	
Minimum value	6.50	6.00
Maximum value	22.00	20.00
Tolerance of Range (α0.10 α0.05)	0.32	0.32
t-value 0.48	$P > .05$	

The mean Pre-ETV score for those who had TV at home was 13.75 and 13.52 for those who did not have. The standard deviations were 2.95 and 3.24 respectively. In each case the difference was less than one point.

Standard error of mean difference was 0.48.

The minimum value of Pre_ETV scores in social studies for TV groups 6.50 and for (NoTV) group was 6.00. The maximum value for TV group was 22.00 and 20.00 for (NoTV) group.

Tolerance of range was 0.32.

Obtained t_value of 0.48 was not significant.

The implication of this was no difference between Pre_ETV scores of TV group and NoTV groups in social studies.

4.1.18 Mean Differences Between Post-ETV Scores of Group I (TV) and Group II (NoTV) in Social Studies.

Results of t-test analysis and other related statistics are included in Table-22

TABLE - 22

Mean Differences Between Post-ETV Scores of Group I(TV) and Group II (NoTV) in Social Studies

Statistics	Gr.I	Gr.II
Sample size	157	63
Mean	15.30	15.25
SD	3.37	3.87
SD_x	0.30	
Minimum value	7.00	9.00
Maximum value	21.00	19.00
Tolerance of Range (α0.10 α0.05)	0.32	0.32
Obtained t-value =0.17	P $>$.05	

The mean Post-ETV score for group I(TV) was 15.30 and for group II (No TV) it was 15.25. The standard deviations were 3.37 and 3.87 respectively. Differences in the two means and two standard deviations were of less than one point each.

Standard error of mean difference was 0.30

The minimum values of Post-ETV scores were 7.00 and 9.00 respectively. The maximum values were 21.00 and 19.00 respectively. The minimum value of group II was 2 points more and the maximum value was 2 points less than that of group I.

Tolerance of range was 0.32.

As the calculated t-value 0.17 was much lower and it was not significant at 0.05 level.

The implication of this was no differences in mean Post-ETV scores between group I and group II in relation to social studies.

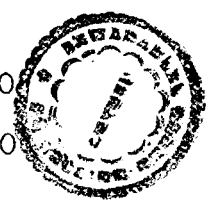
4.1.19 Mean Differences in Communication Efficacy Scores of Group I (TV) and Group II (No TV) in Science.

Results of t-test analysis and other related statistics are included in Table-23.

TABLE - 23

Mean Differences in Communication Efficacy Scores of Group I (TV) and Group II (NoTV) in Science.

Statistics	Gr.I	Gr.II
Sample size	157	63
Mean	65.71	69.63
SD	8.31	6.35
SD_x	1.03	
Minimum value	36.00	45.00
Maximum value	88.00	84.00
Tolerance Range (α0.10 α0.05)	0.32	0.32
Obtained t-value = 3.80	P < .05	



The mean communication efficacy scores for group I (N = 157) was 65.71 and for Group II (N=63), it was 69.63. Thus a difference of 4 points was in favour of group II (No TV). The standard deviations for group I and group II were 31 and 6.35 respecitely.

SD of group I was almost 2 points higher. The variance was greater in group I.

The standard error of mean difference was 1.03.

The minimum value on communication efficacy score was 36.00 for group I and it was 45.00 for group II in science. The maximum values were 88.00 and 84.00 respectively. The minimum value of group II was 9 points higher and the maximum value was 4 points less than that of group I.

Tolerance of range was 0.32.

The calculated value of t-analysis was 3.80 and it was significant at 0.05 level.

This implied a significant difference in the mean communication efficacy score between group I and group II in science. The range of scores was narrower in case of those who did not have TV.

4.1.20 Mean Differences Between Ratings of Group I (TV) and Group II (No TV) on Communication Efficacy in Social Studies.

Results of t-test analysis and other related statistics are included in Table-24.

TABLE - 24

Mean Differences Between Ratings of Group I(TV) and Group II (No TV) on Communication Efficacy in Social Studies.

Statistics type	Group I	Group II
Sample size	157	63
Mean	65.17	62.11
SD	8.49	8.21
SD_x	1.52	
Minimum value	40.00	45.00
Maximum value	92.00	87.00
Tolerance of Range (α 0.10 α 0.05)	0.32	0.32
Obtained t-value = 2.02	P $<$.05	

The mean communication efficacy score for group I (TV) was 65.17 and for group II (No TV) 62.11 in relation to social studies. Thus a difference of 3 points was in favour of group I. The standard deviations were 8,49 and 8.21 respectively.

The standard error of mean difference was 1.52.

The minimum values of communication efficacy scores were 40.00 and 45.00. The maximum values for group I and group II were 92.00 and 87.00 respectively. Group II scored 5 points higher in relation to the minimum value whereas the maximum value was 5 points lower than that of group I.

Tolerance of range was 0.32.

The calculated t values of 2.02 was significant at 0.05 level.

The implication of this was the presence of a significant differences in the mean communication efficacy score of group I and group II in social studies. The scores of those who did not have TV were in a narrower range.

4.1.21 Mean Difference in Classroom Enrironment Scores of Group I (TV) and Group II (No TV) in Science.

Results of t-test analysis and other related statistics are included in Table-25.

TABLE - 25

Mean Differences in Classroom Environment Scores of Group I (TV) and Group II (No TV) in Science.

Statistics type	Group I	Group II
Sample size	157	63
Mean	54.76	58.07
SD	5.24	4.60
SD_x	0.72	
Minimum value	46.00	47.00
Maximum value	68.00	69.00
Tolerance of Range (α 0.05)	0.32	0.32
Obtained t-value = 4.59	P $<$ .05	

The mean classroom environment scores in social studies for group I and group II were 54.76 and 58.07 respectively. The standard deviations were 5.24 and 4.60 respectively. The mean score of group II was 3 points higher than group I.

The standard error of mean difference was 0.72.

The minimum classroom environment score earned by group I was one point less (that was 46.00) than that of group II (47.00). Whereas the maximum score of group II (69.00) was one point higher than that of group I (68.00).

Tolerance of range was 0.32.

The computed t-value 4.59 was significant at 0.05 level.

This implied the existence of significant differences in classroom environment scores between group I (TV) and group II No TV) in relation to science. The two means were thus different.

4.1.22 Mean Differences Between Ratings of Group I (TV) and Group II (No TV) on Classroom Environment in Social Studies .

Results of t-test analysis and other related statistics are included in Table-26.

TABLE - 26

Mean Differences Between Ratings of Group I (TV) and Group II (No TV) on Classroom Environment in Social Studies.

Statistics type	Group I	Group II
Sample size	157	63
Mean	58.41	57.30
SD	3.51	3.27
SD_x	0.50	
Minimul value	49.00	47.00
Maximum value	67.00	66.00
Tolerance of Range (α0.05)	0.32	0.32
Obtained t-value = 2.22	$P < .05$	

The obtained mean classroom environment scores in social studies for the two groups were 58.41 and 57.30 respectively. The mean score of those having TV was only one point difference. The standard deviations for group I and group II were 3.51 and 3.27 respectively.

The standard error of mean difference was 0.50.

The minimum value of classroom environment scores for group I (49.00) was two points higher than that of group II (47.00). The maximum value scored by group I (67.00) was one point higher that of group II (66.00).

Tolerance of range was 0.32.

It was found that the obtained t-value 2.22 was significant at 0.05 level.

There existed a significant differences in the mean classroom environment scores between group I (TV) and group II (No TV) in social studies.

4.2 Correlation Analyses

The correlation analyses were done to find out the relationships among different variables. For the present study the following correlations were considered meaningful.

i. The correlation between Pre_ETV and Post_ETV scores in science.

ii. The correlation between Pre_ETV and Post_ETV scores in social studies.

iii. The correlation between Post_ETV scores in science and communication efficacy scores in science.

iv. The correlation between Post_ETV scores in social studies and communication efficacy scores in social studies.

v. The correlation between communication efficacy scores in science and social studies.

vi. The correlation between classroom environment scores in science and social studies.

vii. The correlation between Post_ETV scores in science and classroom environment scores in science.

viii. The correlation between Post_ETV scores in social studies and classroom environment scores in social studies.

ix. The correlation between communication efficacy scores in science and classroom enrironment scores in science.

x. The correlation between communication efficacy scores in social studies and classroom environment scores in social studies.

4.2.1 Correlations for Boys

The correlations among different variables calculated over the sample of boys are included in Table-27.

TABLE - 27

Correlation Matrix for Boys

Variables	1	2	3	4	5	6	7	8	9	10
1. Pre-ETV Scores in Science	1.00									
2. Post-ETV Scores in Science	.79	1.00								
3. Pre-ETV Scores in Social Studies	.11	.03	1.00							
4. Post-ETV Scores in Social Studies	.02	.13	.48	1.00						
5. TV (Yes/NO)	.00	-.13	.05	-.09	1.00					
6. SES	.09	.04	.01	-.16	.12	1.00				
7. Communication Efficacy Scores in Science	-.14	-.11	-,12	-.05	-.18	-.06	1.00			
8. Communication Efficacy Scores in Social Studies	-.09	-.04	-.07	-.11	-.10	.14	.62	1.00		
9. Classroom Environment Scores in Science	-.18	-.15	-.01	.10	.16	.15	.05	.04	1.00	
10. Classroom Environment Scores in Social Studies	.10	.06	.02	.08	.06	-.11	.06	.10	.09	1.00

The correlation matrix for boys showed the following meaningful correlations :

The correlation between Pre_ETV and Post_ETV scores in science was 0.79 ($P < .05$). This indicated consistency in Pre_ETV and Post_ETV scores in science. In other words students' performance in science between pre and post testing was consistant.

The correlation between Pre_ETV and Post_ETV scores in socials studies was 0.48 ($P < .05$). This implied a moderately high association between Pre_ETV and Post_ETV scores in social studies. Student's performance between pre and post_testing period was farily consistant.

The correlation between Post_ETV scores in science and communication efficacy scores in science was -0.11 ($P > .05$). The relation between Post_ETV and communication efficacy scores in science was low and negative. This correlation was more or less meaningless.

The correlation between Post_ETV scores in social studies and communication efficacy scores in social studies was -0,11 ($P > .05$). It was not significant. This indicated a very weak and negative correlation between Post_ETV and communication

efficacy scores in social studies.

The correlation between communication efficacy scores in science and social studies was 0.62 ($P < .05$). It was significant at 0.05 pevel. This indicated a moderately high positive relations between the communication efficacy score in science and social studies . This implied that subject contents were communicated equally well and effic- tively by ETV.

The correlation between classroom environment scores in science and social studies was 0.09 ($P > .05$). It was not significant. The classroom environment in science and social studies was not related, indicating that students did not find the environ- mental conditions of using TV in these subjects equally favourable.

The correlation between Post-ETV scores in science and classroom environment scores in science was $-.15$ ($P > .05$). It was not significant. The association between the variables was very weak and negative. It appeared that students did not find the classroom conditions conducive to their performance in science after using ETV.

The correlation between Post-ETV scores in social studies and classroom environment in social studies

was 0.08 ($P > .05$). It was not significant. The association was very low. In social studies students found the classroom conditions for learning via ETV Programmes only somewhat helpful.

The correlation between communication efficacy scores in science and classroom environment scores in science was .05 ($P > .05$). The correlation value was not significant. The association was low implying that students did not see classroom conditions very necessary to communicating well the contents of science.

The correlation between communication efficacy scores in social studies and classroom environment scores in social studies was .10 ($P > .05$). The r value was not significant. It indicated a very low relationship indicating that students did not see classroom environment conducive for good communication of the subject contents.

4.2.2 Correlations for Girls.

The correlations among different variables calculated for girls are included in Table-28

TABLE - 28

Corrleation Matrix for Girls

Variables	1	2	3	4	5	6	7	8	9	10
1. Pre-ETV Scores in Science	1.00									
2. Post-ETV Scores in Science	.76	1.00								
3. Pre-ETV-Scores in Social Studies	.14	.11	1.00							
4. Post-ETV Scores in Social Studies	.08	.10	.60	1.00						
5. TV (Yes/NO)	.01	-.10	-.14	.04	1.00					
6. SES	-.31	-.26	-.07	.06	.13	1.00				
7. Communication Efficiency Scores in Science	-.00	.11	.06	.06	-.24	-.09	1.00			
8. Communication Efficiency Scores in Social Studies	-.35	-.42	-..08	-.06	.16	.28	-.17	1.00		
9. Classroom Environment Scores in Science	-.13	-.05	-.10	.03	-.18	.26	.19	-.01	1.00	
10. Classroom Environment Scores in Social Studies	.28	-.27	-.20	-.15	-.15	.15	-.10	.32	.24	1.00

The correlation matrix for girls showed the following meaningful correlations.

The correlation between pre-ETV and post-ETV scores in science was .76 ($P < .05$). It was significant at .05 level. This indicated a strong positive association between the pre-ETV and post-ETV scores.

Students' performances were consistent in science suggesting that in use of ETV was not really meaningful. The correlation between pre-ETV and post-ETV scores in social studies was .60 ($P < .05$). The r value was highly significant at .05 level. This indicated a positive and moderately high association between pre-ETV and post-ETV scores in social studies. Students' performance in social studies was not much influenced by the use of ETV.

The correlation between post-ETV scores in science and communication efficacy scores in science was .11 ($P > .05$). The r value was not significant at .05 level. This showed that the use of ETV did not significantly improve the communication of science contents to students.

The correlation between post-ETV scores in social studies and communication efficacy scores in social studies was -.06 ($P > .05$). The r value was not significant. This indicated that the use of ETV may interfere with the communication efficacy in social studies.

The correlation between communication efficacy scores in science and social studies was -.17 ($P > .05$) The r value was not significant. This implied that the communication efficacy of contents in science and social studies were differently affected by the use of ETV.

The correlation between classroom environment scores in science and social studies was .24 ($P < .05$). This indicated the significance of r value at .05 level. The classroom environment scores in science and social studies were not much different from each other.

The correlation between post-ETV scores in science and classroom environment scores in science was -.05 ($P > .05$). The r value was not at all significant indicating that the use of ETV did not improve the perceptions of classroom environment much.

The correlation between post-ETV and classroom environment scores in social studies was -.15 ($P > .05$). The r value was not significant. This indicated that the use of ETV affected the quality of classroom environment for social studies negatively.

The correlation between communication efficacy and classroom environment scores in science was .19 ($P < .05$). This indicated the possibility of improving classroom environment scores in science, if the communication could be improved.

The correlation between communication efficacy and classroom environment scores in social studies was .32 ($P < .05$). The r value was significant at .05 level. The better communication of ETV programme improved the perceptions of classroom environment in social studies by girls.

4.3 Multiple Regression Analyses

In order to test the hypotheses set for predicting students' performance in science and social studies using communication efficacy and classroom environment scores on the same subjects, multiple regression analyses were carried out on the obtained data.

The post-ETV scores in science was employed as the regressand and communication efficacy scores and classroom environment scores in science were fixed as regressors. In a similar vein, the post-ETV scores on social studies was employed as the regressand. Communication efficacy and classroom environment scores in social studies were served as regressors. The following multiple regression analyses were computed.

4.3.1 Multiple Regression Analysis for Boys in Science

Results of multiple regression analysis and other related statistics are included in Table-29.

TABLE - 29

Multiple Regression Analysis for Boys in Science

X_1 Dependent Variable : Post-ETV Scores in Science					
IV X_2X_3	Multiple Correlation	Regression Coefficient	Standard Error of Reg.Coef.	F Value	P
Comm.Eff. Scores in Science	.18	-.03	.03	1.81	S
Classroom Envt.Scores in Science	.15	-.09	.06	2.31	S

The dependent variable (X_1) or the predictand employed was post-ETV scores in science. The independent variables or predictors employed were communication efficacy scores (X_2) and classroom environment scores (X_3) in science.

Multiple correlation for communication efficacy and classroom environment scores in science were .18 and .15 respectively. The regression coefficients were -.03 and -.09 respectively. The standard error of regression coefficient for X_2 and X_3 was .03 and .06. The obtained F-value 1.81 ($P < .05$) and 2.31 ($P < .05$) indicated that the variances in the population from which the samples are drawn are unequal. The difference hypothesis accepted against null hypothesis.

4.3.2 Multiple Regression Analysis for Girls in Science

Results of multiple regression analysis and related statistics are included in Table-30.

TABLE - 30

Multiple Regression Analysis for Girls in General Science

X_1 : Dependent variable ; Post-ETV Scores in Science					
IV X_2X_3	Multiple Correlation	Regression Coefficient	Standard Error of Reg.Coef.	F-Value	P
Comm. Eff. Scores in Science	.11	.06	.05	1.21	NS
Classroom Envt.Scores in Science	.13	-.08	.10	.89	NS

The dependent variable (X_1) was the post-ETV scores in science. The independent variables employed were communication efficacy scores (X_2) and classroom environment scores (X_3) in science.

The multiple correlations for X_2 and X_3 was .11 and .13 respectively. Obtained regression coefficient and the standard error of regression coefficient for X_2 and X_3 were .06, -.08, and .05, .10 respectively. Both the F values 1.21 and .89, (X_3) and (X_2) were not significant at .05 level. This indicated that the variances in the population from which the samples are drawn are unequal.

4.3.3. Multiple Regression Analysis for Boys in Social Studies

Results of multiple regression analysis and other related statistics are included in Table-31.

TABLE - 31

Multiple Regression Analysis for Boys in Social Studies

X_1 : Dependent variable : Post-ETV Scores in Social Studies

Independent Variable X_2X_3	Multiple Correlation	Regression Coefficient	Stand. Error of Reg.Coef.	F.Value	P
Communication efficacy scores in Social Studies	.11	-.03	.02	1.37	S
Classroom Envt. Scores in Social Studies	.15	.05	.05	1.15	NS

The dependent variable (X_1) employed was the post-ETV Scores in Social Studies. The independent variables used for prediction were communication efficacy (X_2) and classroom environment Scores (X_3) respectively.

The computed multiple R's were .11 for X_2 and .15 for X_3. Regression coefficients were -.03 and .05 respectively. The standard error of regression coefficient were .02 and .05 respectively. F value obtained for communication Efficacy Scores was 1.37 ($P < .05$). This indicated the heteroscedasticity of variance whereas the obtained F value 1.15 ($P > .05$) for X_3 was not significant and thus, indicated the acceptance of null hypothesis against alternative hypothesis.

4.3.4 Multiple Regression Analysis for Girls in Social Studies

Results of multiple regression analysis and other related statistics are included in Table-32.

TABLE - 32

Multiple Regression Analysis for Girls in Social Studies

X_1 : Dependent Variable : Post-ETV Scores in Social Studies					
Independent Variable X_2X_3	Multiple Correlation	Regression Coefficient	Stand. Error of Reg.Coef.	F-Value	P
Communication Efficacy Scores in Social Studies	.15	-.12	.09	1.18	S
Classroom Envt.Scores in Social Studies	.15	-.01	.03	2.33	NS

The dependent variable or the predictand (X_1) was post-ETV scores in social studies. The independent variables employed for prediction purpose was communication efficacy scores (X_2) and classroom environment scores (X_3) respectively.

The multiple correlation value was .15 for X_2 as well as for X_3. Regression coefficient and standard error of regression coefficient for X_2 and X_3 were -.12, .09 and -.01, .03 respectively.

F-value for communication efficacy scores was 1.18 ($P > .05$). This indicated the non-significance of the obtained F value whereas the F value for X_3 (Classroom Environment Scores) 2.33 ($P < .05$) was significant at .05 level. It showed the acceptance of alternative hypothesis against null hypothesis.

CHAPTER - 5

DISCUSSION

The present chapter includes a discussion of the findings in this study. The discussion has been organised around the major hypotheses tested for the sake of clarity.

5.1 Significance of Mean Differences Between Pre-ETV and Post-ETV Scores

Hypotheses one and two test the significance of mean differences between pre-ETV and post-ETV scores in science and social studies for boys.

Hypotheses three and four test the significance of mean differences between pre-ETV and post-ETV scores in science and social studies for girls.

The results of mean differences (Table- 5 & 6, see page,८६,८१) show that the obtained t-values are significant. It indicates that post-ETV scores of boys in science and social studies are significantly different from their pre-ETV scores in the respective subjects.

Similarly, the results of mean differences (Table 7 & 8, see page,८५,९८) reveal the significance of computed t-values for girls. It indicates that the post-ETV scores

of girls in science and social studies are significantly higher than their pre-ETV scores in the respective subjects.

The consistently higher pre-ETV scores of boys and girls in science and social studies suggest that they do gain from their regular exposure to ETV programmes. ETV can play thus, a facilitating role in all school subjects. Students perceive it as a positive device. It is felt that intruction through ETV may be providing vicarious experiences to the students. Despite the fact that it does not leave the student an active doer, he/she learns. The whole perceptual field is found relevant in shaping the experience and behaviour of the observer.

It is observed that learning in the presence of ETV programme occurs in a relatively homogeneous symbolic environment. This should make a comparable impact on every learner exposed to ETV programme. It is considered plausible because the timing, pace and contents of teaching materials are more controlled and organized in ETV instructions than in 'live' instructions. Moreover, the concreteness of messages (concepts, figures, symbols) and the element of realism in the presentation ensure focus of attention on the TV screen for a longer time. The visual attention to specific, critical segments of a programme is found crucial for learning also by Lorch et al.(1979).

Further, instruction through ETV may help in heightening the level of student's motivation. It may stimulate their desire for gaining more information and ensure involvement in the learning process.

Holmes (1959); Mangal (1967); Swami (1967); Aghi (1977); Sambboornam (1980); Misra et al.(1983) have reported that ETV has significant influence on performance and learning behaviour of students who are exposed to ETV programmes regularly as against those who are not so exposed or not exposed at all.

5.2 Sex Differences in Pre-ETV and Post-ETV Scores

Hypotheses five and six test the significance of gender differences on pre-ETV scores in science and social studies separately.

The analysis of mean differences (Table-9, see page,93) on pre-ETV scores in science shows the significance of gender differences. In other words, boys and girls differed from each other in their pre-ETV scores in science.

The t-test analysis (Table-10, see page,95) of gender differences on pre-ETV scores in social studies shows that there are no significant differences between boys and girls in the learning of social studies.

Hypothesis seven tests the significance of gender differences in post-ETV scores in science.

Hypothesis eight tests the significance of gender differences in post-ETV scores in social studies.

The analyses of mean differences (Table 11 & 12, see page,९९,९९) indicate the presence of significant differences on post-ETV scores in science and social studies. In other words, boys and girls differed significantly from each other in their post-ETV scores in science and social studies.

The finding of significant sex differences in the learning of science at the pre-ETV as well as post-ETV stage is important. The same is true about sex differences in post-ETV scores in social studies. ETV does not help in eradicating the sex-bias in teaching. The findings indicate that differential reinforcements and verbal conditioning remain crucial. Reinforcements are basic ingredients that determine the strength of learning in a particular subject area. The rewards , penalties etc. which occur with or during untelevised or televised instructions directly influence student's attitude towards and performance in science and social studies.

Besides, verbal conditioning (generally, any conditioning in which verbal components are used as either

stimuli or responses and in turn, are reinforced) whether oral or audio-visual, leads to the development of sex-specific interests and attitudes. The reinforcements, student receive at home, among peer groups, in school/ classroom for holding sex-specific interest and atttitude, get stamped into their personality make up. This later on, contributes to differential performance in different academic (even non-academic) subjects. The use of TV is not able to nullify the difference. There is need for careful planning and monitoring of TV instruction.

The sex differences in the learning of science found here are consistent with the findings of the International Association for the Evaluation of Educational Achievement (IEA) Science Study (Comber and Keeves, 1973). This study revealed gender differences in favour of boys in science achievement in schools in 19 industrialised countries. Sex differences in science achievement were apparent as early as the upper primary school level and these differences increased at the secondary level.

However, the findings on sex-related differences in performance are inconsistent and debatable. It has been almost a normative practice to put forth either biogenic, sociogenic or psychogenic explanation or sometime even combination of all, to account for sex-related

variations in performance in different subject areas.

5.3 Sex Differences in Communication Efficacy Scores

Hypothesis nine tests the significance of gender differences in ratings of communication effectiveness of ETV programmes in science.

Hypothesis ten tests the significance of gender differences in ratings of communication effectiveness of ETV programmes in social studies.

The analysis of mean differences (Table 13, see page,101) reveals that boys do not differ significantly from girls in their ratings of communication effectiveness of ETV programmes in science.

The results of t-test analysis in social studies (Table-14, see page,103) however, reveal that there is significant differences between boys and girls in mean communication efficacy scores.

The clarity and the order of the materials presented on the TV screen, are important factors in promoting the communication effectiveness of ETV programmes in general. The efficacy of these factors could only be realised through meaningful messages. Student's perceptions of messages are reinforced by student-teacher interaction before, during and after the televised instructions. This happens perhaps,

with greater uniformity in science than in social studies.

5.4 Sex Differences in Classroom Environment Scores

Hypothesis eleven tests the significance of gender differences on the perception of classroom environment in science.

Hypothesis twelve tests the significance of gender differences on the perception of classroom environment in social studies.

The results of t-test analysis (Table 15 & 14, see page 105,107) reveal that there are significant differences between boys and girls on the perceptions of classroom environment in science and social studies.

The differential perception of classroom environment by boys and girls in science and social studies are conceived to be the result of interaction among a number of factors, namely, the external learning conditions, the personality characteristics of individual learner, and the institutionalized norms, values and culture. Moreover, student's social background factors are known to contribute to the differential perceptions of the learning environment.

The aforementioned factors have comulative effects on shaping the perceptions of classroom environment for boys' and girls'.

5.5 Subject-Related Differences in Communication Efficacy and Classroom Environment Scores

Hypothesis thirteen tests the significance of mean differences between science and social studies on communication efficacy scores.

The t-test analysis (Table - 17, see page,109) shows that there are significant differences. Students' ratings of the communication effectiveness of ETV programmes in science were different from their ratings on social studies.

The subject-wise differences in ratings of communication efficacy demonstrate that ETV is more efficacy prone in teaching some subjects than others. The use of immediate feedback by the teacher in teaching science inculcates in the student greater accuracy and confidence in learnt materials. On the contrary, in social studies the content is so abstract that the feedback may be delayed.

Hypothesis fourteen tests the significance of mean differences between science and social studies on perceptions of classroom environment.

The analysis of mean differences (Table-18, see page,111) shows the nonsignificance of differences between science and social studies on classroom environment scores.

The finding of nonsignificant differences on classroom environment scores in different subjects is in

direct contradiction to the finding of Walberg et al.(1969). They found a significant relationship between the perceptions of classroom environment and courses.

The teaching of different academic subjects is directed to achieve specific educational goals. These specific goals vary from one subject to the other. Teaching methods are said to be efficient if the specific goals are achieved and the desired changes are produced in learner's behaviour. The absence of significant differences here reveal either lack of clarity in specification or outlining of the specific goals (subject-wise) in the instructions or lack of student's genuine involvement in the learning of subjects.

5.6 Correlations among Ratings on Communication Effectiveness and Classroom Environment

The significance of relationships among ratings on communication effectiveness of ETV programmes in science and social studies and perceptions of classroom environment in science and social studies are tested separately for boys and girls.

Results of correlational analysis for boys (Table-27, see page 131) reveal that the communication efficacy scores in science and social studies are not significantly related to classroom environment scores in science and social studies. One implication of this may be that boys

do not perceive the classroom environment as a necessary condition for better communication effectiveness of ETV programme either in science or in social studies.

The results of correlational analysis for girls (Table 28, see page 135) indicate the significance of relationships among different variables. In other words, girls' perceptions of classroom environment are more positive and they find classroom environment necessary for better communication effectiveness of ETV programmes in science and social studies.

The differential perceptions of communication effectiveness and classroom environment by boys and girls may be the result of differentiations in institutionalized norms, values, culture, socialization processes and attitudinal factors. While girls attend to classroom environment boys do not. The later focus on ETV programme per se.

5.7 Predictability of Performance in Science and Social Studies.

Four hypotheses are formulated to test whether students' performance in science and social studies can be reliably predicted by using the perceptual scores on communication efficacy of ETV programmes and classroom environment.

The results of multiple regression analysis (Table-29,30,31 & 32, see page 139-42) do not reveal positive results.

The regression coefficients indicate the presence of substantial error.

The multiple correlation (R) by using communication effectiveness of post-ETV scores in science is higher in case of boys than girls (0.18 & 0.11 respectively). The multiple correlation (R) by using classroom environment of post-ETV scores in science and communication efficacy scores in science is also higher in case of boys than girls (0.15 & 0.13 respectively).

The multiple correlation (R) by using communication efficacy and post-ETV scores in social studies is higher for girls (0.15 for girls and 0.11 for boys). The multiple correlation (R) by using classroom environment of post-ETV scores and communication efficacy scores in social studies is comparable for both boys and girls (0.15 and 0.15 respectively).

The variations in the value of multiple R by using different predictors (as mentioned above) show that boys earn more differential scores in science and girls earn more in social studies.

The regression analyses show that student's performance can not be reliably predicted by using scores on

communication efficacy of ETV programmes and classroom environment in science and social studies.

5.8 Overview:

The above discussion indicates that exposure to ETV programmes results in higher post-ETV scores by boys and girls in science and social studies.

Another noted observation is that boys' ratings show very low relationships between communication efficacy of ETV programmes and classroom environment in science and social studies. Whereas, girls show moderate positive association between perceptions of communication effectiveness of ETV programmes and classroom environment in science and social studies.

While the positive relationships for boys as well as girls can be explained in terms of production factors, in case of girls audience and environmental factors assume importance.

The production factors include the rate of presentation, timing of presentation, quality of instruction, clarity of objectives, quality of resources used, selection and organization of materials etc.

The audience factors include the characteristics of students in terms of aspirations, motivation, abilities,

previous training, state of physical and mental health, social background, attitudes, interests etc.

The environmental factors include the institution of rewards and punishments; viewing condition, classroom climate; behaviour of classroom teacher; student-student cooperation; student-teacher cooperation and so on.

As expected, the success of ETV programmes in different subjects depend on the receptivity of the audience, the boys and girls under the study.

Agarwal and Chowdhury (1984) pre-tested the ETV programmes meant for children belonging to 6-11 age groups. They collected information from children and teachers on content load, comprehension of language/content, audiovisual quality etc. On the basis of information gathered, they suggested the following to the producers :

(i) content matter load should be in accordance with the level of mental development of the children;

(ii) programmes should be in simple Hindi, and English words should be avoided; and

(iii) speed of delivery of message should move from known to unknown.

Another consideration in the understanding of audience factors, as rightly pointed out by White (1983), is to study

the "nexus of mediating conditions" in which members of the audience decode messages, assign meaning to them out of the crucial of their own experiences. It is understood that communication transmits messages and not meanings. Meanings on the other hand, are attached to or inferred from the messages by the message-user (audience/receiver). The inference of meaning is determined by the selective nature of the perception. This enables the receiver to attend to some part and not to other, depending on his/her past experiences, interests and attitudes. This means that one's interests, past-experiences and attitudes are important in perceiving the messages and learning situations.

In an earlier study Allpert et al. (1963) suggested that interests and attitudes influence achievement which are in turn, modified and changed by achievement.

Among the environmental factors the classroom teacher assumes crucial role in creating conducive climate for learning. She/he prepares students for receiving the instructions accurately and efficiently. She/he is expected to be well aware of the needs of the students and know the personal profile of every student. The TV teacher presents, explains and demonstrates the major points of the lesson, stimulates pupils interest and raises questions. It is the duty of the classroom teacher, thus,

to involve students in learning from ETV. After the programme gets over, she/he is expected to answer questions, clarify points, lead discussions, make assignments, provide individual help and feedback. A negligence in carrying out any of these activities may result in poor perceptions of communication effectiveness of ETV programme and classroom environment in different subjects.

5.9 Home TV Environment and Performance in Science and Social Studies.

Though this hypothesis was not set appriori, it was realised that the TV environment at home and the increased exposure to television programmes may operate as a variable in student's achievement. The selected sample was thus, categorised into two groups, such as (1) TV group and (2) No TV group.

The analysis of mean differences reveals that there is no significant difference between TV group and No TV group either in their post-ETV or pre-ETV scores in science and social studies (See Table-19,20,21 & 22, page 113-19).

In other words, regular exposure to home TV enrironments did not bring any significant change in student's achievement.

The above finding may be interpreted in terms of

the help and guidance given to students in TV use at home. As early as 1972, the Surgeon General's Advisory Committee on Television and Social Behaviour endorsed the need to guide, supervise and control the amount and nature of children's television viewing at home. It suggested future research in the context of the "totality of environmental influences, particuparly that of the home environment" (P.187).

Because the family environment is an important source of social information for children, it follows that family attitudes and interaction patterns should influence the acquisition of new information, experiences and social behaviours from television. Indeed, a significant body of research indicates that parents have the potential to greatly influence their children's viewing patterns (Navin, 1960; Wand, 1968; Lyle & Hoffman, 1972; Heald, 1980), interpretation (i.e. "perceived reality") of television content (Ball & Bogatz, 1972; McLeod et al.1972) and acceptance of television content (McLeod et al.1972; Greenberg,1972; Ghaffee & McLeod,1972; Corder-Bolz,1980).

While parents can have a considerable impact on their children's learning from television, research also indicates that few parents become involved in active consumption, interpretation, and use of television information.

This scenario delimits the scope of positive impact on or transfer effect of home TV environment to classroom learning environment.

5.10 Home TV Environment and Ratings on Communication Efficacy Scale and Classroom Environment Inventory.

The results of t-test analysis (Refer Table-23 & 24, page 121-22) reveal significant mean differences between TV group (I) and No TV group (II) on communication efficacy scores in science and social studies.

The higher scores on communication efficacy in science and social studies by TV group (I) may be the indirect result of viewing television programmes at home.

Regular exposure to television programmes at home sharpens the cognition, ensures order and continuity in thinking, fosters imaginative involvement and promotes the accuracy in deciphering and decoding televised messages. More important, the clarity and concretness characteristics of the TV materials fosters children's sense of pattern or structure in the experiences they observe on the TV screen. In all, these factors contribute to the better comprehension of ETV programmes in different subjects.

The results of t-test analysis (See Table 25 & 26, page 125-26) report significant mean differences between TV group and No TV group on classroom environment scores in science and social studies. The range of scores were much narrower for No TV group.

Viewing the television programmes at home seems to have an impact on the comprehensibility of ETV programmes and perceptions of classroom environment in school.

These observations are consistent with Jonsson's (1986) findings. His study examined the relationship between children's TV use and their TV environment on the one hand and their school performance on the other.

He argued that children who grow up in a more cognizant TV environment also cope better with the cognitive requirements of school. These children show greater inclination to use TV as complementary to school work.

Some children thus have better opportunities of using TV as a resource among other things because of their environment, while others don't.

Extensive television viewing has effects on childrens perceptions of the accuracy of televised portrayals of characters and social situations (Abelman & Courtright, 1983). It also has impact on children's identification and

labelling of effective displays. It proved to be effective in both (Abelman, 1987).

The home TV environment may thus, be labelled as a potent factor in shaping student's attitude towards ETV programmes at school. TV environment may also play an interactive role in determining student's performance provided that they are encouraged to devote more time for watching the educational programmes meant for their age group and to make critical appraisal of the programmes seen. Thereby, continuity and order in thought processes would be reinforced. Students should be prepared to consciously review their own TV consumption in terms of when, why, how much and what they watch, as well as their reactions to television programmes.

CHAPTER - VI

SUMMARY, CONCLUSIONS AND IMPLICATION

6.1 Summary

The present study was undertaken to ascertain the existence of relationships among different variables, like the communication effectiveness of ETV programmes, classroom environment and performance in science and social studies of class X students in Delhi.

It was assumed that -

(i) Exposure to ETV programme may enhance student's performance in different academic subjects.

(ii) Perception of communication effectiveness of ETV programme may relate to the perception of classroom environment or vice-versa.

(iii) Effectiveness of TV instruction not only relate to the gain in information but also to the gain in comprehension and positive perception.

Some testable hypotheses were laid down for the present study. These were formulated :

(i) to find out gains in learning science and social studies because of exposure to ETV programmes;

(ii) to find out gender differences in perceptions of classroom environment;

(iii) to find out gender differences in ratings on communication efficacy;

(iv) to identify relationships among ratings on communication efficacy in science and social studies with ratings on classroom environment in the same subjects;

(v) to predict students' performance in science and social studies by using communication efficacy and classroom environment scores.

110 boys of Government Boys' Senior Secondary School and 110 girls of Government Girls' Senior Secondary School were chosen as the sample subjects. The selection of the sample was made on the basis of quota method of sampling. Three types of variables were included in the study. The matching variables included were type of schools (Government); level of education (class X); subject for comparison (Science and Social Studies); and gender (Boys and Girls). The exploratory variables employed were the communication effectiveness of ETV programme and classroom environment. The criteria variables used were two (science and social studies) sets of examination marks obtained by boys and girls separately.

The instruments included the communication efficacy scale and classroom environment inventory to assess the psychosocial characteristics of the classroom environment.

Following a pre-post design, the data were collected and then codified. The data were analysed by using t-test analysis, correlational analysis and regressional analysis.

It is observed that -

(i) Regular exposure to ETV programme results in higher post-ETV scores by boys and girls in science and social studies.

(ii) Boy's ratings show very low association between communication effectiveness of ETV programme and classroom environment in science and social studies. Whereas girl's ratings show moderate positive association on the same.

(iii) Predictability of performance of boys and girls in science and social studies by using communication efficacy and classroom environment scores in science and social studies,do not reveal positive results.

(iv) Home TV environment contributes (directly/indirectly) to the differential perception of communication effectiveness of ETV programme and classroom environment.

(v) Effectiveness of ETV programmes can well be predicted by using communication efficacy and classroom

environment scores in science and social studies.

6.2 Conclusion

One of the discernible fact from the findings of the present investigation, is that sex-wise and subject-wise ETV viewing has significant and meaningful impact on student's performance. However, the differentiations in perceptions of the comprehensibility of televised material and classroom environment in different academic subjects may be the singular or pooled effect of production, audience and environmental factors. The differential impact of ETV may have resulted from the variations in production factors that include pacing, timing, frequency, content and quality of the presentation. A fine-grained analysis of psychological function of each event in the production, the intended effect of each statement, of each visual of each motion and technique will certainly help in mixímising the learning effects of ETV programme. At each moment of the production, whatever is being transmitted has the potential of adding to comprehension or detracting from it. Calvert et al.(1982) observed that formal features of TV production can and should be used to support comprehension.

Kozma's (1986) paper examines the implications of a cognitive model of learning for the design of educational

television. Specifically examined in this paper are the research studies with instructional implications for such functions as pacing, cueing, modelling, and transformation of the television presentation.

Some consideration must be given to differential abilities and entry level skills present among the audience/receiver in the classroom situation. Because these influence to a great degree the student's ability to cognitively process the information from television. The level of children's cognitive sophistication (Collins, 1983; Salomon, 1980; Wartella, 1979; 1981) and the amount of invested mental effort in viewing mediated material (Salomon, 1981; 1983) are instrumental in what and how children learn from television. Krendle and Watkins (1983) found that by merely telling children that the purpose of a programme was educational, they learned at a deeper level than did those children who viewed the same programme after being told it was an entertainment programme.

The attitude and belief, among other things, stand out conspicuously in determining the efficacy of any sort or mediated/unmediated instructions. Teachers (TV/live) have the potential to induce attitude change about a growing phenomenon or circumstance irrespective of existing attitudes (whether well established or not).

Some of the major environmental factors, like viewing

conditions, management of reinforcements and teachers cooperation etc. exert influence on differential perceptions of communication efficacy of televised materials and classroom environment

The classroom teacher is essential to the success of televised instruction. It is he/she who delivers reward for meaningful responses and punishment for inappropriate responses. He provides the warm and humanizing influence, that is essentially needed in learning via television due to the changed interface. Sometimes, the teachers themselves do possess ambivalent attitude towards the success of television teaching. Sometimes, teachers are not called for previewing the TV lessons. They are not provided with TV guide or they do not have the training experience as to how effectively integrate the television instructions into regular classroom fare. More important, the TV set seems to be out of order due to some reason or other. Lack of electricity or proper viewing condition etc. appear to disrupt continuity in exposure to ETV programmes and thus, inhibit learning to take place.

Care should be taken to delimit the interplay of extraneous factors in order to maximise the efficiency of learning via television.

One of the secondary observations of the present

study reveal that home TV environment play an important role in shaping student's attitude towards ETV programme at school. Additionally, it has facilatory effect on comprehensibility of ETV programmes.

The teaching and learning that takes place within a family/home is considered by some educators to be one of the most important of all educational experiences (Bobbitt & Paolucci, 1976). A significant body of research indicates that parents have the potential to greatly influence their children's viewing patterns (Nivin,1960; Wand,1968 ; Lyle and Hoffman,1972; Heald, 1980), interpretation (i.e., 'perceived reality') of television content (Ball & Bogatz, 1972; McLeod et al., 1972) and acceptance of television content (McLeod et al., 1972; Greenberg, 1972; Corder-Bolz,1980).

Lastly, a glimpse into the tenuous relation between teaching (tv/no tv) and learning unables the researcher to draw any conclusion undisputedly with regard to learning via television. The present research or work,only identifies two mediating factors namely the extent of comprehensibility of the televised instruction and perceptions of classroom environment. It is assumed that these factors, in turn, determine the effectiveness of learning via television and contribute to performance in different academic subjects.

6.3 Implications

The finding of positive association between the perception of communication effectiveness of ETV programme and classroom environment do imply that classroom environment has immense potentiality to the success of student's learning via television. It has the property to instigate and to encourage cognitive activity and development. Educators should be made aware of this fact in order to promote efficient learning via television.

For students, the findings of the study imply that they are the active appropriaters to decode messages from televised instruction. They need to develop critical television viewing habit as the 'receivership' skill is directly related to the degree of comprehension of television message.

Further, the effectiveness of TV instruction depends on: (i) clarity of materials presented, concepts used etc., (ii) specification of clear-cut objectives (both specific and general); (iii) the teaching strategy (overtly/covertly) entailed; (iv) the conditions (internal/external) of the learner; (v) the limitations or peculiarities of the medium itself; (vi) interaction (before, during and after) with the televised material at the receiving end; (viii) student-teacher and student-student cooperation (during, before and after telecast); and

(ix) parental altitude towards and interest in learning via television.

6.4 Limitations

Despite the fact that nearly 450 or so schools in Delhi are showing ETV programmes regularly to the students of different classes, the present study was limited (due to the time constraints) only to class X students of two (Boys and Girls) Secondary Schools.

The efficiency of the instruments employed for measuring the communication effectiveness of ETV programme and psychosocial characteristics of classroom environment has to be established in the longer perspective.

6.5 Suggestions

Enumerated below are some of the suggestions for further exploration and study in the field of TV learning.

1. An instructional television development process which incorporates classroom pretesting, will increase the likelihood of programmes that are successful in a school system.

2. Proper planning in pacing, cueing, modelling and transformation of the television presentation will result in better comprehension of the televised materials.

3. Suitable stimuli, meaningful response patterns and opportunities for active participation by the student will promote efficient learning via tele-vision.

4. The interface between learner and TV teacher (as opposed to 'live' teacher) can be made conducive for better learning with the humanizing influence and cooperation of classroom teacher.

5. Well defined role for the teacher would facilitate learning from TV instruction.

6. In-depth knowledge of the gender differences in attitude towards television learning/teaching should be acquired. It is noticed that attitudes dictate interests which in turn, contribute to academic performance in different subjects.

7. Parents should be provided with training experiences to take up the role of better teachers at home. This will help in probing into teaching-learning processes with greater understanding.

8. Pre-viewing and field testing of ETV programmes will enhance the effectiveness of the same.

9. Preparing and motivating the students for learning experience will facilitate in retaining more of the televised instruction.

10. Learning can be fostered when educators base their teaching on child's perceptions, feelings and actions with emphasis on those activities which the child can test and try out.

11. The creation of effective television technology for instructional purposes, requires research and development process. This should involve reiterative testing and revision of the materials until students learn well in actual classroom environment.

B_I_B_L_I_O_G_R_A_P_H_Y

Abelman, R. Television literacy: amplifying the cognitive level effects of television's prosocial fare through curriculum intervention. Journal of Research and Development on Education, vol.17, No.1, 1983, pp.45-57.

Abelman, R. TV Literacy 11: amplifying the affective level effects of Telvision's prosocial fare through curriculum intervention; Journal of Research and Development in Education, vol.20, No.2, 1987, pp.40-49.

Agarwal, B.C. SITE Social Evaluation. Ahmedabad: Space Applications Center, I.S.R.O., 1980

Agrawal, B.C. SITE Social Evaluation: Results, Experiences and Implications. Ahmadabad: Space Applications, Center, 1981, p.83.

Agarwal, S.C. and Choudhury, S.V.S. Prefesting of ETV Programmes Faipur, New Delhi, Upgraha Delhi Doordarshan Kendra, 1984.

Aghi, M. Impact of Science Education Programmes on SITE Children of Rajasthan, Ahmadabad: Space Applications Center, 1977, p.73.

Allpert, R. Stellwagen, G. & Backer, D, "Psychological Factors in Mathematics Education", School Mathematics Study Group Newletter, No.15, 1963, pp.17-24.

Anderson, D., Lorch, E., Field, D., & Sanders, J. The effects of TV programmes' comprehensibility on preschool children's visual attention to television, Child Development, vol.52, 1981, pp.151-157.

Anderson, G.J., Walberg, H.J. & Welch, W.W. Curriculum effects on the Social Climate of learning: A new representation of Discriminant functions, American Educational Research Journal, vol.6, 1969, pp.315-329.

Anthony, B.C.M. "The Identification and Measurement of Classroom Environmental Process Variables Related to Academic Achievement". Unpublished Doctoral Dissertation, University of Chicago, 1967.

Armsey, J.W. & Dahl, N.C. An Inquiry into the Uses of Instructional Technology, Ford Foundation Report, New York, 1973.

Bailey, M. The art of positive Principalship, Momentum, vol.10, 1979, pp.46-47.

Ball, S. and Bogatz, G.A. The first year of seasame street: An evaluation. Princeton: Educational Testing Service, 1971.

Ball, S. & Bogatz, G.A. Seasame Street: A continuing evaluation, New York: Teachers College Press, 1972.

———— Reading with Television - An evaluation of the electric Co. Princeton: Educational Testing Service, 1973.

Barker, R.G., On the nature of the environment, Journal of Social Issues, vol.19, No.4, 1963, pp.17-38.

Barrow, L.C., Proposed Theory for the Effect of Educational Television in: Schramm, W. (ed.) The Impact of Educational Television, Board of Trustees of the University of Illinois, USA, 1961.

Backer, W.C., Madsen, C.H., Arnold C.R. & Thomas, D.R. Interference in meaningful learning, Journal of Special Education, vol.29, 1971, pp.75-78.

Beelick, D.B. Sources of Student Satisfaction and dissatisfaction, The Journal of Educational Research, vol.67, No.1, 1973.

Bhaskaran, P. & Patel, I, SITE FOR Children: Morning Feedback, Ahmadabad: Space Application Center, 1977.

Balin, B.B., Effects of Film Narration Type and List Enability Level on Learning of Factual Information, Unpublished doctoral dissertation, Indiana University, USA, 1956.

Bloom, B.S., Stability and change in Human Characteristics New York, Viley, 1964.

Bobbitt, N., & Paolucci, B. Home as a learning Center, Washington, D.C.: Bureau of Occupational and Adult Education (ERIC Document Reproduction Service, No.ED 120 033), 1976.

Brookover, W.B. & Schneider, J.M. Academic environment and elementary school achievement, Journal of Research and Development in Education, vol.9, No.I, 1975, pp.82-99.

Brookover, W.B., Schweitzer, J.H., Schneider, J.M., Beady, C.H., Flood, P.K. &Wisenbaker, J.M. Elementary School social climate and school achievement, American Educational Research Journal, vol.15, 1978, pp.301-18.

Campbell, W.J., The influence of home environment on the educational progress of selected secondary school children, British Journal of Educational psychology, vol.12, No.2, 1952, pp.89-100.

Carpenter, C.R. "Review of Research on Instructional Television", in Proceedings of the Economics of Educational Television, Waltham,Mass Brandeis University, 1963, pp.01-28.

Chaffee, S.H. & McLeod, J.M. Adolescent television use in the family content. In G.A.Constock & E.A.Rubinstein (Eds.) Television and Social behaviours, (vol.3) Television and adolscent aggressiveness, Washington, D.C.: U.S.Government Printing Office,1972.

Chu, G.C. & Schramm, W. Learning from Television. Washington: National Association of Educational Broadcasters, 1967.

Chu, G.S. & Schramm, W.Learning rom Television: What the Research Says, NAEB, Washington D.C, 1968.

Chu, G. & Schramm, W. Learning from television: What the research says, (Rev.Ed.), Washington, D.C.National Association of Educational Broadcasters, 1974.

Gollins, W.A. Interpretation and inference in Children's television viewing. In J.Bryant & D.R.Anderson (Eds.), Children's under standing of televisions Research on attention and comprehension, New York, Academic Press, 1983.

Comber, L.C. & Keeves, J.P. Science Education in Nineteen Countries, Almquist and Wiksell, Stockholm, 1973.

Cook, T. Appleton, H., Conner, R., Shaffer, A., Tomkin,G. & Weber, S.Seasame Street Revisited, New York: Russell Sage Foundation,1975.

Corder-Bolz, C.Tv literacy and Critical TV viewing skills. In D.Pearl, L.Bouthilot & J.Lazar (Eds.) Television and behaviour: Ten Years of of Scientific progress and implications for the eighties, Washington, D.C.: U.S.Government Printing Office,1980.

Corle, C.C. Mathematics teaching behaviour changes made by intermediate grade teachers during a 15 Week period of instruction by educational television. University Park, Pa: Pennsylvania State University, 1967.

Cox, W.B. Crime and Punishment an campus: An inner city case Adolescence, vol.13, 1978, pp.339-348.

Coyne, R. Environmental assessment: Mapping for counselor action, Personnel and Guidance Journal, vo..54, 1975, pp.150-155.

Dale, E. Audiovisual Methods in Teaching. The Dryden Press Inc. Illinois, 1969.

Dubin, R. & Hedley, R. The Medium may be related to the message, Eugene, OR: Conter for the Advanced Study of Educational Administration, 1969.

Dugan, R. An investigation of the personal, social, educational and economic reasons for success and lack of success in schools as expressed by 195 tenth grade biology students, Journal of Educational Research, vol.55, No.10, 1962, pp.544-553.

Duke, D.L. & Perry, C.Can alternative schools succeed where Benjamin Spoke, Spiro Agnew and B.F.Skinner have failed ? Adolescene, vol.13, 1978, pp.375-392.

Allett, C.D., Payne, D.A., Masters, J.A., & Pool, J.E., The relationship between teacher and student assessments of school environment characteristics and school outcome variables. Paper presented at the 23rd annual meeting of the Southeastern Psychological Association, Holly wood, Fla, May 1977,

Febel, A. "The relationship of the organisational climate of school to student teacher's perception of the Efficiency of the Student Teaching Situation and commitment to Education: Unpublished Doctoral Dissertation, State University of New York, Baffote, Dissertation Abstracts, vol.27, 3660, A,1966.

Feldvebel : "Organizational Comiate Social Class, Educational Output". Administrator's note book, Chicago Midwest Administration Center, The University of Chicago, vol.XII, No.8, 1964.

Fisher, D.L. & Fraser, B.J. Using Short forms of Several Classroom environment Scales to assess and improve classroom psychosocial environment. Paper presented at annual meeting at National Association for Research in Science Teaching. French Lick, Indiana, 1985.

Flagg, J.T., Jr. The organizational climate of schools: Its relationship to pupil achievement, size of school, and teacher turnover (Unpublished doctoral dissertation, Rutgers, the State University, 1964). Dissertation Abstracts, vol.26, 1965, pp.818-819.

Fraser, B.J. Differences between preferred and actual classroom environment as perceived by primary students and teachers, British Journal of Educational psychology, vol.54, 1984, pp.336-339.

Fraser, B.J. & Deer, C.E. Improving classrooms through use of information about learning environment, Curriculum Perspectives, vol.3, 1983, pp.41-46.

Fraser, B.J. & Fisher, D.L. Predicting Students' outcomes from their perceptions aof classroom psychosocial environment, American Educational Research Hournal, vol.19, 1982, pp.498-518.

Fraser, B.J. & Fisher, D.L. Student achievement as a function of person-environment fit: A regression surface analysis, British Journal of Educational psychology, vol.53, pp.89-99.

Fraser, B.J. & Fisher, D.L. Use of actual and preferred classroom environment scales in person-environment fit research, Journal of Educational psychology, vol.75, 1983, pp.303-313.

Fraser, B.J. Seddon, T. & Eagleson, J. use of student perceptions in facilitating improvement in classroom environment. Australian Journal of Teacher Education, vol.7, 1982, pp.31-42.

Fraser, B.J., Treagust, D.F. & Dennis, N.C. Development of an Instrument for Assessing Classroom Psychosocial Environment at Universities and Colleges, Studies in Higher Education, vol.11, No.1, 1986, pp.43-54.

Friederich, L. & Stein, A. Prosocial television and young children: The effects of verbal labelling and role playing on learning and behaviour. Child Development, vol.46, 1975, pp.7-38.

Gagne, R.M., Instruction and the conditions of Learning, in: Davies T.K., & Hartley, J. (Ed.), Contributions to Educational Technology, Butterworths & Co. London, 1972.

Gordon, G.N. Educational Television, The center for Applied Research in Education Inc. New York, 1965.

Greenberg, B.S. Children's reactions to television blacks, Journalism Quarterly, vol.49, No.1, 1972, pp.5-14.

Greeno, J. Psychology of learning, 1960-80: One participant's observations. American Psychologists, vol.25, No.8, 1980, pp.713-728.

Haertel, G.D., Walberg, H.J. & Haertel, E.H. Socio-Psychological environments and learning: a quantitative synthesis, British Educational Research Journal, vol.7, 1981,pp.27-36.

Hamberlin, E. The Effects of Classroom Environment on Academic Achievement, Classroom Behaviour and Attitudes of Inner-city Students.

Doctoral Thesis, University of Illinois, Urbana, 1983, Published on demand by University Microfilms, International, 1985.

Heald, G.R. Television Viewing guides and parental recommendations, Journalism Quarterly, vol.57, 1980, pp.141-144.

Herminghaus, E.G. Large group instruction by television: An experiment. School Review, vol.68, 1957, pp.119-133.

Herr, E.L. Differential Perceptions of "environment Press" by high school students. Personnel and Guidance Journal, vol.13, 1965, pp.678-86.

Holmes, P.D., Jr. Television Research in the Teaching - Leraning Processing Wayne State University. Division of Broadcasting, 1959, p.152.

Instructional Film Research Programme, Evaluation of the Film: Military Police support in Emergencies (Riot Control). TF 19-1701, Port Washington, L.I. New York: Special Devices Center, Technical Report SDC 269-7-51, 1954.

Jackson, P.W. & Getzels, J.W., Psychological health and Classroom functioning: A Study of dissa-tisfaction with School among adelescents. Journal of Educational Psychology, vol.50, No.6, 1959.

Jackson, P.W. & Lahaderne, H.M. Scholastic Success and Attitude towards school in a population of sixth grade, Journal of Educational Psychology, vol.58, No.1, 1976.

Jamison, D., Suppes, P. & Wells, S. The effectiveness of alternative instructional media: A Survey Review of Educational Research, vol.44, No.1, 1974, pp.1-67,

Jaspen, N. Effects on Training of Experimental Film variables. Nomenclature, Errors, How it works', Repetition, Port Wahington, L.I., New York: Special Devices Center, Technical Report SDC 269-7-17-1950.

Jaspen, N. Effects on Training of Experimental Film variables, Study II: Verbalization, "How it works", Nomenclature, Audience Participation, and Succint Treatment, Port Washington, L.I., New York, Special Devices Center, Technical Report SDC 269-6-11, 1950b.

Jonsson, A. TV: a threat or a complement to school ? Journal of Educational Television, vol.12, No.1, 1986, pp.29-38.

Kanada, H.M. A Study of the impact of Instructional Television on the behaviour of the rural elementary school children. Ph.D. Thesis, MSU, Baroda, 1982.

Keeves, J.P. Educational Environment and Student Achievement. ACER Publication Melborne.

Kemp, L.C.D. Environmental and other characteristics determining attainment in primary schook, British Journal of Educational Psychology, vol.25, No.1, 1955, pp.67-77.

Kimbe, G.A. & Wulff, I.J., The Effects of "Response Guidance on the value of Audience Participation in Training Film Instruction, Washingron, D.C.: Human Factors Operations Research Laboratories, Bollington Air Force Base, Report No.35, from an abstract by E.Faison, Audio-visual communication Review, vol.I, 1953, pp.292-93.

Kalusmeir, H.G. Physical behavioural, and other characteristics of high and low achieving children in favoured environment, Journal of Educational Research, vol.51, 1968, pp. 573-581.

Kopstein, F.F., Sulzer, R.L. & Lumsdaine, A.A., The Value of Using Multiple Examples in Training Film Instructions, Washington, D.C. Human Resources Research Laboratories, Bolling Air Force Base, Report No.25, 1952.

Kazma, R.B. Implications of Instructional Psychology for the Design of Educational Television. Educational Communication and Technology Journal, vol.34, No.1, 1986, pp.11-19.

Krendle, K. & Watkins, B. Understanding television: An exploratory inquiry into the reconstruction of narrative content, Educational Communication and Technology Journal, vol.31, No.1, 1984, pp.201-212.

Krull, R. & Husson W. The effects of form and content on children's attention: The case of TV viewing. In E. Wartella (Ed.) children communicating: Media and development of thought speech and understanding. Beverely Hills: Sage, 1979.

Kuert, W.P. Curricular structure in: Walberg, H.J. (Ed.) Educational Environments and Effects: Evaluation policy and productivity, Berkley, Calif, McCutchan, 1979.

Kumta, H. An Inventory of Instructional Television Research. Michigan State University, 1956, p.155.

Kurtz, A.K., Walter, J. & Brenner, H. The Effect of Inverted Questions and Statements on Film Learning, Port Washington, L.I., N.Y.: Spedial Devices Center, Technical Report SDC 269-7-16, 1950.

Lorch, E., Anderson D., & Levin. S. The relationship of visual attention to children's comprehension of television, Child Development, vol.50, 1979, pp.722-727.

Lumsdaine, A.A., Sulzer, R.L. & Kopstein, F.F., The Influence of Simple Animation Techniques on the value of a Training Film, Washington, D.C. : Human Resources Research Laboratories, Balling Air Force Base, Report No.24, 1951.

Lyle, J. & Hoffman, H.R., Children's Use of television and other media. In E.A.Rubinstein, G.A. Comstock & J.P.Murray (Eds.), Television and social behaviour, vol.1, Television in day to day life: Patterns of use, Washington, D.C.: U.S.Government Printing Office,1972.

Mangla, L.R., A Study of Comparative Achievement in Chemistry of the tenth class students in tv and non-tv schools. M.Ed. Dissertation, Jamia Millia Islamic Univ. New Delhi, 1967.

McDrill, E.L., Meyers, E.D. & Rigsby, L.C. "Institutional Effects on the Academic Behaviour of High School Students', Sociology of Education', vol.40, No.3, 1967, pp.181.199.

McDill, E.L., Rigsby, L.C. & Meyers, E.D. "Educational climates of High Schools: The Effects and sources". American Journal of Sociology, vol.74, No.6, 1969, pp.567-586.

McDill, E.L. & Rigsby, L.C., Structure and Process in Secondary schools: The academic impact of educational climates. Baltimore, Md.: Johns Hopkins Univ. Press, 1973.

McIntgre, C.J., Training Film Evaluation: FB 254 Cold Weather Uniforms, Port Washington.L.I., N.Y.: Special Devices Center, Technical Report, SDC 269-7-51-1954.

McKeachie, W., Psychology in America's bicentennial year, American psychologist, vol.31, No.12, 1976, 819-833.

McLeod, J.Atkin, C.K., & Chaffee, S. Adolescents, parents and television use: A adolescent self report measures from a maryland and Wiscensic sample. In G.A. Comstock & E.R. Rubinstein (Eds.), Television and social behaviour, (vol.3) Television and adolescent aggressiveness. Washington, D.C.: U.S.Government Printing Office, 1972.

Miller, J., Levine, A.V., & Kanner, J.H.,Astudy of the Different Types of Review and of Structuring Sub-Titles on the Amount of learned from a Training Film, Washington, D.C.: Human Resources Research Laboratories, Bolling Air Force Base, Memo Report No.17, 1952.

Misra, R., Joshi, H. & Parmer, K.M. Formal Education Programmes: Impact Study. A Report Kheda Communication Project, Ahmedabad: Space Applications center, 1983.

Misra, R., Joshi, H., Trivedi, B. & Parmar, K.M. Towards Educational Programming for children: A Report: Kheda Commission Project, Ahmedabad Space Applications centre, 1983.

Molstad, J., "Readability Formulas and Film Grad Placement", Audio visual Communication Review, vol.3, 1955, pp.99-103.

Moos, R.H., Evaluating Educational Environments: Procedures, measures, findings and plicy implications, San Francisco, Jossey, Bass, USA, 1979.

Moos, R.H., Educational Climates, in: Walberg's (Ed.) Educational Environments and Effects, Berkeley, California: McCutchem, 1979.

Narayanad, A., The impact of television on Indian families-A case study of Bombay television viewers. Ph.D.Thesis, Bombay Univ. 1983.

Neurath, P. School Television in Delhi. All India Radio, New Delhi, 1966, p.114.

Nivin, H. Who in the family selects the TV programme? Journalism Quarterly, vol.36, No.1, 1960, pp.110-111.

Northrop, D.S. Effects on Learning of the Prominance of the Organizational Outlines in Instructional Films, Port Washington, L.I., N.Y.: Special Devices Center, Technical Report SDC 269-7-33, 1952.

Peerson, N. An experiment, with evaluation, in the eradication of adult literacy by use of television instruction over a state educational network supplemented by supervised group viewing andby the related use of project-supplied materials of instruction. Florance, Ara: Florence State College, August, 1961.

Phutella, R.L., A study into utilization and comprehensibility of school Television Programmes in Delhi, NCERT, New Delhi, 1980.

Rahman, S., Satellite Instructional Television Experiment A Study in Educational Television (Udaya Bhanu), Ministry of Education and Social welfare, Government of India, New Delhi, 1977.

Report of the Education Commission: 1964-66, Ministry of Education, Government of India, New Delhi, 1966, P.I.

Rimland, B.O. McIntyre, C.J., & Sterk, H.D., Effectiveness of Several methods of Repetition of Films, Washington, L.I., N.Y.: Special Devices Center, Technical Report SDC 269-7-33.1952.

Rosenthal, R.A., Increasing Sense of Effectiveness Through Media, in: Lipsitz, L.(Ed.) Technology and Education, Educational Technology Publications, Englewood Cliffs, New Jersey, 1971.

Aalomon, G. What does it do to Johnny ? A Cognitige functionalistic view of research on media. Viepoints (Bull of the School of Education, Indiana University), vol.46, No.5, 1980, pp.33-89.

Salomon , G. Introducing AIME: The assessment of children's mental involvement with television. In H. Gardner & H.Kelly (Eds.). Children and the Worlds of television. San Francisco, (A: Jossey Bass, 1981.

Salomon, G. Television watching and mental effort : A Social Psychological view. In J.Bryant & D.R.Anderson

Samboornam, K.V., The impact of Television viewing on achievement in History and Tamil. M.Ed. Dissertation, Madras University, Madras, 1980.

Sandeep, P., Schools and Mental Abilities. Light and Life Publishers, New Delhi, 1981.

School Television Mannual. TV Branch of Education, New Delhi, 1986.

Schramm, W., "what we know about learning from instructional television", in Educational Television: The nest ten years. Stanford: The Institute for communication Research, 1962, pp.52-76.

Schramm, W. Big media, Little Media, Sage Publications, Beverly Hills, California, 1977, pp.15-16.

Schramm, W. Combs, P.H., Hajnert, F. & Lyle, J., The New Media: Memo to Educational Planners, International Institute for Educational Planning, UNESCO, 1967.

Shah, M., The Scope, utility and Limitations of Educational Television in India, Doctoral Thesis, MSU, Baroda, 1972.

Sharma, M., Adolescents' Satisfaction with Educational Institutions, M.N.Publishers & Distribters, New Delhi, 1985, p.129.

Sharma, M.L. "A Comparative Study of Organizational Climate of Government Secondary Schools and Private Secondary Schools of Churu District (Rajasthan)". Journal of Educational Research and Extension, vol.3, 1969, pp.20-26.

Shivarudrappa, G. Role of Mass Media in Education with Special Reference to Distance Education paper submitted in the XVIII Annual Conference of Indian Association of Educational Technology, New Delhi, (21-23 February) 1986, p.2.

Shukla, S. and Kumar, K. SITE Impact study on primary School Children, Technical Report, NCERT, New Delhi, 1977.

Sindhi, J.N. A Study of the previsions prevaling and the use being made of TV in the teaching of Hindi to Class X of Delhi higher Secondary Schools in 1962-63 Delhi, Univ. of Delhi, Unpublished M.Ed., Dissertation, 1963.

Singh, J. and Singh A.K., A Study of the Impact of ETV Programmes on the children of Class IV-V in Sambalpur, District (Orissa). Mineographed NCERT, New Delhi, 1983, p.57.

Stickell, D.W., A Critical review of the methodology and results of research comparing televised and fact-to-face instruction. Doctoral dissertation, Pennsylvania, State University, 1963,

Suba Rao, V., A Survey of the growth and development of audio-visual education in the Maharashtra state. Doctoral Thesis, University of Bombay, Bombay 1972.

Surgeon General's Advisory Committee on Television and Social Behaviour. Television and growing up; The impact of television violence. Washington, D.C.: Department of HEW, 1972.

Swami, D.N. Opinion of teachers and students of tv schools regarding tv lessons in physics, Delhi; Jamia,Millia Islamic) Unpublished M.Ed. Dissertation, 1967.

Taba, H., School culture. Washington, D.C.: American Council on Education, 1955.

The Educational Use of Mass Media. World Bank Staff Working paper No.491, USA, October 1981.

Trickett, E.J., Toward a Social ecological conception of adolescent socialization: normative data on contrasting type of public school classrooms, child development, vol.49, 1978, pp.408-414.

Trickett, E.J., Trickett, P. K.Castro, J.J. & Schaffner, P., The independent School experience: aspects of normative environments of single sex and coed schools, Journal of Educational Psychology, vol.74, 1982, pp.374-381.

Twyford, L.C. (Ed.), Instructional Television Research Reports, U.S.Naval Training Device Center, 1956, p.372.

Vagrecha, Y.S., Devriya, K.C. & Chaudhary, S.V.S., Field testing of ETV Programmes, Jaipur, New Delhi, Upagraha Doorsarshan Kendra,1981.

Vincent, W.S., Ash, P. & Greenhill, L.P., Relationship of length and Fact Frequency to Effectiveness of Instructional Motion Pictures (Rapid Mass Learning), Port Washington, L.I., N.Y.: Special Devices Center, Technical Report SDC 269-7-7, 1949.

Vyskocil, J.R., & Goens, G.A., Collective bargaining and supervision: A matter of climate Educational Leadership, vol.37, 1979, pp.175-177.

Walberg, H.G., Teacher personality and classroom climate, Psychology in the Schools, vo.5, 1968, pp.163-169.

Walberg, H.J., Class size and the Social environment of learning Human Relations, vol.22, 1969, pp.465-475.

Walberg, H.J., Social Environment as a Mediator of Classroom Learning, Journal of Educational Psychology, vol.60, No.6, 1969a, pp.443-48.

Walberg, H.J. Predicting Class Learning: A multivariate to the class as a social system. American Educational Research Journal, vol.4, 1969, pp.529-543.

Walberg, H.J., (Ed.) Educational Environments and Effects, Berkeley, California : Mc Cutcheon, 1979.

Walberg, H.J.,& Anderson, G.J., Learning Environment Inventory, Cambridge, Mass : Harvard Project Physics, 1967.

_____ & _____ Classroom climate and Individual Learning Journal of Educational Psychology, vol. 59, 1968 a, pp 414-419.

_____ Achievement-Creating Dimension and Classroom Climate, J of Creative Behaviour, vol. 2, 1968 b, pp.281-291.

Walberg, H.J. and Anderson, G., "Properties of the Achieving Urban Classes", Journal of Educational Psychology, vol.63, 1972, pp. 381-85.

Wand, B., Television viewing and family differences. Public Opinion Quarterly, vol.32, 1968, pp. 84-94.

Wartella, E.(Ed.), Children Communicating : Media and development of thought, Speech, Understanding. Beverely Hills, CA: Sage, 1979.

Wartella, E., The child as a viewers. In M.E. Ploghoft and J.A. Anderson (eds.), Education for for television age. Athens, OH : The cooperative center for Social Science Education, 1981.

Watson, C.G., Cross-validation of certain background variables as predictors of academic achievement, Journal of Educational Research, vol. 59, 1965, pp.147-148.

Weber, G. Inner City Children can be taught to read : Four Successful Schools. (Occasional Paper 18), Washington D.C. : Council for Basic Education, October, 1971.

Welhch, W.W., Curriculum Evaluation, Review of Educational Research, vol. 39, 1969, pp.429-433.

Wheeless, L.R., & Hurt, H.T., Instructional Communication Theory and Research : An overview of instructional strategies as instructional communication systems in Nimmo, D. (Ed.) Communication Year Book-3, Transaction Books, New Brunswick, New Jersey, 1979.

White, R.A., Mass Communication and Culture : Transition to a new paradigm, Journal of Communications, vol. 33, 1983, pp.279-301.

Wilgosh, L. Effects of labels on memory for pictures in four year old children. Journal of Educational Psychology, vol. 67, No. 3, 1975, pp.375-379.

Wright, J. & Huston, A., The information processing demands of television and "media literacy". Paper presented at the American Educational Research Association Meeting, New York, 1982.

Wynne, E.A., Looking at Schools : Good, bad, and indifferent, Lexington, Mass : D.C. Heath, 1980.

COMMUNICATION EFFICACY SCALE

Given below are statements to measure the communication efficacy of teacher cum television oriented teaching method. Each statement has five alternatives (1,2,3,4,5) to indicate the degree of effectiveness of communication as judged by you. Tick ( ) mark the alternative which you think to be true.

Alternative	Interpretation	Percentage
1.	Very much	Above 80% true
2.	Much	From 60% to 80% true
3.	Neither much nor Little	From 40% to 60% true
4.	Little	From 20% to 40% true
5.	Very little	Below 20% true

I think teaching lessons in Geography by TV and then followed by teacher-discussions helps in -

		1	2	3	4	5
1.	Focusing Attention on the TV lesson					
2.	Deceloping proper attitude towards the subject					
3.	Discussing the learnt material confidently with others					
4.	Clear understanding of the subject matter					
5.	Seeing links among different parts of the lesson					

6. Generating curiosity

7. Finding solutions to problem easily

8. Feeling nervous in the class

9. Repruducing the lesson afterwards

10. Relating classroom learning to other situations

11. Asking more questions in the class

12. Attending class regularly

13. Making a point more clear by using examples

14. Analysing the subject

15. Keeping interest alive in the subject

16. Rearranging the given ideas in an orderly manner

17. Raising willingness to receive instruction

18. Expressing the learnt material accurately in different ways.

19. Promoting willingness to put extra effort

20. Facing difficulty in understanding the subject

---

1. Your Name Please :
2. Your Father's Education : Occupation Income
3. Your Mother's Education: Occupation Income
4. Do you have a TV in your house: Yes No
5. Do you find this scale a difficult one: Yes No
6. What is your personal view on TV lesson in Physics and Geography.

Thank you very much
for your co-operation.

CLASSROOM ENVIRONMENT INVENTORY

Directions - The purpose of this questionnaire is to find out your opinions about the class you are attending right now. This form of the questionnaire assesses your opinion about what this class is ackally like. Indicate your opinion about each questionnair statement by circling: For Example Ⓐ Ⓓ etc.

SA	if you strongly Agree	that it describes what this class is actually like.
A	if you agree	do
D	if you Disagree	do
SD	if you strongly Disagree	do

1.	The teacher talks rather than listens	SA	A	D	SD
2.	All students in the class are expected to do the same work, in the same way and in the same time	SA	A	D	SD
3.	The teacher talks individually with students	SA	A	D	SD
4.	Each student knows the other members of the class by their first names	SA	A	D	SD
5.	Students are dissatisfied with what is done in the class	SA	A	D	SD
6.	New and different ways of teaching are rarely used in this class	SA	A	D	SD
7.	This is a disorganised class	SA	A	D	SD
8.	The teacher helps each student who is having trouble with the work	SA	A	D	SD
9.	Students rarely present their work to the class	SA	A	D	SD

10.	Friendships are made among students in the class	SA	A	D	SD
11.	After the class, the students have a sense of satisfaction	SA	A	D	SD
12.	Class assignments are clear so everyone knows what to do	SA	A	D	SD
13.	The sealing in this class is arranged in the same way each week	SA	A	D	SD
14.	Students are generally allowed to work at their own pace.	SA	A	D	SD
15.	The teacher is not interested in students problems	SA	A	D	SD
16.	The instructor dominates class discussion	SA	A	D	SD
17.	Students in this class get to know each other well	SA	A	D	SD
18.	Classes are boring	SA	A	D	SD
19.	Activities in this class are clearly and carefully planned	SA	A	D	SD
20.	Students seem to do the same type of activities every class	SA	A	D	SD
21.	It is the teacher who decides what will be done in our class	SA	A	D	SD

1. Your Name Please -
2. Your Father's Education - (b) Occupation
   (c) Income
3. Do you have a TV in your House: Yes No
4. Do you think TV Lessons in Physics and Geography are better than classroom Teaching
   Teaching: Yes No No difference
5. Do you think TV lessons in Geography and psysics are useful to you in gaining more knowledge in the subject ?
6. Do you think TV class is more interesting than non TV class ?
7. What is your opinion on TV lessons ?

Thank you very much for your co-operation.