CHAPTER - II

REVIEW OF RELATED STUDIES

In order to define the problem specifically, it was considered desirable to survey researches already completed in the area of educational television. This chapter deals with the review of studies concerned with the application of television in school situation, generally termed as educational, instructional or school television.

The studies are presented according to the objectives of the study. Studies related to effectiveness of educational television in relation to pupils achievement are reported first, followed by studies on effects of variations in the manner in which educational television is used in the classroom, on the achievement of children.

Studies on Effectiveness of Educational Television in Relation to Pupils' Achievement

In this section, the studies are arranged under four groups: (1) status studies on the utilisation of educational television, (2) studies on learning through the medium of television and their comparison with traditional teaching, (3) studies relating to relationship

between ability level of students and effect of educational television on their achievement and (4) studies regarding the effect of educational television where it has been used as one of the components in national educational reform projects.

Utilisation of educational television

In this section the status studies on the utilisation of educational television in India have been discussed. They give an overall picture of the utilisation of the medium since 1974 to date.

In India, the first study in the area of educational television was conducted by Neurath (1966). As it was an impact study, it has been mentioned later. After this study, though the programmes have expanded to include more schools, as also additional grades and subjects, there has been no subsequent evaluation except that a status study of school education service was carried out in Delhi by All India Radio (1974). Its purpose was to study the extent and manner of utilisation of the school television service. The sample consisted of 100 schools. The findings of the study were that most of the viewing rooms were not suitable in terms of furniture and were not provided with curtains to control the intensity of light and glare. In 25 percent of the sample schools space in the viewing room was not

adequate enough for watching television.

It was also reported that the extent of viewing varied from subject to subject in class IX and X. Students in the class X viewed chemistry lessons in 64.5 percent of the sample schools, physics in 72 percent of the schools and biology in 78 percent of the schools. Among the Higher Secondary schools, pre and post-telecast activities were conducted by the teachers only in 50 to 60 percent of the schools. It was also observed that in some schools the teachers concerned were not present during the telecast. It further reported that the number of schools that missed the TV lessons was rather on the high side. And the reasons, ostensible or real for missing the lessons were not unavoidable in most of the cases. There was considerable scope for improvement in the utilisation of these programmes.

Another study on the extent and manner of utilisation done by All India Radio, Delhi (1975) was on primary school telecasts. On the spot observational studies were carried in 65 schools to obtain the first hand information regarding the state of affairs at the viewing end. They found that the viewing rooms were spacious but lacked facilities for seating. Children had to sit on floor. Most of the rooms had no curtains to control the intensity of light. Another observation was

that television programme was being viewed in 22 out of 65 schools on the day of telecast. In primary schools there was no particular system of showing the programme to the children. Two or three classes were combined for purpose of viewing the programme in majority of schools. Some schools showed TV programmes to all the classes by rotation while others showed them to some classes by rotation. The teachers wanted to know in advance the particulars regarding the subject and the scope of the programme to be telecast.

When they visited the schools, they found that in 23 schools sets were out of order. In some schools, it was reported that sets were out of order for more than one year. Some of the suggestions given by schools regarding the timings of the telecast and programme chart were that the time of the telecast should be changed as it clashes with the school recess and TV Centre should send in advance to all schools a list of programmes, giving the scope and significance of each programme.

Shah (1972) conducted a study of the scope, utility and limitations of educational television. Some of the findings were that the planning of ETV programmes is not done well in advance; the consultative panel meets in a routine manner and does not serve any purpose; the pamphlets and guidance notes are not available to

the subject teachers in due time; pre and post-telecast activities are not conducted scientifically, the producers of school TV do not possess adequate qualifications and training for the job; the services for maintenance of TV sets are not quick and effecient. He further reported that the students are interested in the school telecast and the telecasts are useful to teachers.

Shah interviewed primary school headmasters and reported that there is a demand by the primary schools for the introduction of school television programmes. Headmasters were in favour of programmes for classes III to V in mathematics, science, social studies and Hindi.

In a study into utilization and comprehensibility of school television programmes in Delhi, Phutela (1980) reported that in 25 percent of Higher Secondary Schools TV sets were not found in order. At the time of visits to schools, 38.2 percent schools were found viewing the TV programme and 61.8 percent of schools were found not viewing the TV programme. Among the reasons mentioned for under-utilisation of the STV programmes, 'lack of provision of a separate room for the television viewing' was considered important reason by most of the schools. This was followed by TV set remaining out of order, non-receipt of guidance notes, TV programmes not fitting into the sequence of classroom

teaching and noise outside the classroom. Regarding the activities after the telecast, in the majority of schools either there was no post-telecast discussion or there was a short question answer session. Only in nine percent of the schools, a complete discussion was observed. As regards the preference for school subjects for which TV intervention would be beneficial, it was found that first preference was for teaching of general science, followed by English, mathematics and physics. Only a few schools favoured the teaching of geography, biology, chemistry and history with the help of TV.

Another aspect of this study was the extent of comprehension of these programmes. For this purpose five programmes were selected. The difference in mean gain with regard to performance was found significant at .01 level for four programmes and at .05 level for one programme. It shows that the television lesson caused marked difference between pre and post-telecast knowledge.

The Doordarshan Kendra, Delhi (1982) conducted a status study of education lessons telecast for primary schools. The findings of this study were that out of the total TV sets of New Delhi Municipal Committee Schools (NDMC), only 66 percent of the sets were functioning at the time of visit and lessons were being

shown to students in 62 percent of the schools. In the remaining schools, the lessons were not shown mainly due to 'lack of space'. In Delhi Municipal Corporation (DMC) schools only one third of the sets were found in functioning order. Of these, only 69 percent sets were being operated and the remaining 31 percent sets were not operated due to power failure and pre-occupation of the teachers with the census work. For repairs and maintenance of NDMC sets, contract had been given to a person working in NDMC, and MCD sets were got repaired through private contractor.

The study further showed that in most of the schools, students of grades IV and V were exposed to TV lessons (90 percent) and the responsibility of showing the lessons to the children was assigned to one of the members of teaching staff in all the schools of NDMC and MCD.

A number of studies of INSAT conducted by the Centre of Educational Technology, National Council of Educational Research and Training (1983a, 1983b and 1983c) have revealed that the status of ETV utilisation was not very encouraging in both Sambalpur and Hyderabad in Orissa and Andhra Pradesh respectively. Some of the important reasons for under-utilisation were: TV sets remaining out of order; lack of orientation and

motivation among user teachers/custodians for using TV set; lack of awareness among the user teachers about the content and scope of programmes to be telecast; and lack of coordination between Doordarshan and Department of Education.

As may be seen from these studies, there is no difference in the extent and manner of utilization of television from 1974 till to date. All these studies reveal that viewing conditions are poor and television is under-utilized in the schools.

Educational television and traditional teaching

During the last three decades a considerable number of research studies have been carried out to study the effectiveness of educational television. Effects of television instruction has been measured either by comparison with conventional instruction or by comparison with some absolute or assumed standard.

Enders (1960) compared two groups of sixth-grade children who had received a series of science programmes on television with a control group that did not watch the programmes. Both television groups scored significantly greater improvement than the control group.

Ogawa (1960) let 140 Japanese fifth-grade children watch an educational television programme about the Tokyo-Yokohama industrial area. Comparison of pre-test and post-test showed substantial increase in the students' knowledge.

Sykes (1964) compared 58 education majors who had been randomly assigned either to a television or control group. The former group watched six 45-minute art lessons over six weeks, while the latter did not. A post-test showed, a significant difference in favour of television group.

On the other hand, there had been studies where investigators have come out with exactly the opposite results. Herminghaus (1957) compared ninth-grade students in composition class. Those students who were taught face-to-face scored significantly higher than the TV taught students. On teaching of geometry, Johnson and Harty (1960) reported that high school students taught geometry by face-to-face instruction did significantly better than the TV taught group. Similar results were obtained by Woodward (1964) who reported that the achievement of face-to-face studants in biological science was significantly superior to that of TV-taught students.

Another approach to measurement of effectiveness of educational television is for the teachers or experimenters to set a standard of satisfactory performance. Frazier and Evans (1960) had 151 teachers and 4,814 third and fourth grade children in Ohio watch ten half-hour television programmes on elementary science. After the programme, the teachers reported that they themselves had significantly greater confidence in teaching elementary science and that the pupils showed more interest in it. But a test of achievement showed no significant increase in the children's score.

There have been a number of studies, where the general finding is, no significant difference between learning from televised teaching andthat from conventional teaching (Anderson and Vandermeer, 1955 ; Tannenbaum, 1956 ; Herminghaus, 1957 and Siebert,1958). Similar findings were obtained in a comparitive study of teaching of high school chemistry conducted by the Cincinnati Board of Education (1958).

Carpenter and Greenhill (1958) have conducted research with television for teaching at Pennsylvania and reported no significant differences between the achievement of pupils taught by television and those taught by other methods. Greenhill (1959), said that 500 students who had studied zoology by television

lessons had obtained good results. He reported that experiments with television over a five-year period indicated that television instruction was effective.

Ambrosino (1957), reporting experiments with television in Schenectady high schools, found the learning of television and control groups to be equal. Dreher and Beatty (1960), reported similar findings after investigations in San Francisco.

General conclusions, based on a review of investigations conducted in the United States, were made by Seldes (1957). He claimed that the value of television as an instrument of direct teaching had been demonstrated and that though the evidence, at that time, was not conclusive - no negative evidence had been adduced.

The Ford Foundation (1961) sponsored 'The National Programme on the use of Television in the Public Schools'. Two committees of experts, on education and testing methods, were set up to evaluate the results of comparisons between television -taught and non-television-taught pupils in elementary and high schools. During the first two years, from 1957 to 1959, 251 comparisons were made of the achievement of television-taught pupils with those of control pupils. One hundred and sixty-five comparisons favoured television

and 86 the control pupils. Ninety of the comparisons were significant and 161 not significant. Of the comparisons showing significant differences, 69 favoured the television groups and 21 favoured the control groups. These results were obtained from comparisons where the groups had been equated on scholastic aptitude and pre-test score or where such initial differences between groups had been held constant so that legitimate comparisons could be made.

Wetter and Gable (1958), reported that junior high school students taught mathematics by television scored significantly higher than did face-to-face students.

Suchy and Baumann (1960) conducted a three-year experiment in which high school students were taught American history either by television or by conventional instruction. In both the first and the second year, the TV group scored significantly higher than the conventional instruction group. In an experiment conducted by Pinto (1962) in Chile, high school students were taught history of the Middle Ages and modern times. On questions related to interpretation and description, the TV group students did significantly better than the two groups taught without television.

Johnson (1960) reported that students taught introductory geography by conventional instruction had significantly better achievement than students taught by television. Similar results were obtained by Abe (1960) who compared two groups of Japanese students randomly assigned either to a television programme or to a lecture by the same professor. The programme was about elementary psychology concerning the mind. His finding was that the lecture group did significantly better than the TV group.

Television has been used for teaching of languages. In an experiment by Gordon (1960), students in 20 Hawaiian schools who had pronounciation problems were taught remedial speech by either television or their own regular teachers. The same jury rated the students' tape-recordings before and after the remedial programme. Students taught by television had an average gain score of 9.8 as compared with a slight average loss of 0.4 for students taught by their own teachers. Different results were obtained by Stake (1959) who compared high school students taught elementary Spanish vocabulary by television with face-to-face taught students. The television group had significantly lower scores than the face-to-face group.

In another study Belson (1956) found television medium effective in teaching of Spanish and English; and Langdale (1962) in teaching of French words, phrases and knowledge about France.

Schramm (1962) reported that of 56 comparisons of television science instruction with conventional instruction, it was found, on testing for significant differences at the .05 level or higher, that 20 studies favoured television, 7 studies favoured conventional instruction, and in 29 studies there were no significant differences. Schramm concludes by saying: 'There can no longer be any doubt that students learn efficiently by television.'

A study conducted in Anaheim City Schools (1963) included two separate, but similar, investigations. The first studied 1157 fifth-grade pupils during a nine month period; the second included 1016 fourth-grade students and extended over a period of 26 months. Of 23 comparisons evaluating the differences between televised instruction plus regular instruction in regular size classrooms and instruction without television in regular size classrooms, it was found that eleven comparisons favoured television - enriched instruction at .05 level of significance or better and no comparison favoured the classroom without televised instruction.

The researcher made further comparisons of large classrooms (75 students) using television instruction combined with conventional teaching by two subject matter teachers versus regular-size classroom (25 students) with the regular teacher using traditional methods of instruction without television. The results were: seven comparisons favoured the televised instruction in large classrooms (75 pupils); five comparisons showed no difference and two comparisons favoured classrooms without television instruction.

Kornadt and Abankwa (1975) in a comparitive study between television classes and conventionally taught classes, in which objective oriented tests on the effectiveness of a programme on social studies for grade IX and X were administered, report that in 26 out of 40 comparisons between two comparable classes, higher achievement scores in the subject were obtained by pupils in television classes. In seven cases higher achievement scores of conventionally taught classes were observed; and in seven cases there were no significant differences.

Laboratory study, in which a student works individually but requires frequent access to an instructor, might seem to be a subject ill-adapted to television. But Seibert and Honig (1960) conducted laboratory sections by television in chemistry. Between groups

taught conventionally and by television, they found, only one difference in six comparisons - this in favour of the television group. In the teaching of Anatomy, Diamond (1962) found no significant differences in achievement between the groups taught conventionally and by television. However, he reported that television saved time by permitting an entire class to see a demonstration at the same time.

There is some evidence from Japan (Ishikawa, 1959) of students in remote isolated regions learning less efficiently from television than do city students, but this is believed to relate to their previous preparation and perhaps to the classroom context in which they worked. Later a study was conducted by Tsuji (1964) on supplementary TV in an isolated village. Fifth grade children in two schools received one science and one social studies programme per week, each twenty minutes in length. The other two schools in the village served as a control group. At the end of the year, the TV classes in all the three measures namely, intelligence, social studies and science had moved significantly ahead of the Non-TV groups. The gains in both intelligence and science were significant at .01 level of confidence. There were no significant differences in social studies.

Similar results were obtained by Maeda (1962) in an experiment with television lessons in a remote village school at Doruba in Japan. After six months of viewing a series of science lessons, achievement tests given by experts, indicated that the ability of pupils had been remarkably raised. After one year, Ministry of Education testers found the pupil's ability in science to be higher than the national average.

In some studies comparisons have been made between more than two methods of instruction. Williams (1954) described a comparitive study of the effectiveness of teaching by television carried out in Canada. One hundred and eight high school students were randomly allocated to four teaching groups. An unfamiliar topic was chosen: then, one group studied by television, a second group read the script of the broadcast, the third was present in the studio during the broadcast, and the fourth heard only the soundtrack of the broadcast. After testing, the students who had viewed the programme proved to have learned significantly more than all the others.

Daniels (1959) reported that four groups of secondary modern school pupils studied a science topic by different methods. Of the four groups involved, one viewed a television lesson, one heard only a sound track of the broadcast, and the third had a conventional

science lesson. The fourth group received no instruction, and was used as a control group. The conclusions were that some teaching was better than no teaching at all but that there were no significant differences to indicate that any of the three methods was superior.

Deutschmann, Barrow and McMillan (1962) reported a comparative study in which one group of students saw a film, a second group viewed the film over television, a third group had a science lesson in a laboratory, and a fourth group had a laboratory lesson and saw the film. An assessment was then made of the relative efficiency of the different methods of instruction. Efficiency was defined as 'the discrepancy between the amount of relevant information and the amount of irrelevant information a student learned'. Analysis of variance produced an F value which was highly significant ($P < .001$). The order of efficiency of methods was: (1) television; (2) film; (3) film and laboratory; (4) laboratory.

Barrington (1964) compared the achievement of pupils who had studied physics by television with that of pupils taught by conventional methods. His sample consisted of five groups of thirty pupils taken from the first and second years of a secondary modern school. One group was taught by television lessons integrated with laboratory lessons. A second group had conventional

laboratory lessons. A third group took the television lesson in a classroom and a fourth group had 'conventional classroom lesson based on a textbook. A fifth group was used as a control group. No significant difference was found between the achievement of the TV/laboratory group and the conventional laboratory group. The achievement of TV/classroom group was found to be significantly higher ($P < .05$) than that of conventional classroom group.

There are some reviews, in which the findings of number of studies on educational television have been compiled and an attempt has been made to draw conclusions regarding its effects in an integrated manner.

Holmes (1960), who reviewed 281 comparisons between television teaching and conventional teaching reports that out of 281 comparisons reported, he found 246 which produced no significant difference between TV and face-to-face teaching. Similar findings were reported by Tanner (1961). In a survey of 281 investigations, he noted that 90 percent comparisons between television-taught and conventionally-taught pupils resulted in finding of no significant difference in achievement.

Dieuzeide (1960), notes that experiments with educational television had taken place in Belgium,

Netherlands and Switzerland but that the results were inconclusive.

Schramm (1962) summed up 393 experimental comparisons on television versus classroom teaching, including a considerable amount of unpublished material. He reported that 225 of these comparisons showed no significant differences, 83 were significantly in favour of televised teaching, and 55 in favour of conventional teaching.

Summarizing the results of a three year national programme in which 200,000 students from 800 public schools took part, Pflieger and Kelly (1961) reported that whereas most comparisons showed no significant differences; 119 were significant in favour of TV taught students, and 44 in favour of conventionally taught students.

Kelley (1964) made more than three hundred comparisons on achievement tests between television teaching and conventional teaching during the period 1956-1961. These test comparisons were classified under four subject matter areas; English, mathematics, science and social studies. Results of the comparisons showed that students generally did well when television was used as a regular resource. In one out of every four comparisons, significantly higher achievement scores

were made by television groups.

Dublin and Hedley (1969) examined 381 such studies, including many of those in the Chu-Schramm list, and found 191 showing no difference, 102 in favour of television, 89 in favour of classroom instruction. Not all these differences were statistically significant.

Chu and Schramm (1967) reviewed upto 1966, 207 published studies involving 421 separate comparisons, in which television teaching has been compared with conventional teaching. Of the 421 separate comparisons made in these studies 308 showed no significant difference, 63 showed television instruction to be superior, and 50 found conventional instruction better. The analysis of the studies led them to summarise these results into sixty conclusions. Some of these are:

- Given favourable conditions, children learn efficiently from instructional television.

- By and large, instructional television can more easily be used effectively for primary and secondary school students than for college students.

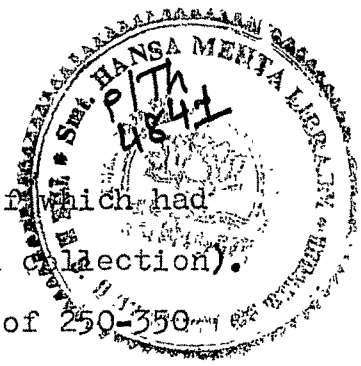
- So far we can tell from present evidence, television can be used efficiently to teach any subject matter where one-way communication will contribute to learning.

- Television is most effective as a tool for learning when used in a suitable context of learning activities at the receiving end.

- Television is more likely to be an efficient tool of learning if it is planned and organised efficiently.

These and other conclusions of Chu and Schramm show how the effectiveness of educational television can be enhanced, so as to be of practical use to the programme producers and users.

As mentioned earlier, in India, the first important study was by Neurath (1966). He evaluated the school television project at the instance of Ford Foundation mainly to study the effectiveness of school telecast in physics and chemistry. His main hypotheses had to do with the kinds of knowledge that would be better learned with television than without it. He developed test questions of three types: (1) factual things learned by heart, from books or lectures; (2) visuals where the student draws primarily on experiments, diagrams, or pictures; and (3) understanding where the student has to draw on his ability to generalize, to make deductions, to recognize a problem or a connection even when it comes in an unfamiliar form. He hypothesized that television students would do better than control group with visual questions, and about the same as those in control group on factual questions; he left open the question of which group would do better with understanding questions.



He gave four rounds of tests (One of which had to be thrown out because of incomplete data collection). Each round was given to a different sample of 250-350 television students and 100-250 control students from Higher Secondary schools of Delhi. He found that the television students did some-what better on all types of questions. They did best comparatively on visual questions, and the difference was least on factual questions, thus being in general agreement with the hypotheses. Television students did distinctly better on the understanding (problem solving) questions.

He gave one of the tests again, after a month's interval. Again the television students did better on all the three kinds of questions, but the difference between television and non-television students was less on the delayed test. Some of his observations about the impact of television on the Delhi schools were as follows:

- The whole teaching process, though not necessarily the teaching performance of every single teacher, is slowly improving.

- Science teachers are becoming aware (from seeing the television teacher) not only of the necessity but also of the possibility to mobilise their own, even though in most cases rather meager, laboratory resources... more vociferous in their clamor for more laboratory space and equipment.

His conclusions about the impact on the students and the school system need to be mentioned:

- Television lessons provide a break in the routine, thus making school itself more interesting.
- The impact of television lessons, themselves is less than the impact of television as an innovation within the whole television teaching process.

Some studies have been conducted at M.Ed. level. Sindhi (1963) conducted a study of the provisions prevailing and the use being made of television in the teaching of Hindi to class X of Delhi Higher Secondary Schools. Then after a period of four years in 1967, three studies were conducted at M.Ed. level in Delhi. Sharma (1967) studied the problems and challenges faced by the teachers in teaching by television in the Higher Secondary Schools of Delhi. Swami (1967) conducted a study to find out the opinion of teachers and students of ETV schools regarding television lesson in physics.

Another investigation conducted in the same year (1967) at M.Ed. level was by Mangla. It was a study of comparative achievement in chemistry of the tenth class students in TV and Non-TV schools. The students in the TV and Non-TV groups were compared on intelligence and socio-economic status. In each group there were 105 students. The difference in achievement

in chemistry between two groups was found to be statistically significant at .01 level of confidence. He concludéd that TV is beneficial for the teaching of chemistry. In Sharma's study students felt that they were very much benefitted by the physics lessons taught through TV but he did not study the effect of ETV on the achievement of pupils.

Roy (1974) studied the cognition effects of ETV programmes through four bases of cognition, namely, discrimination, categorisation, assimilation and utilisation. His study revealed that nearly half of the students were not having the over all cognitive effects out of ETV lessons; and the most affected were the assimilation and utilisation bases.

Three studies of the SITE, that have wide educational implications for educational television in schools, need to be mentioned in some details. The impact of SITE on primary school children by Shukla and Kumar (1977) is one of the most extensive study attempted in India so far. The study was aimed to find out change in cognitive development of primary school children, and changes in attitude and teaching strategies of teachers as a result of exposure to television. The results of the study showed improvement in the language of children exposed to educational television. Out of

the 48 recordings of differences between gain scores of experimental and control groups (four language tests, at two grade levels and in six regions), 46 were found to be positive and as many as 33 differences were statistically significant. Further analysis indicated that grade III had gained more in language development than grade V from TV exposure and non Hindi school children gained more in language development than children from Hindi speaking states. One of the explanation for higher gains in respect of children from non Hindi states suggested by the authors is that wherever TV programmes have been produced by people familiar with the areas, and addressed to smaller and more homogeneous audiences, they have been more effective (Shukla and Kumar,1977). This was supported by Aggarwal (1978). He indicated that the local dialects in Hindi speaking clusters differ substantially from the standard Hindi used on TV.

The gain in mean scores on achievement tests, which included three subjects - general science, social studies and mother tongue, between pre and post SITE of control and experimental school children showed very little gain in various clusters. It seemed that the SITE either did not effect the achievement of children in school subjects or it affected it to a very small extent.

The second study was by Aghi (1977) regarding impact of science education programmes on SITE children of Rajasthan. Aghi studied not the total school programme but primarily the science education programmes and it was conducted only in one state, namely, Rajasthan. Information and knowledge tests in science were administered to children in Rajasthan. Out of seven items tested, statistically significant information gain as a result of TV viewing of science education programme was observed on 4 items. However, no significant difference emerged on the application of information to solve the problem after viewing science programme.

As stated earlier, similar findings were obtained by Shukla and Kumar (1977), who reported that in all clusters the school children did not learn from the content of the programme. The findings seem to support the view that school children exposed to TV did not learn a great deal from the content presented in the telecast. The researchers feel that it is possible that the science programmes went over the heads of the children or that the programmes were very different in their approach compared to the approach of class teachers. They also note that in most cases the teachers did not intervene to interpret or explain the telecast.

The objective of the study "Educational Television in Orissa" (Rehman, 1977) was to ascertain the extent to which rural children "liked" or "appreciated" the programme, comprehended or were able to recall the main elements of the content and perceived the visuals. For this study, 8 programmes were chosen. On the basis of data obtained on appreciation of programmes on 3 point scale, the researcher reports that there was high liking for the programme among both children and teachers; there was variation in the level of liking among children and teachers; and by and large there was a similarity in children's and teachers assessment of programmes.

In terms of choices between formats it was found that documentry treatment of familiar themes and topics was preferred, though sometimes programmes using graphs also found favour. She further reports that fragmentary information, given primarily through spoken word was not perceived. Dialogue was also not a very successful method of transmitting information. The researcher concludes that high comprehension is closely related to visually affective and conceptually well structured communication.

As Gore (1979) states this is not really a study of impact in terms of gain in any area, either of knowledge or attitudes or behaviour. The study is more

like an effort to provide a feed back to producers in terms of what the children are likely to understand or appreciate.

In a study conducted by Space Application Centre, Ahmedabad (1979) in Kheda, a series of science programmes for children of 6 to 12 years were transmitted. These programmes were on nutrition, hygiene, environmental science, nature, the universe, etc. To find out the impact of these programmes, questions framed on the content of the programme were asked to children in experimental and control villages. It was found that children in experimental villages gave correct answers for questions on the cause and effect phenomenon, principles of hygiene and simple science experiments as compared to children in control villages.

In another series for children on means of transportation, which used fantasy format, 'Jinn and the magic lamp' the researchers reported that compared to control group children, the experimental group children gave more correct answers to questions on means of transportation.

Kanade (1982) studied the impact of instructional television on the behaviour of the rural elementary school children. His sample consisted of 216 children drawn from television and non-television schools

and he used a "Post-test-only control group design," He found that creative behaviour was influenced to some extent as a result of the exposure. He reported improvement in language fluency but not on language refinement. As a result of the exposure children showed a positive attitude towards school, but motivation remained uneffected.

A study of the impact of educational television programmes on the children of class IV and V in Sambalpur District (Orissa) was conducted by Centre for Educational Technology, N.C.E.R.T. (1983c). The study has shown a positive effect of ETV on pupil's learning. The extent of gain was, however, only 3.2 percent as compared to the children of Non-ETV schools. However, the gain was not statistically examined. One of the objective of the study was to invite suggestions of teachers to make the programmes more effective. Sixtyfive percent of the teacher respondents (N-31) suggested that the ETV programmes should be supplementary to classroom teaching rather than of enrichment type alone as this would be a better way of using the medium for improving the teaching learning process. The researchers added on the basis of their observations that teachers were not always confident to teach all topics effectively and wanted TV to support

them. The study concluded that a three pronged approach would be useful for the effective utilisation of medium: (1) to improve the functioning of TV sets, (2) to improve the quality of ETV programmes, and (3) to improve the utilisation of ETV programmes.

Educational television and students' ability

Special consideration has been given in studies to the effectiveness of television with pupils at different ability levels. Kanner, Runyon and Desiderato (1956) claimed that television was more effective than traditional methods for teaching pupils of lower aptitudes. In the Hagerstown experiment, pupils of I.Q.90 and below made a gain of 14 months in arithmetic attainment over a period of 7½ months.

Jacobs and Grate (1962), however, seem to imply the opposite when they say: "there appears to be a trend for the conventional method to become more superior to the television method of instruction as the ability level decreases". Boeck and Washton (1961) reported that television instruction was better than conventional instruction for the average pupil only. Pupils of I.Q. 120 and above and I.Q.100 and below, did better with conventional instruction.

Barrington (1961) carried out an investigation into the effectiveness of television for teaching physical science as compared with conventional instruction in the laboratory. Two groups of secondary modern school boys of average ability, aged between thirteen and fourteen years of age, formed the sample. One group allowed three television lessons from the B.B.C. and the second group had conventional lessons in the laboratory. The results indicated that the laboratory group had done a little better than the television group but that the difference was not significant.

Jacobs, Bollenbacher and Keiffer (1961) tested the effectiveness of television in teaching mathematics to below average I.Q. junior high students. No significant differences were found between the television and conventional groups on the computation section of the test. In two of five comparisons on problem solving and concepts, the TV-taught classes did significantly better.

Devitt (1963) investigated the effectiveness of television lessons in providing intellectual stimulation for gifted pupils. He concluded that television instruction had a desirable effect on gifted

pupils and that subject matter assistance was less important for learning from television than students' awareness of the value placed by their teachers upon the programme presented.

Similar findings were reported by Hennes and Saltzman (1965). They presented to 570 gifted children in fifth and sixth grades three series of enrichment units on astronomy, mathematics and geography through television, but there was no classroom follow-up. Tests showed that children who viewed the enrichment lessons scored significantly higher than a control group of 1,000 children.

The situation regarding the effectiveness of television for teaching at the different levels of ability was perhaps best expressed by Schramm (1962) whose judgement was that: 'It must be admitted that we do not yet understand the relation of mental ability to differential learning from television'.

Educational television in national educational reform projects.

Television has been used in some of the national educational reform projects. The purpose of these projects was to make major changes in their educational system with the aid of television. The results of the studies conducted on the effect of educational

television in these projects are given below.

Chu and Schramm (1967) report that in Niger, where some first-grade classes were taught by television and classroom monitors, the children were carefully tested at the end of the year in the four subjects they had studied; spoken French, reading, writing and arithmetic. When their performance was compared with the standard average for the grade in Niger, the results were: 79 percent scored better than the standard average in spoken French; 88 percent scored better than the standard average in reading; 56 percent scored better than the standard average in writing and more than half scored better than the overall average for arithmetic. The Niger examiners concluded that television in the classroom would not only produce satisfactory learning, but would also improve the average of class performance over what it had been before the introduction of television.

In Samoa, the high school entrance examination at the end of the first two years of the television experiment made it possible to compare public school children who had been taught by television for two years, for one year, and not at all, and children who had been taught throughout the eight grades by American teachers in mission schools. The first set of tests

indicate that children who have television for even one year do considerably better in the entrance examination than those who have not had it, and those who have been exposed to television teaching for two years do about as well as the mission graduates taught by foreign teachers (Schramm et al 1967).

Comstock and Maccoby (1966) report that in Columbia some thousands of primary school pupils taught in part by television were tested against a comparable group taught from the same syllabus, but without the aid of television. Tests were based on the course of syllabi. Eight comparisons in the second, third, fourth and fifth grades, were possible. In three of them, the television students did significantly better; in the other five, there were no significant differences. The three comparisons that favoured television were grade II language, grade V mathematics, and grade IV natural science. The ones in which differences were not significant were two science and three social studies classes.

In some studies a more widely useful standard of comparison was derived from the performance on a standardised test. After television had been installed in the Washington coun'y school system, Hagerstown, Marylard, the performance of students was measured on

the IOWA tests of achievement. The results of the standardised tests which have been summarised by Wade (1967), showed television classes to be out - performing conventional classes. Hagerstown children in grade V gained 1.9 years, measured against national norms, in 1.0 years of television instruction - as they did - this is rather impressive evidence of efficient learning from television. The average level of Hagerstown junior high mathematics students rose, during the four years of televised instruction, from the 31st to the 84th percentile, measured against national norms. This can assumed to be efficient learning.

The Ivory Coast with only about 24.7 percent of its age Cohort in school in the first grade in 1967-68, 18.5 percent in the second grade, 16.3 in the third, and 13.8 in the fourth, wanted to achieve universal primary education. The Ivory coast offered televised lessons in the first year of the reform, 1971-1972, to 447 first grade classes (about 27000 students). In 1974 (Grant, 1974), 55 percent of the school age population were served by the new system. The target is 100 percent by 1986. However, as Schramm (1977) says "no reports on learning gains and attitudes have come to us."

Mayo et al (1976) report the EL Salvador's experience with television which is unique in many ways. Unlike other developing countries that attempt to upgrade one or other aspect of their educational system with television, El Salvador conceived the medium as an integral component of national reform, embracing curriculum revision, teacher training and new concepts of supervision and pupil evaluation. A major goal of the ETV project in EL Salvador was to improve the quality of student learning. Consequently two kinds of learning were evaluated in the course of this study: basic skills, i.e., reasoning and reading ability and course achievement. On most learning comparisons, students exposed to ITV, retrained teachers, the revised curricula, and new learning materials out performed their peers in traditional class and in classes that had all elements of reform except television.

In Korea, TV programmes were used to enhance the quality of instruction and to reduce the difference between rural and urban areas which are caused by the concentration of competent teachers in urban schools. No systematic figures are avilable for Korea, where time has been spent on preparing and testing both hardware and software for the national project. However,

test results from unit try-out as reported by Schramm (1977) indicate that the new materials are working effectively. A comparison was made between the experimental group using the new material in two subjects namely Korean and arithmetic and a control group using previous materials. The groups were equated by a diagnostic test which showed the control group scoring slightly (but not significantly) higher at the beginning of the unit. At tne end of the unit, the experimental group was significantly higher than the control (.01 level). Furthermore, when the students were divided according to the percentage who attained "mastery" (80 percent or over), and near mastery (60 to 70 percent), again the experimental students did noticeably better.

Effects of Variations in the Utilisation of Educational Television on Pupil's Achievement.

When television was introduced in the schools, the research on educational television was concentrated on its effect as compared to traditional/conventional teaching. Later some studies have been conducted to find combinations which will be more efficient than only classroom teaching or only television teaching. Some studies have been done on various ways in which a classroom teacher can involve a learner in

educational television programmes. Some of these studies are mentioned in this section.

A comparitive study of the teaching of physics by television and other methods was reported by Boeck and Washton (1961). One group of pupils received instruction by television, a second group received the television lesson and had their own teacher in the room to develop the lesson, and a third group had a conventional lesson given by the same teacher. No significant differences were found between the achievement of groups.

Follow up procedures were investigated by Hayman and Johnson (1963). A second viewing of television lessons in Spanish (i.e. exact repetition) was evaluated under three conditions: (1) compared with a single viewing; (2) compared with a single viewing and teacher directed practice (varied repetition); and (3) as an addition to a single viewing and classroom practice compared with the same conditions without repeat viewing. It was found that exact repetition significantly increased learning where no other follow-up was used. But it was not as effective as teacher - directed follow-up, provided such follow-up is skilfully presented.

In Columbia Comstock and Maccoby (1966) found a great variety in the learning contexts being provided for television in the classroom. A few teachers actively rehearsed their students in the points made on television; a few others invited questions; few simply lectured on the same subject as the television programme; still others did very little of anything related to the broadcasts. So an experiment was designed. One group of teachers was assigned to direct a purposeful question and answer session based on the television programme during the remaining minutes of the period. Another group was assigned to lecture on the main points made in the broadcast. Still another group did what they had always been doing; different methods for different teachers.

The question and answer pattern proved to be superior in all cases, apparently because it provided more chances to practice. On the basis of results the experimenters conclude that what happens in the classroom makes a great difference in the effectiveness of supplementary ITV.

Tada (1966) in order to evaluate the effects of classroom teaching, showed social studies programmes designed for nine-year-olds to three groups of children once a week for two months. The first group

received instruction from teachers to help them memorise the contents of the programme, the second group was given instruction that let them think for themselves and make their own findings. The third group received no complementary instruction of any kind. The first of the findings was that the first and second groups achieved better results in all the tests, which indicate that teacher has a considerable role to play in the classroom, even with the adoption of television into his teaching. In the test of the children's memory, the second group was better than the first. This suggests that, rather than instruction to help the children to memorise the programme contents, guidance letting them actively deepen their learning is more suited to teaching with television.

The role of teacher in increasing effectiveness of ETV programmes has been emphasised by Mizukoski on the basis of series of experimental studies carried out by him from 1974 to 1976 on the use of social studies programme. Mizukoski, in his successive studies, pointed out that it was important in terms of effectiveness that a series of instructional programme be viewed every week without being missed and also that purposeful instruction be given by the teacher.

Such research has also been conducted in Santa Clare, California (1968) by television personnel who studied the relative effectiveness of three methods of classroom television utilisation. Eight hundred fifth grade students divided into three groups were exposed to 12 television lesson in science. In one group, the teachers were asked to use the Socratic approach to ask questions and give immediate knowledge of correct responses after each telecast. In the second group, the teachers were asked merely to explain to the students that they would proceed directly into television experience without any preliminary question-and-answer session. In the third group, the teachers were provided with a programmed guide and left to their own devices in using it or ignoring it. It was found that the teachers who used the Socratic or discussion method of instruction achieved the highest results with their pupils. The generalisation is that teachers who attempt to involve their students in the lesson and encourage them to respond actively to questions about the content achieve good results. That is, if the teacher, through his actions and behaviour in the classroom, gives evidence that television is an important and useful learning tool, students invariably accept the cue.

Another research on teaching strategies was carried by Kikuchi (1975) who showed children a geography programme produced for ten-year-olds and asked them to write down which scenes they had found "important" as well as to freely express themselves regarding the programme. The children were also given achievement tests before and after the viewing of the programme so as to evaluate effect of its use. Kikuchi, at the same time, conducted a survey of teacher's opinions of TV assisted education. His research showed that there were positive effects due to TV viewing, and that pupils whose teachers were progressive and active about instructional broadcasting were utilising classroom television on more favourable lines than those pupils who had teachers with traditional attitudes about education.

On teaching of languages also, some studies have been done. In Denver (Schramm et al, 1964) various ways of using television and related media to teach Spanish to elementary school children were tested, with interesting results. ITV programmes were used in combination with records, tapes, and a special programmed instruction text in Spanish to which learners could refer. The television programmes were used throughout a semester in four different ways with four groups of fifth-graders. All four groups used the same additional

learning devices and materials. The first group viewed the television programmes once. The second group viewed the television programmes twice, once when they were broadcast and immediately afterward on video-tape. The third group viewed the television programmes once in school and once again in the early evenings at home over open-circuit television. Parents were encouraged to join their children in watching the repeat viewings. The fourth group viewed the television programmes once and then practiced what they had learned orally for 15 minutes under the direction of their teacher.

As in the case of films and other visual materials, repeated viewing increases learning. Having parents view the programmes also had a positive effect. However, the greatest gains were made by those who had a chance to practice orally after each lesson, helped by their classroom teacher. In another experiment in Denver, Hayman and Jhonson (1963) found that different 'Packages' of classroom activities built around the television made significant differences in the total amount of learning. The general conclusion of the experimenters was that a well-trained and motivated classroom teacher is the most effective aid. When the television part of the course was held constant, "both the

interest and experience of the classroom teacher influenced learning."

Randall (1964) on the basis of his study "Research results in three large televised foreign language courses in the elementary school programmes," concludes that enthusiastic and conscientious handling of foreign language ITV lessons by classroom teachers invariably results in higher achievement by participating students. According to Randall:

> Far from the concept of letting the machine do all the work, it is evident how little foundation there is to the fear that television will replace the teacher. On the contrary..... and here the finding of research projects agree.....evidence mounts up that it is only with the aid of the teacher that television can be an effective means of teaching foreign language.

Overview

Studies presented in this chapter include reviews reported in professional literature and researches by investigators. Most of the reviews, especially those of Seldes (1957), Holmes (1960), Schramm (1962) and Chu and Schramm (1967) show that in majority of comparative studies, there is no significant difference between learning from television and learning from conventional teaching. In some studies, however, there is a significant difference, and this

difference is in favour of television group.

According to Kumata (1960) when differences are found, these seem to be better explained by conditions other than the mere fact of TV transmission. For example, a great many differences favouring TV students have appeared in studies at elementary and secondary school level (Pflieger, 1958; Hagerstown, 1959 and Ford Foundation, 1961). In these studies, TV did not carry the entire load in the class but was used as an augmentation to regular classroom instruction.

Schramm (1962) also found a tendency from 393 comparisons indicating that the lower the grades, the more likelihood there was of television teaching to be superior to face-to-face teaching. At the third to sixth grade level, he found 50 comparisons in favour of TV, 86 no difference, and 16 in favour of face-to-face teaching. The same picture held for seventh to ninth grade: 18 in favour of television, 28 no difference and 5 in favour of face-to-face teaching. For tenth to twelth grades, the trend was reversed; 12 in favour of television, 57 no difference and 21 in favour of face-to-face teaching. At the college level, the reverse trend became even more pronounced: only 3 in favour of television, 84 no differences, and 13 in favour of face-to-face instruction. Later in review

of 207 studies involving 421 separate comparisons Chu and Schramm (1967) have come with similar findings which may be seen in Table I.

Table - I

RESULT OF 421 COMPARISONS BETWEEN INSTRUCTIONAL TELEVISION AND CONVENTIONAL TEACHING

Level	No Significant difference	Television more effective	Conventional more effective
Elementary	50	10	4
Secondary	82	24	16
College	152	22	28
Adults	24	7	2
	308	63	50

These findings consistently indicate that television instruction is apt to be more effective in teaching primary and secondary school students than college students.

In the absence of more evidence, one can speculate as to why this may be so. One possible reason could be the lack of immediate feedback in televised

teaching. It is assumed that higher the grade level, the more complex the material taught, the more serious will be the lack of immediate feedback and discussion.

Another possible factor is the role of television in the environment in which the students are brought up. It is assumed that younger the children, the more intimately has television been part of their experience of growing, and the more readily they are able to learn from the medium.

A third possibility is the different preference for the media by different age-groups. Ames (1958) got the impression after his visits to instructional television in ten big cities that the TV teacher usually has a special prestige value for younger pupils, and thus may be able to stimulate and motivate learning. Perhaps the younger pupils are more likely to prefer television teaching while the older students are more likely to prefer face-to-face teaching.

Other important factor is the attitude of the teacher. The elementary school teacher is accustomed to a more flexible schedule, less accustomed to lecturing, and more likely to be grateful for outside help with unfamiliar subject matter (like new mathematics) with demonstration and visual aids which could hardly

be produced in a single classroom. Therefore, if the elementary school teacher is more receptive than the secondary school or the college teacher to televised instruction, it is expected that students too would be more receptive.

Another point which should be taken care of, while interpreting results showing no difference between TV teaching and conventional teaching may be that many of the comparisons of television with conventional teaching are of classes taught completely by television versus classes taught completely by conventional methods. This is an unreal comparison because almost nowhere in the world, is television being used in classroom without being built into a learning context managed by the classroom teacher. Indeed some of the most successful uses seem to depend on the studio teacher and classroom teacher working as a team, towards the same learning goals. Therefore, the finding of "no significant difference" seems to mean that television can do its part in this combination. Hence, there is a need to find what combinations will be more efficient than either classroom teaching or television teaching.

Allen (1971) reviewed studies on ITV and concluded that the students learn from television cannot

be doubted, but the conditions under which learning takes place, and the specific characteristics of the television presentation that brings this about are yet to be determined, and most research ignored such questions.

In the review of studies it may be seen that television teaching has been found to be effective in Niger, American Samoa, EL Salvodor and Ivory coast. These were national educational reform projects and the purpose of all these projects was to make major changes in their educational system either expanding or upgrading the instruction or both, and to make the changes, with the aid of massive use of media, that is, television, much more quickly than they could otherwise hope to do. In each case, television demonstrated its ability to catalyze change in a change resistant system, and to enforce a schedule on that change. Thus while interpreting the results, it should be kept in view that none of these projects was really a television project, except in the sense that television was a principal component.

Television is hardly a self-sufficient instructional tool. It needs teachers' guides, study materials for students, visuals for classroom use, and all the other tools of instruction that a live teacher

needs. Looking at the experience of EL Salvador, for example, one can say that the retraining of teachers was at least as important an influence on educational opportunities offered to students as was television, and the provision of new and excellent teachers' guides and classroom study materials was not far behind in importance. Thus, it may be said that once effective television learning experience has been designed and produced, great reliance must be placed on the classroom teacher, who invariably is the ultimate influence that determines when and how the student is affected. Accordingly, some studies have been conducted in the West on various ways in which the classroom teacher can actively involve the learner in television instruction.

The above review brings out the status of research in the area of educational television. It shows that not many studies have been attempted in India. In the next section some areas of research more relevant to the present day needs have been suggested.

Implications for Research

The review of studies gives a picture of some of the research problems attempted in West and in India. This is suggestive of research in the following areas:

The review points out to the fact that by and

large television has been under utilised in India. The reasons for under utilisation of the medium may be studied in greater detail. Some studies indicate poor maintenance of equipment and others lack of coordination between producers and users of educational television programmes. Field work and survey studies could pin point these drawbacks in detail.

These studies do not indicate any trend in the effectiveness of educational television for teaching at the different levels of ability. This may require further research.

The review indicates that in India no attempt has been made to survey the needs of the students and teachers regarding educational television programmes. Such surveys could provide useful material for need-based programmes.

There is some indication that the lower the grade level, the more favourable is the attitude of teachers and students towards ETV programmes. However, it has to be seen as to how curriculum-based and non-curriculum based television programmes compare in imparting the learning experience.

Research attempts in the area of educational television also need to focus attention on the various

aspects which affect the effectiveness of educational television programmes. These include procedures of planning the content of the programme for different grade levels; production of programmes; specifically, formats and quality of presentation; and the manner in which the programmes are utilised at the receiving end.

The review as well as listing of areas of research were found useful in identifying and defining the problem under investigation in the present study. As may be seen from the review, in India no attempt has been made to study the effect of educational television with the active support of teachers. During SITE an attempt was made in this direction by sending teacher's guides on television programmes, so that post-telecast discussion could be held after the programme. But as researchers have themselves reported (Shukla and Kumar 1977, Bhaskaran 1977), nothing was done by way of post-telecast discussion. Hence, the present investigation has been planned to see the effect of ETV as it is being used today, and to experimentally examine its effectiveness along with intervention programmes, i.e., pre and post-telecast activities conducted by teachers on the educational development of children.