

## CHAPTER IV

### ANALYSIS AND FINDINGS

Hypotheses formulated earlier in chapter I were examined in the light of the data collected from experimental and control groups of students. The statistical procedures adopted in this context, and the findings are presented in this chapter.

Hypotheses examined to study the effect of educational television, and educational television with intervention programmes are presented first, followed by the feedback from teachers for improvement and effective utilization of educational television programmes.

#### Statistical Design of Analysis

As the main objective of the study was to test the significance of the differences on criterion variables under different treatments, pre-post control group design was employed.

Generally in this type of experimental design, two  $t$ 's are computed, one for the pretest-post-test difference in experimental group and one for the pretest-post-test gain in the control group. If the former be statistically significant and the latter 'not' then it is concluded that the  $x$  (treatment) had an effect. This

holds true if the groups are matched at their entry level scores on different variables. However, if the groups are not matched at their entry level scores, in that case any difference obtained on post-test scores or mean gains on criterion variables can not be attributed to treatment alone. Since the conclusion drawn from such analysis do not take into account the direct statistical comparison of the experimental and control groups. Therefore, in such cases, if a more appropriate test had been used, the difference would not have been significant (as in the case where the significance values are border line, with the control group showing a gain almost reaching significance).

Windle (1954) and Cantor (1956) have shown how frequent this error occurs. Hence, randomized 'blocking' or 'leveling' on pre-test scores and the analysis of covariance with pre-test scores as the covariate, are preferable to simple gain score comparisons (Campbell and Stanley 1963; Bereiter 1963). Taking all this into account it was decided to use the technique of analysis of covariance to study the differences in post-test scores between treatment groups after adjusting for the initial difference in pre-test score.

Apart from analysis of covariance, pair-wise comparison for different treatment groups were made to

study the difference between ETV and Non-ETV group, ETV with intervention and ETV group, ETV with intervention and Non-ETV group. This analysis reveals how far the overall significance of differences among group means is attributable to a specific contrast. For one variable, namely acquisition of information related to ETV programmes, only post-test scores were available. Therefore, on this variable analysis of variance was used to find out if the three groups differ. As the groups were different, 't' test was used for paired comparisons of the groups.

A total of 447 students were tested to examine the hypotheses in respect of the effect of ETV and ETV with intervention on the educational development of children. Of these, 149 were in ETV with intervention group, 153 in ETV group and 145 in Non-ETV group. As the number of children in three groups did not differ much, it was decided to equate the number of children in three groups for convenience in computational analysis. Also it has another advantage. According to Lindquist (1956):

When all the groups are of the same size, it matters little whether the group or subject is the unit of analysis, since in this case weighted and unweighted means of the group are same.

To equate the number of children in each group, 4 children in ETV with intervention group and 8 children

in ETV group, were dropped randomly. Finally there were 145 children in each group, and a total of 435 children in all the three groups.

#### Equating Groups on Intelligence

It may be recalled that certain factors were controlled such as (a) type of school (all Municipal Corporation schools), (b) sex (all girls), grade (class V children), schools of comparable standards (on the basis of judgement of Inspectors of schools and Assistant Education Officers of Municipal Corporation). However, before testing the hypotheses and making comparative analysis, among these randomly drawn samples, the three groups were examined in relation to intelligence. To test whether the group means differ significantly or not, analysis of variance technique was applied.

The mean, SD and F value in respect of intelligence of children in three groups is reported in Table 2 and 3 respectively.

TABLE 2

MEAN AND S.D. OF SCORES ON INTELLIGENCE TEST  
FOR THREE GROUPS OF CHILDREN

Group	N	Mean	S.D.
Non-ETV	145	17.22	4.81
ETV	145	16.57	4.61
ETVI*	145	16.53	4.62

\* ETVI = ETV group with intervention.

TABLE 3

ANALYSIS OF VARIANCE OF SCORE ON INTELLIGENCE TEST  
FOR THREE GROUPS OF CHILDREN

Source	df	SS	MSS	F	P
Between groups	2	43.8	21.9		
Within groups	432	9196.7	21.28	1.03*	NS
Total	434	9240.5			

\* For 2 and 432 degrees of freedom, minimum value significant at 0.05 and 0.01 levels are 3.02 and 4.66 respectively.

Table 3 gives the obtained F ratio. The observed F ratio of 1.03 with 2 and 432 degree of freedom, is not significant at 0.05 level. This showed that the

three groups did not differ significantly on intelligence. Therefore, the three groups were found to be well-equated on intelligence.

### Testing the Hypotheses

The results are presented with reference to each hypothesis. Hypotheses in the null form are stated, one at a time, for statistical analysis and interpretation.

#### Hypothesis 1.1

There is no difference in the language development of children who are exposed to ETV programmes and those not exposed to ETV programmes.

As there were five aspects under language development, five sub-hypotheses were formulated as stated below:

- 1.1.1 There is no difference in the word meaning skills of children who are exposed to ETV programmes and those who are not exposed to ETV programmes.
- 1.1.2 There is no difference in the verbal fluency of children who are exposed to ETV programmes and those who are not exposed to ETV programmes.
- 1.1.3 There is no difference in the listening comprehension of children exposed to ETV programmes and those who are not exposed to ETV programmes.
- 1.1.4 There is no difference in reading comprehension of the children exposed to ETV programmes and those who are not exposed to ETV programmes.

- 1.1.5 There is no difference, in the language development (derived by adding scores on word meaning, verbal fluency, listening comprehension and reading comprehension) of children exposed to ETV programmes and those who are not exposed to ETV programmes.

Table 4 presents consolidated results related to hypotheses stated above.

TABLE 4

MEAN SCORES OF CRITERION VARIABLES (LANGUAGE DEVELOPMENT) BEFORE AND AFTER TREATMENT, ANACOVA ADJUSTED MEANS AND F VALUES FOR ETV AND NON-ETV GROUPS.

Criterion Variable	Group	Pre-Mean	Post-Mean	ANACOVA adjusted Mean	F Value	P
Word Meaning	ETV	17.70	21.88	22.76	1.51	NS
	Non-ETV	19.67	22.32	22.01		
Verbal Fluency	ETV	26.23	36.48	36.98	16.59	0.01
	Non-ETV	27.46	32.04	31.69		
Listening Comprehension	ETV	9.34	11.12	11.78	0.32	NS
	Non-ETV	10.93	12.13	11.60		
Reading Comprehension	ETV	18.88	20.14	19.87	3.18	NS
	Non-ETV	18.42	19.08	19.08		
Language Development	ETV	72.16	89.63	91.98	21.38	0.01
	Non-ETV	76.48	85.57	84.02		

Table 4 reveals the ANACOVA mean difference between ETV and Non-ETV group on all the five variables. The obtained F value 16.59 in respect of verbal fluency and 21.38 in respect of language development are significant at 0.01 level. Hence, the null hypotheses that there is no significant difference between ETV and Non-ETV groups on the criterion variables verbal fluency and language development are rejected. Therefore, it can be inferred that there is a significant difference between ETV and Non-ETV groups on verbal fluency and language development. The results are favourable for ETV group.

Table 4 also gives the ANACOVA means and F values concerning the hypotheses 1.1.1, 1.1.3, 1.1.4. The obtained F value of 1.51 in respect of word meaning, 0.32 in respect of listening comprehension and 3.18 in respect of reading comprehension are not significant at 0.05 level. Therefore, there is, no evidence to reject the hypotheses 1.1.1, 1.1.3 and 1.1.4. This shows that there is no significant difference between the ETV and Non-ETV groups on word meaning, listening comprehension and reading comprehension.

#### Hypothesis 1.2

There is no difference in the acquisition of information related to ETV programmes

between children who are exposed to ETV programmes and those who are not exposed to ETV programmes.

Table 5 presents the results of the above hypothesis.

TABLE 5

DIFFERENCE IN MEAN SCORES ON TEST BASED ON ETV PROGRAMMES BETWEEN ETV AND NON-ETV GROUPS.

Group	N	Mean	S.D.	Differe- nce in Mean	t	P
ETV	145	14.47	7.04	1.70	2.36	0.01
Non-ETV	145	12.77	5.05			

Table 5 gives the result concerning the hypothesis 1.2 regarding acquisition of information related to ETV programmes. The 't' value of 2.36 is significant at 0.01 level of significance. The null hypothesis is therefore rejected, implying that there is a significant difference between ETV and Non-ETV groups on acquisition of information related to ETV programmes. The results are in favour of ETV group.

### Hypothesis 1.3

There is no difference in the scholastic achievement of children who are exposed

to ETV programmes and those who are not exposed to ETV programmes.

As the groups were compared on three subjects, three sub-hypotheses were formulated as stated below:

- 1.3.1 There is no difference in the scholastic achievement in science of children who are exposed to ETV programmes and those who are not exposed to ETV programmes.
- 1.3.2 There is no difference in the scholastic achievement in social studies of children who are exposed to ETV programmes and those who are not exposed to ETV programmes.
- 1.3.3 There is no difference in the language achievement of children who are exposed to ETV programmes and those who are not exposed to ETV programmes.

Table 6 presents the results related to these hypotheses.

TABLE 6

MEAN SCORES OF CRITERION VARIABLES (SCHOLASTIC ACHIEVEMENT) BEFORE AND AFTER TREATMENT, ANACOVA ADJUSTED MEANS AND F VALUES FOR ETV AND NON-ETV GROUPS

Criterion Variable	Group	Pre Mean	Post Mean	ANACOVA Adjusted Mean	F Value	P
Science	ETV	9.22	11.94	12.03	6.17	0.05
	Non-ETV	9.39	11.12	11.11		
Social Studies	ETV	9.05	13.34	13.26	0.78	NS
	Non-ETV	8.72	13.52	13.66		
Language Achievement	ETV	26.35	35.72	36.61	16.14	0.01
	Non-ETV	27.94	33.09	32.57		

Table 6 reveals that the ANACOVA mean score difference between ETV group and Non-ETV group on two criterion variables, namely, science and language achievement are significant at 0.05 and 0.01 level of significance respectively. Therefore, null hypotheses with regard to science and language achievement are rejected, implying that there is a significant difference between the ETV and Non-ETV groups with regard to achievement in science and language. The results are in favour of ETV group.

In social studies, the F value of 0.78 was not significant at 0.05 level of significance. Hence, there is no reason to reject the hypothesis that there is no significant difference in achievement in social studies between the ETV and Non-ETV groups.

#### Hypothesis 2.1

There is no difference in the language development of children who are exposed to ETV programmes with intervention and those exposed to ETV programmes without intervention.

As there were five aspects under language development, five null sub-hypotheses were formulated.

- 2.1.1 There is no difference in word meaning skills of children who are exposed to ETV programmes with intervention and those exposed to ETV programmes without intervention.

- 2.1.2 There is no difference in the verbal fluency of children who are exposed to ETV programmes with intervention and those exposed to ETV programmes without intervention.
- 2.1.3 There is no difference in the listening comprehension of children who are exposed to ETV programmes with intervention and those exposed to ETV programmes without intervention.
- 2.1.4 There is no difference in reading comprehension of children who are exposed to ETV programmes with intervention and those exposed to ETV programmes without intervention.
- 2.1.5 There is no difference in the language development of children who are exposed to ETV programmes with intervention and those exposed to ETV programmes without intervention.

Table 7 presents consolidated results related to the hypotheses stated above.

TABLE 7

MEAN SCORES OF CRITERION VARIABLES (LANGUAGE DEVELOPMENT)  
BEFORE AND AFTER TREATMENT, ANACOVA ADJUSTED MEANS  
AND F VALUES FOR ETVI AND ETV GROUPS.

Criterion Variable	Group	Pre Mean	Post Mean	ANACOVA adjusted Mean	F Value	P
Word Meaning	ETVI	20.13	22.97	22.38	0.39	NS
	ETV	17.70	21.88	22.76		
Verbal Fluency	ETVI	27.18	42.67	42.51	18.22	0.01
	ETV	26.23	36.48	36.98		
Listening Comprehension	ETVI	10.40	13.03	12.89	11.75	0.01
	ETV	9.34	11.12	11.78		
Reading Comprehension	ETVI	17.94	21.48	21.75	17.81	0.01
	ETV	18.89	20.14	19.87		
Language Development	ETVI	75.66	100.14	99.33	18.31	0.01
	ETV	72.16	89.63	91.98		

It can be seen from the above table that the ANACOVA mean score difference between ETV group with intervention and ETV group without intervention on four out of five variables are significant at 0.01 level of significance. Hence the null hypotheses with regard to verbal fluency (2.1.2), listening comprehension (2.1.3),

reading comprehension (2.1.4), and language development (2.1.5) are rejected. It may be inferred from the results, that there is a significant difference between ETV and ETVI groups on verbal fluency, listening comprehension, reading comprehension and language development. These differences are in favour of ETV group with intervention.

Table 7 reveals that the ANACOVA mean difference on word meaning between ETV and ETVI groups is not significant at 0.05 level of significance. Therefore, the null hypothesis with regard to word meaning is tenable.

Hypothesis 2.2

There is no difference in the acquisition of information related to ETV programmes between children who are exposed to ETV with intervention programmes and those who are exposed to ETV without intervention programmes.

Table 8 presents the results of the above hypothesis.

TABLE 8

DIFFERENCE IN MEAN SCORE ON TEST BASED ON ETV PROGRAMMES BETWEEN ETVI AND ETV GROUPS.

Group	N	Mean	S.D.	Difference in Mean	t	P
ETVI	145	16.88	6.53	2.41	3.01	0.01
ETV	145	14.47	7.04			

It is evident from the 't' value of 3.01 in table 8 that the difference between ETVI and ETV group is significant at 0.01 level of significance. The results indicated in table 8 lead to rejection of null hypothesis. As the mean of ETVI group is 16.88 and of ETV group 14.47 on test based on ETV programmes, the results are favourable to ETVI group

### Hypothesis 2.3

There is no difference in the scholastic achievement of children who are exposed to ETV programmes with intervention and those exposed to ETV programmes without intervention.

As the groups were compared on three subjects, three sub-hypotheses were formulated.

- 2.3.1 There is no difference in the scholastic achievement in science in respect of children who are exposed to ETV programmes with intervention and those who are exposed to ETV programmes without intervention.
- 2.3.2 There is no difference in the scholastic achievement in social studies of children who are exposed to ETV programmes with intervention and those who are exposed to ETV programmes without intervention.
- 2.3.3 There is no difference in the language achievement of children who are exposed to ETV programmes with intervention and those who are exposed to ETV programmes without intervention.

Table 9 presents consolidated results related to the hypotheses stated above.

TABLE 9

MEAN SCORES OF CRITERION VARIABLES (SCHOLASTIC ACHIEVEMENT) BEFORE AND AFTER TREATMENT, ANACOVA ADJUSTED MEANS AND F VALUES FOR ETVI AND ETV GROUPS.

Criterion Variable	Group	Pre Mean	Post Mean	ANACOVA adjusted Mean	F Value	P
Science	ETVI	9.56	12.68	12.59	2.27	NS
	ETV	9.22	11.94	12.03		
Social Studies	ETVI	9.04	14.52	14.44	6.82	0.01
	ETV	9.05	13.34	13.26		
Language Achievement	ETVI	27.80	37.19	36.80	0.04	NS
	ETV	26.35	35.72	36.61		

Table 9 reveals that the ANACOVA mean difference between ETV group with intervention and ETV group without intervention on science and language achievement has not reached the level of significance. Therefore, the null hypotheses with regard to achievement in science and language are tenable. In social studies, the difference between two groups was found to be significant at 0.01 level of significance. Therefore, the null hypothesis with regard to achievement in social studies is rejected,

implying that there is a significant difference in achievement in social studies between ETV and ETVI groups.

#### Hypothesis 2.4

There is no difference in the language development of children who are exposed to ETV programmes with intervention and those who are not exposed to ETV programmes.

As there were five aspects under language development, five null sub-hypotheses were formulated.

- 2.4.1 There is no difference in the word meaning skills of children who are exposed to ETV programmes with intervention and those who are not exposed to ETV programmes.
- 2.4.2 There is no difference in the verbal fluency of children who are exposed to ETV programmes with intervention and those who are not exposed to ETV programmes.
- 2.4.3 There is no difference in the listening comprehension of children who are exposed to ETV programmes with intervention and those who are not exposed to ETV programmes.
- 2.4.4 There is no difference in the reading comprehension of children who are exposed to ETV programmes with intervention and those who are not exposed to ETV programmes.
- 2.4.5 There is no difference in the language development of children who are exposed to ETV programmes with intervention and those who are not exposed to ETV programmes.

Table 10 presents consolidated results related to the hypotheses stated above.

TABLE 10

MEAN SCORES OF CRITERION VARIABLES (LANGUAGE DEVELOPMENT)  
BEFORE AND AFTER TREATMENT, ANACOVA ADJUSTED MEANS  
AND F VALUES FOR ETVI AND NON-ETV GROUPS.

Criterion Variable	Group	Pre Mean	Post Mean	ANACOVA adjusted Mean	F Value	P
Word Meaning	ETVI	20.13	22.97	22.38	0.37	N.S.
	Non-ETV	19.67	22.32	22.01		
Verbal Fluency	ETVI	27.18	42.67	42.51	69.79	0.01
	Non-ETV	27.46	32.04	31.69		
Listening Comprehension	ETVI	10.40	13.03	12.89	16.07	0.01
	Non-ETV	10.93	12.13	11.60		
Reading Comprehension	ETVI	17.94	21.48	21.75	36.15	0.01
	Non-ETV	18.42	19.08	19.08		
Language Development	ETVI	75.66	100.14	99.33	79.81	0.01
	Non-ETV	76.48	85.57	84.02		

Table 10 reveals that ANACOVA mean difference between ETV group with intervention and Non-ETV group on four out of five variables are highly significant. Therefore, the null hypotheses with regard to verbal fluency (2.4.2), listening comprehension (2.4.3), reading comprehension (2.4.4), and language development (2.4.5) are rejected. The results reveal, that there is a significant difference between ETVI and Non-ETV groups on

verbal fluency, listening comprehension, reading comprehension and language development. These differences are in favour of ETV group with intervention. The ANACOVA mean difference for the word meaning is not significant. Therefore, the null hypothesis with regard to word meaning is, not rejected.

Hypothesis 2.5

There is no difference in the acquisition of information related to ETV programmes between children who are exposed to ETV programmes with intervention and those who are not exposed to ETV programmes.

The results relating to above hypothesis are are presented in table 11.

TABLE 11

DIFFERENCE IN MEAN SCORE ON TEST BASED ON ETV PROGRAMME BETWEEN ETVI AND NON-ETV GROUPS.

Group	N	Mean	S.D.	Difference in Mean	t	P
ETVI	145	16.88	6.53	4.11	5.96	0.01
Non-ETV	145	12.77	5.05			

Table 11 shows that mean of ETVI group is higher than the mean of Non-ETV group. The difference in mean between the two groups is significant at 0,01 level of

significance. Therefore, the results indicated in the table 11 lead to rejection of null hypothesis.

#### Hypothesis 2.6

There is no difference in the scholastic achievement of children who are exposed to ETV programmes with intervention and those who are not exposed to ETV programmes.

As the groups were compared on three subjects, three sub-hypotheses were formulated.

- 2.6.1 There is no difference in the scholastic achievement in science of children who are exposed to ETV programmes with intervention and those who are not exposed to ETV programmes.
- 2.6.2 There is no difference in the scholastic achievement in social studies of children who are exposed to ETV programmes with intervention and those who are not exposed to ETV programmes.
- 2.6.3 There is no difference in the language achievement of children who are exposed to ETV programmes with intervention and those who are not exposed to ETV programmes.

Table 12 presents the results related to the hypotheses stated above.

TABLE 12

MEAN SCORES OF CRITERION VARIABLES (SCHOLASTIC ACHIEVEMENT) BEFORE AND AFTER TREATMENT, ANACOVA ADJUSTED MEANS AND F VALUES FOR ETVI AND NON-ETV GROUPS.

Criterion Variable	Group	Pre Mean	Post Mean	ANACOVA adjusted Mean	F	P
Science	ETVI	9.56	12.68	12.59	15.92	0.01
	Non-ETV	9.39	11.12	11.11		
Social Studies	ETVI	9.04	14.52	14.44	2.99	N.S.
	Non-ETV	8.72	13.52	13.66		
Language Achievement	ETVI	27.80	37.19	36.80	17.79	0.01
	Non-ETV	27.94	33.09	32.57		

It may be seen from the above table that ANACOVA means on all the three variables, that is, science, social studies and language achievement are higher for the ETV group with intervention. The ANACOVA mean difference between ETV group with intervention and Non-ETV group on science and language achievement were found to be significant at 0.01 level of significance. Hence the null hypotheses with regard to these variables were rejected. On social studies, the difference between ETVI and Non-ETV group has not reached the level of significance, though the ANACOVA mean was higher for the ETVI group. Therefore, the null hypothesis in respect of social studies is tenable.

### Comparison of Three Groups

The overall findings are given for the three groups on the three aspects, namely, language development, acquisition of information related to ETV programmes and scholastic achievement.

For each aspect consolidated tables showing pre-mean, post-mean, adjusted-mean for the three groups as well as paired comparisons are given along with the main findings. The graphical presentation of the adjusted means on language development measures, test-based on ETV programmes and scholastic achievement measures for the three groups are also given in Fig. 4.1, 4.2 and 4.3 respectively.

### Language Development

There are five aspects under language development. Tables 13 to 22 present the pre-mean, post-mean and adjusted-mean scores on the five aspects for the three groups as well as pair-wise comparisons for the different treatment groups.

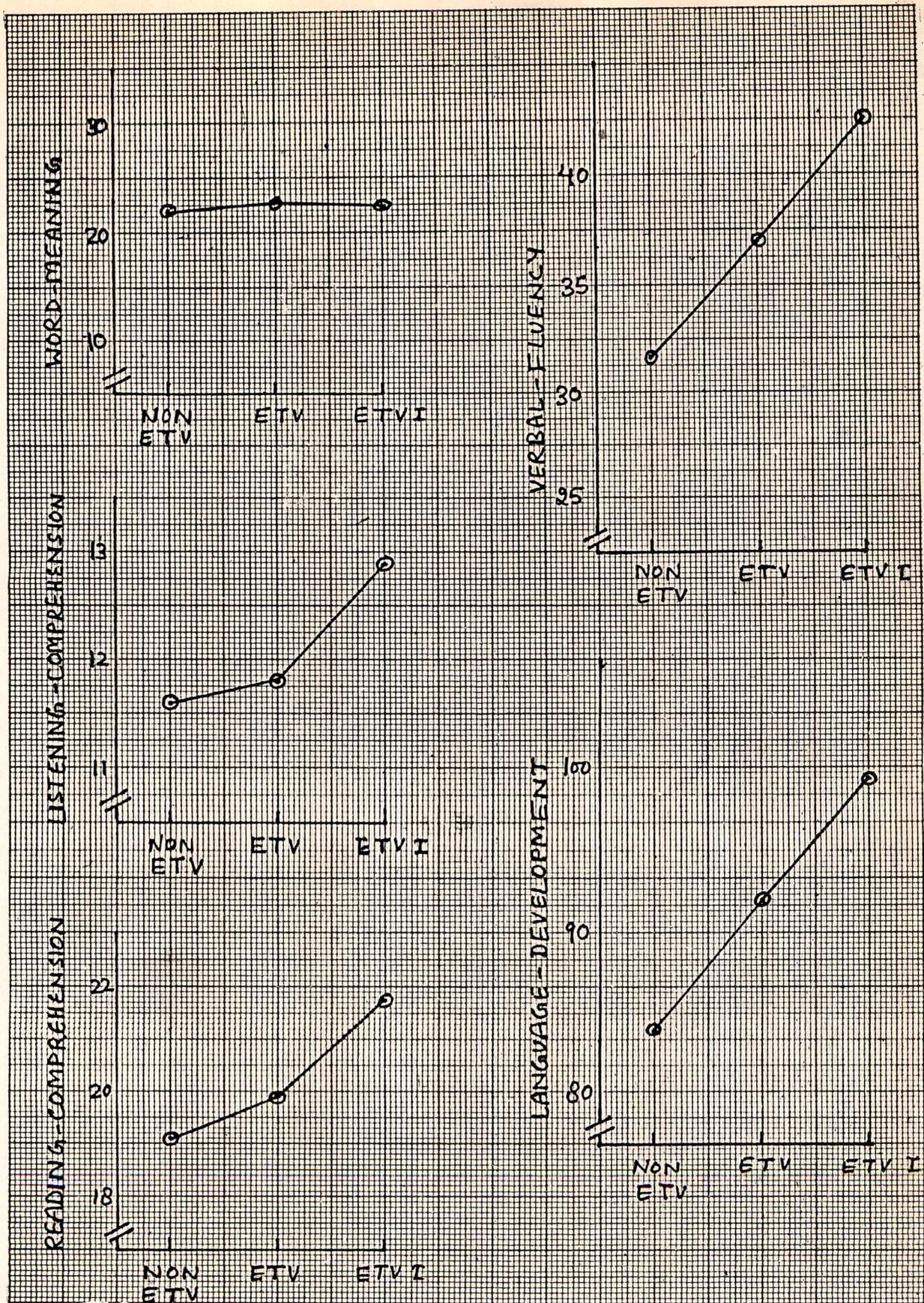


Fig. 4.1 Adjusted mean score on language development measures for non-ETV, ETV and ETV I groups.

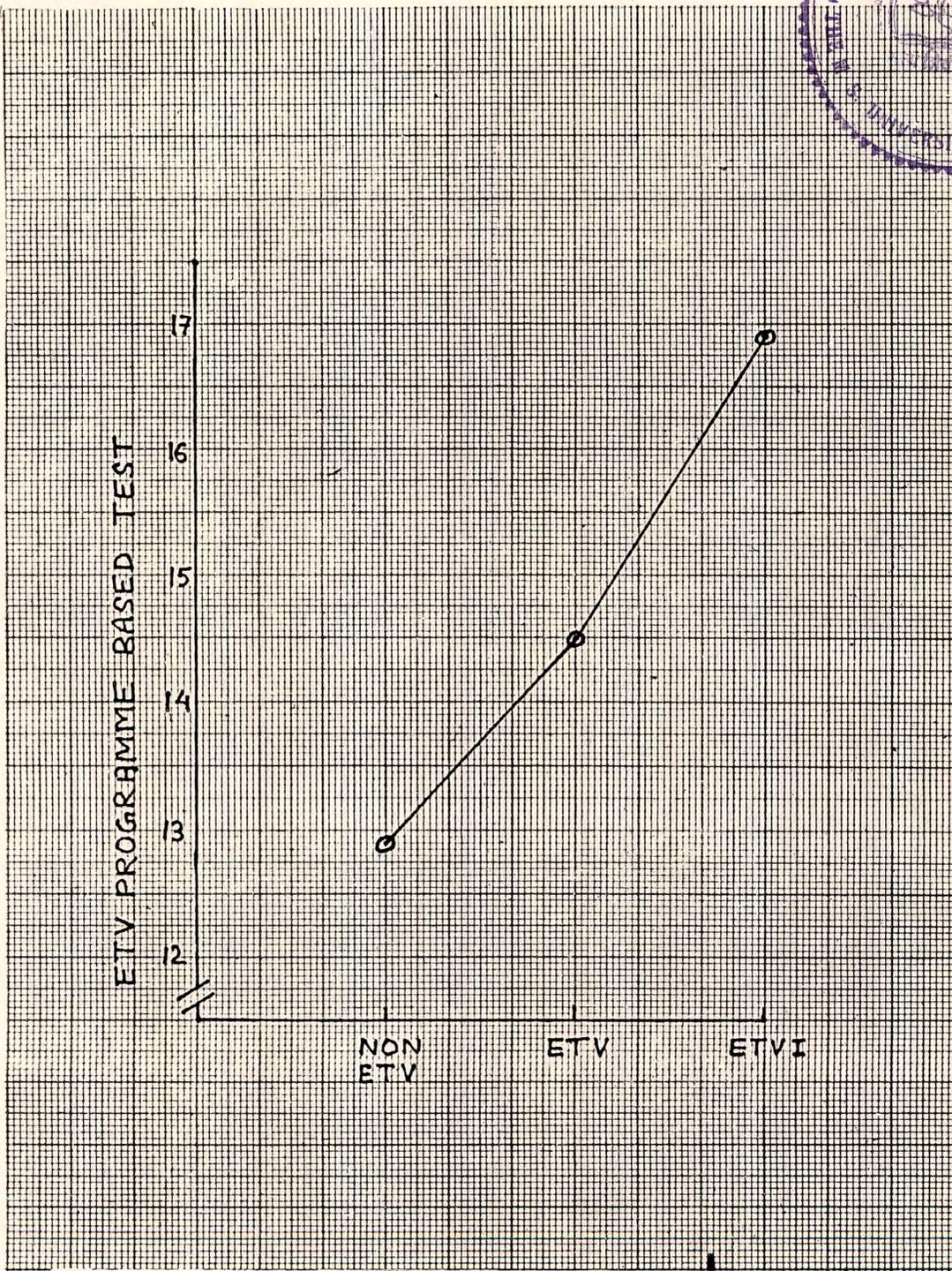


Fig. 4.2 Mean score on ETV programme based test for Non-ETV, ETV and ETV I groups.

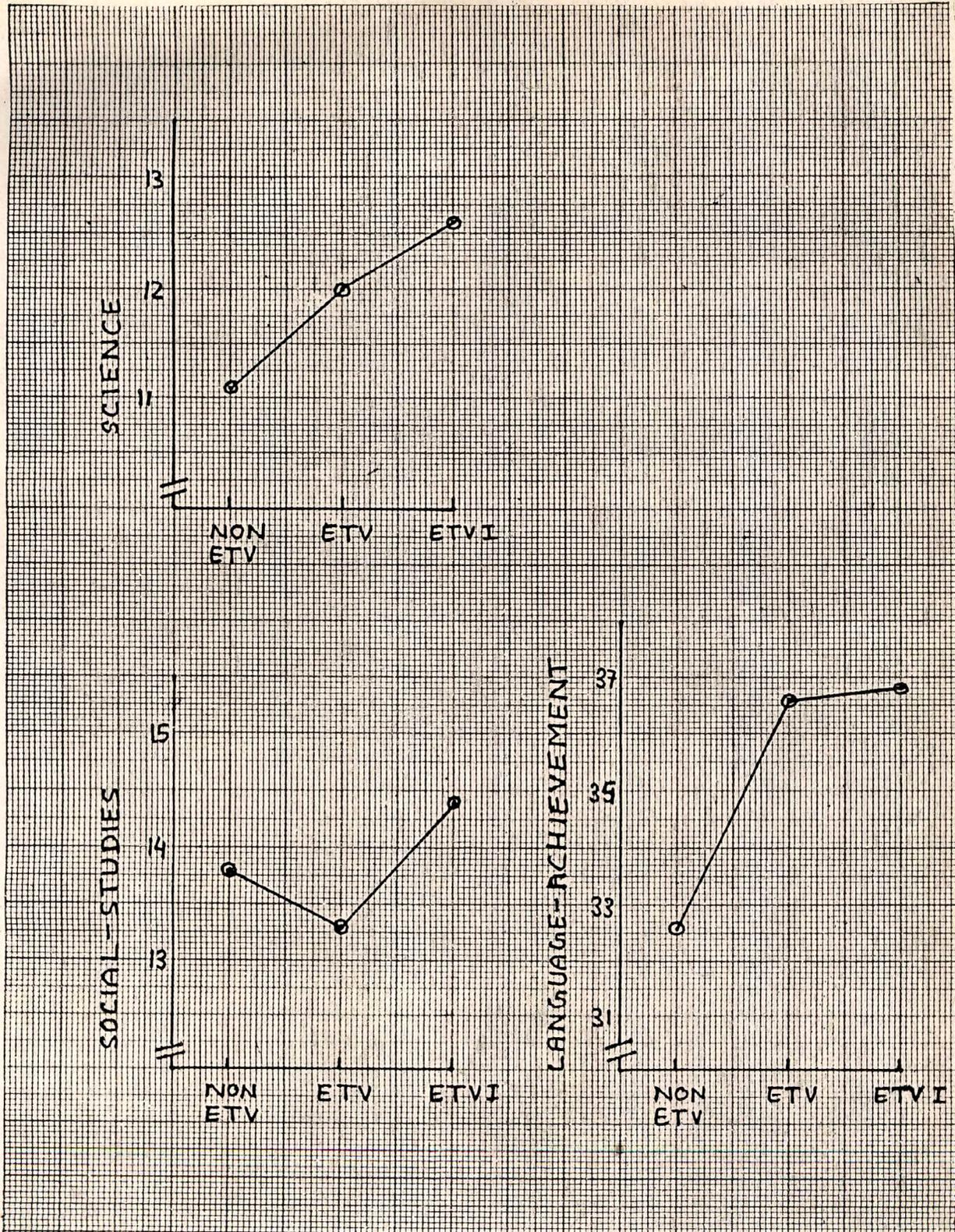


Fig. 4.3 Adjusted mean score: on scholastic achievement measures for non-ETV, ETV and ETV I groups.

TABLE 13

ADJUSTED MEAN SCORES ON THE CRITERION VARIABLE WORD  
MEANING AFTER ADJUSTMENT FOR THE COVARIATE.

Group	Pre-Mean	Post-Mean	Adjusted Mean
ETVI	20.13	22.97	22.38
ETV	17.70	21.88	22.76
Non-ETV	19.67	22.32	22.01

TABLE 14

CONTRAST BETWEEN ADJUSTED MEANS ON THE CRITERION VARIABLE  
POST-TEST SCORE ON WORD MEANING AFTER ADJUSTING  
FOR THE COVARIATE PRE-TEST SCORE ON WORD MEANING.

Contrast	df	Sum of Squares	F Value	P
ETV-I vs ETV	1	10.53	0.39	N.S.
ETV-I vs Non-ETV	1	9.89	0.37	N.S.
ETV vs Non-ETV	1	40.71	1.51	N.S.

TABLE 15

ADJUSTED MEAN SCORES ON THE CRITERION VARIABLE VERBAL  
FLUENCY AFTER ADJUSTMENT FOR THE COVARIATE.

Group	Pre-Mean	Post-Mean	Adjusted Mean
ETV-I	27.18	42.67	42.51
ETV	26.23	36.48	36.98
Non-ETV	27.46	32.04	31.69

TABLE 16

CONTRAST BETWEEN ADJUSTED MEANS ON THE CRITERION VARIABLE POST-TEST SCORE ON VERBAL FLUENCY AFTER ADJUSTING FOR THE COVARIATE PRE-TEST SCORE ON VERBAL FLUENCY.

Contrast	df	Sum of Squares	F Value	P
ETV-I vs ETV	1	2217.26	18.22	0.01
ETV-I vs Non-ETV	1	8483.28	69.71	0.01
ETV vs Non-ETV	1	2018.54	16.19	0.01

TABLE 17

ADJUSTED MEAN SCORES ON THE CRITERION VARIABLE LISTENING COMPREHENSION AFTER ADJUSTMENT FOR THE COVARIATE.

Group	Pre Mean	Post Mean	Adjusted Mean
ETV-I	10.40	13.03	12.89
ETV	9.34	11.12	11.78
Non-ETV	10.93	12.13	11.60

TABLE 18

CONTRAST BETWEEN ADJUSTED MEANS ON THE CRITERION VARIABLE  
POST-TEST SCORE ON LISTENING COMPREHENSION AFTER ADJUSTING  
FOR THE COVARIATE PRE-TEST SCORE ON LISTENING COMPREHENSION

Contrast	df	Sum of Squares	F Value	P
ETV-I vs ETV	1	88.2703	11.73	0.01
ETV-I vs NON-ETV	1	120.9669	16.07	0.01
ETV vs NON-ETV	1	2.3936	0.32	NS

TABLE 19

ADJUSTED MEAN SCORE ON THE CRITERION VARIABLE READING  
COMPREHENSION AFTER ADJUSTMENT FOR THE COVARIATE.

Group	Pre Mean	Post Mean	Adjusted Mean
ETV-I	17.94	21.48	21.75
ETV	18.89	20.14	19.87
Non-ETV	18.42	19.08	19.08

TABLE 20

CONTRAST BETWEEN ADJUSTED MEANS ON THE CRITERION VARIABLE  
POST-TEST SCORE ON READING COMPREHENSION AFTER ADJUSTING  
FOR THE COVARIATE PRE-TEST SCORE ON READING COMPREHENSION

Contrast	df	Sum of Squares	F Value	P
ETV-I vs ETV	1	254.87	17.81	0.01
ETV-I vs NON-ETV	1	517.32	36.15	0.01
ETV vs NON-ETV	1	45.50	3.18	NS

TABLE 21

ADJUSTED MEAN SCORES ON THE CRITERION VARIABLE LANGUAGE  
DEVELOPMENT AFTER ADJUSTMENT FOR THE COVARIATE.

Group	Pre Mean	Post Mean	Adjusted Mean
ETV-I	75.66	100.14	99.33
ETV	72.16	89.63	91.98
Non-ETV	76.48	85.57	84.02

TABLE 22

CONTRAST BETWEEN ADJUSTED MEANS ON THE CRITERION VARIABLE  
POST-TEST SCORE ON LANGUAGE DEVELOPMENT AFTER ADJUSTING  
FOR THE COVARIATE PRE-TEST SCORE ON LANGUAGE DEVELOPMENT.

Contrast	df	Sum of Squares	F Value	P
ETV-I vs ETV	1	3899.28	18.31	0.01
ETV-I vs NON-ETV	1	16995.24	79.81	0.01
ETV vs NON-ETV	1	4552.21	21.38	0.01

As may be seen from the tables 13 to 22 amongst the various variables under language development, significant differences were found in respect of listening comprehension, reading comprehension, verbal fluency and language development. On all these four variables differences were significantly in favour of ETV group with intervention programmes as compared to ETV group without intervention and Non-ETV groups.

For ETV group as compared to Non-ETV group, differences on only two variables, namely, verbal fluency and language development were found to be significant in favour of ETV group.

Acquisition of Information Related to ETV Programmes

The mean scores and S.D. for test based on ETV programme are presented in table 23 and pair-wise comparisons for the treatment groups in table 24.

TABLE 23

MEAN SCORES OF CHILDREN IN THREE GROUPS ON TEST BASED ON ETV PROGRAMMES AFTER THE TREATMENT.

Group	N	Mean	S.D.
ETV-I	145	16.88	6.53
ETV	145	14.47	7.04
Non-ETV	145	12.77	5.05

TABLE 24

PAIR-WISE COMPARISON OF DIFFERENT TREATMENT GROUPS ON TEST BASED ON ETV PROGRAMMES

Group	N	Mean	S.D.	Difference in Mean	t	P
ETV	145	14.47	7.04	1.70	2.36	0.01
Non-ETV	145	12.77	5.05			
ETV-I	145	16.88	6.53	2.41	3.01	0.01
ETV	145	14.47	7.04			
ETV-I	145	16.88	6.53	4.11	5.96	
Non-ETV	145	12.77	5.05			

As may be seen from table 23 and 24, the highest mean is for ETV-I group and lowest for Non-ETV group and

significant differences were found in all the three comparisons. The differences are significantly in favour of ETV group with intervention programmes as compared to ETV group without intervention and Non-ETV group. For ETV group as compared to Non-ETV group the difference was found to be significant in favour of ETV group.

#### Scholastic Achievement

The groups were compared on three subjects for scholastic achievement. Tables 25 to 30 present the pre-mean, post-mean and adjusted means on the three subjects for the three groups as well as pair-wise comparisons for the different treatment groups.

TABLE 25

ADJUSTED-MEANS ON THE CRITERION VARIABLE SCIENCE  
AFTER ADJUSTMENT FOR THE COVARIATE.

Group	Pre-Mean	Post-Mean	Adjusted Mean
ETV-I	9.56	12.68	12.59
ETV	9.22	11.94	12.03
Non-ETV	9.39	11.12	11.11

TABLE 26

CONTRAST BETWEEN ADJUSTED-MEANS ON THE CRITERION VARIABLE  
POST-TEST SCORE ON SCIENCE AFTER ADJUSTING FOR THE  
COVARIATE PRE-TEST SCORE ON SCIENCE.

Contrast	df	Sum of Squares	F Value	P
ETV-I vs ETV-I	1	22.36	2.27	NS
ETV-I vs Non-ETV	1	157.15	15.92	0.01
ETV vs NON-ETV	1	60.91	6.17	0.05

TABLE 27

ADJUSTED-MEANS ON THE CRITERION VARIABLES SOCIAL STUDIES  
AFTER ADJUSTMENT FOR THE COVARIATE.

Group	Pre-Mean	Post-Mean	Adjusted Mean
ETV-I	9.04	14.52	14.44
ETV	9.05	13.34	13.26
Non-ETV	8.72	13.52	13.66

TABLE 28

CONTRAST BETWEEN ADJUSTED-MEANS ON THE CRITERION VARIABLE  
POST-TEST SCORE ON SOCIAL STUDIES AFTER ADJUSTING FOR THE  
COVARIATE PRE-TEST SCORE ON SOCIAL STUDIES.

Contrast	df	Sum of Squares	F Value	P
ETV-I vs ETV	1	101.60	6.82	0.01
ETV-I vs Non-ETV	1	44.54	2.99	NS
ETV vs Non-ETV	1	11.54	0.78	NS

TABLE 29

ADJUSTED MEANS ON THE CRITERION VARIABLES LANGUAGE  
ACHIEVEMENT AFTER ADJUSTMENT FOR THE COVARIATE.

Group	Pre-Mean	Post Mean	Adjusted mean
ETV-I	27.80	37.19	36.80
ETV	26.35	35.72	36.61
Non-ETV	27.94	33.09	32.57

TABLE 30

CONTRAST BETWEEN ADJUSTED MEANS ON THE CRITERION VARIABLE  
POST-TEST SCORE ON LANGUAGE ACHIEVEMENT AFTER ADJUSTING  
FOR THE COVARIATE PRE-TEST SCORE ON LANGUAGE ACHIEVEMENT.

Contrast	df	Sum of Squares	F Value	P
ETV-I vs ETV	1	2.74	0.04	N.S.
ETV-I vs Non-ETV	1	1298.14	17.79	0.01
ETV vs Non-ETV	1	1177.87	16.14	0.01

As may be seen from tables 25 to 30 significant differences were found in respect of all the three subjects, namely, science, social studies and language achievement. The findings for the three subjects are given separately as follows.

In science, the difference was significantly in favour of ETV group with intervention as compared to Non-ETV group. For ETV group as compared to Non-ETV, the difference was also found to be significant in favour of ETV group.

In social studies, the results of only one comparison, that is, between ETV with intervention and ETV was found to be significant and this was in favour of ETV with intervention.

In language achievement the difference was significantly in favour of ETV group with intervention and ETV group as compared to Non-ETV group.

#### Discussion of the Results

The results of the study are discussed hereunder in relation to the first two objectives mentioned earlier.

Comparison of ETV and Non-ETV Groups: Effectiveness of ETV programmes was studied on three aspects of educational development, namely, language development acquisition of information and scholastic achievement. The results indicate that the children exposed to ETV were higher on verbal fluency and language development in comparison to children not exposed to ETV. Similar results were obtained by Shukla and Kumar (1977) on verbal fluency. This finding also appears to indicate some resemblance with the results obtained by Schramm et al (1961) and Sachchindananda et al (1979). In both the studies, the vocabulary of children increased after viewing television programmes. On the other three aspects, that is, word meaning, listening comprehension and reading comprehension, the difference between ETV and Non-ETV group were not significant, though, the ANACOVA means were higher for the ETV group as compared to Non-ETV group. The results on listening comprehension

are contrary to results of the SITE study (Shukla and Kumar, 1977) which showed significant differences in ETV groups in five out of six states, where the experiment was conducted. The reason may be that during SITE children were exposed to ETV for six days in a week, while in the present study the exposure was limited to twice a week. Other reason for this difference may be that the SITE had a novelty effect. Children were exposed to this medium for the first time. This might have led them to discuss these programmes not with their peers only but also with their parents and other members of the family. These factors might have affected their listening comprehension.

The result of this study indicate that the children exposed to ETV programmes are higher on acquisition of information related to ETV programmes, compared to children not exposed to ETV. This finding is consistent with the finding of Kemmelfield (1972).

On scholastic achievement in two out of three subjects, namely, science and language, ETV group was found higher as compared to Non-ETV group. In social studies no difference was found between the two groups. The reason may be that the two programmes telecast on social studies were found difficult by children. This was reported by teachers during interview for getting

the feedback on different aspects of ETV programmes.

Effectiveness of ETV along with intervention programmes: The children exposed to ETV programmes along with intervention programmes were compared with children exposed to ETV without intervention programmes and to those not exposed to ETV on all the aspects mentioned earlier. The results indicate the effectiveness of ETV along with intervention programmes on the verbal fluency, listening comprehension, reading comprehension and language development of children. On all these aspects, children exposed to ETV along with intervention programmes were higher as compared to children who were exposed to ETV programmes without intervention and to those not exposed to ETV programmes. Similar results were obtained on acquisition of information related to ETV programmes.

It may be seen that the results obtained on scholastic achievement are different from those obtained on other variables. Out of six recordings (between ETVI-ETV and; ETVI-Non-ETV) on three subjects, only three have reached the level of significance, though the ANACOVA means on all the subjects are highest for ETVI group as compared to ETV and Non-ETV group. In science, significant difference were found between ETVI and Non-ETV but not between ETV and ETVI group. It means exposure

to ETV effects the achievement in science but not the intervention programmes. Similar findings have been obtained in language achievement. In social studies, the findings are not very conclusive.

On the whole, the results of the study indicate the effect of exposure to ETV and also the exposure of ETV along with intervention programmes on the verbal fluency of children. The children of both the experimental groups were found higher on richness of vocabulary which can be recalled around a central concept, as compared to control group i.e., the group not exposed to ETV. The results further indicate that the verbal fluency of children exposed to ETV along with intervention programme is better than those exposed to ETV without intervention programmes and to those not exposed to ETV at all. It also appears from results that the verbal fluency of children exposed to ETV without intervention is better than those who are not exposed to ETV.

It also appears from the results that the listening comprehension of children exposed to ETV along with intervention programmes is higher than those who are exposed to ETV without intervention, and to those not exposed to ETV. An important finding of this study was that ETV without intervention programmes does not effect the listening comprehension of children. Similar results

have been obtained in respect of reading comprehension.

Another finding of this study was that ETV with intervention programmes as well as ETV without intervention programmes does not make any difference to word meaning skills of children. Perhaps the reason may be that no effort was made either in the ETV programmes or in the intervention programmes to develop word meaning skills in children. As television is an audio-visual medium, the children may understand the meaning of the word in a context but may not be able to find the synonym for that word when it is not presented in a context.

The results of the study support the view that the language development of children exposed to ETV along with intervention programmes is higher than those exposed to ETV without intervention programmes, and to those not exposed to ETV. It also appears from the results that the language development of children exposed to ETV without intervention programmes is higher than those not exposed to ETV.

The overall results on language development appear to indicate some resemblance with the results obtained by Shukla and Kumar (1977). They found that all the 24 (four variables in six States) recordings of difference between gain in mean scores between experimental (ETV group) and control (Non-ETV) group children

of class V were positive i.e., in favour of experimental group exposed to television. Out of these 24 gains, 14 were statistically significant. However, in present study out of 15 recordings of difference between Non-ETV and ETV; ETV and ETV with intervention; Non-ETV and ETV with intervention; ten differences were significant.

The results of the study indicate that children exposed to ETV with intervention programmes are higher on acquisition of information related to ETV programmes, as compared to children exposed to ETV without intervention and children not exposed to ETV. It also appears from the results that exposure to ETV without intervention also helps in acquisition of information as compared to non-exposure to ETV programmes.

The results emphasize the potentiality of ETV in teaching learning for Primary School children; specially when these programmes are strengthened by pre and post-telecast activities conducted by the teachers. Similar observations have been made by Santa Clare office of Education, (1968) and Wittch et al (1972).

It may be seen that the results obtained on scholastic achievement are different from those obtained on other variables. The reason may be that the programmes telecast by Delhi Doordarshan are not syllabus based.

These are enrichment programmes, which could be seen as something interesting and informative but not much to do with instruction or teaching. It appears that a few programmes connected with school subjects did not have much effect on the achievement of children in school subjects. The two programmes telecast on social studies were found difficult by children. This was reported by teachers during interview for getting the feedback on different aspects of ETV programmes. Another reason may be that the whole process of teaching-learning examination may be too rigid to permit quick infiltrations by indirect means. It is in considerations to these that the results obtained on scholastic achievement have to be seen.

Here it may be mentioned that the studies conducted abroad have been taken mostly from review articles or from abstracts. As such the methodological details are not sufficient. Hence, it is difficult to compare most of those studies with the results of the present study.

To sum up the results, it may be said that the ETV programmes improved the language development of children exposed to ETV. The results of the study also indicate that the relative effectiveness of programmes increases with the active participation of teachers and

students. The same trend holds true for acquisition of information related to ETV programmes.

On the whole, the results of this study establish the potentiality of ETV in the process of teaching-learning primary school children; specially when they are strengthened by pre and post-telecast activities.

Feedback from Teachers for Improvement and Effective Utilisation of ETV Programmes.

As mentioned earlier, the teachers of both the experimental groups of schools were interviewed at the end of the year to obtain their opinion about the quality of programmes and to get feedback for improvement and effective utilisation of ETV programmes. The interviews with teachers were tape-recorded and later transcribed by the investigator. This data was then collated and their opinion on different aspects of educational television programmes is given below:

1. Suitability of the programme: All teachers felt that the ETV programmes were more suitable for class IV and V children than for class I to III children.

2. The most liked programmes: The respondents were asked to mention the programmes, which in their opinion, the children liked the most. The responses obtained in this respect are given in Appendix 30.

Their answers revealed that in mentioning the programmes most liked by children, the teachers placed more emphasis on the format and treatment than on the content of the programme. The reason was that they felt, the first requirement of a likeable programme was that it should be interesting and able to hold the attention of children.

3. The least liked programmes: The respondents were next asked to mention those programmes which the children liked the least. The responses obtained in this respect are given in Appendix 31.

Regarding the reasons for not liking the programmes, the teachers pointed towards the lack of visuals, use of difficult language and non-suitability of the content of the programme for children.

4. Interest holding capacity of the programmes: The programmes were generally found interesting. However, some of the programmes, which lacked visuals (Khel Dikha-ye Bhalu, Anokhi Bhatti Pet etc.) were not liked by children.

5. Speed of the presentation: Teachers felt that for most of the programmes, the speed of presentation was all right but wherever documentary films were used in the programme, their speed was rather fast. For example in

'Khat'( खत /letter) the documentary regarding pin code numbers was rather fast and children could not get much out of it.

6. Vocabulary: Children could not understand those programmes where English words were used, for example, Joker Ke Dant. So use of English words could be avoided.

7. Content of the programme: Generally the content of the programmes was suitable for children except for few programmes such as Upgrah, Badalte Mausam, which were more suitable for higher classes.

8. Duration of the programme: The 20 minute duration of the programme was considered to be appropriate by the teachers. But they wanted that the number of programmes per week should be increased.

9. Programme chart: Out of 12 teachers interviewed, only three teachers reported that they received programme chart sometimes from the Education Department. Six teachers reported that they regularly received guidance notes from the investigator. However, all teachers were of the opinion that programme chart as well as guidance notes for each of the programme should be sent to them.

The teachers were asked to give their suggestions for improving upon the programmes as well as their utilisation. Suggestions made by them are reported as under:

1. Proper weightage should be given to syllabus based programmes. However, different teachers suggested different weightage to be given to syllabus based programmes. For syllabus based programmes the range was 50 to 80 percent and for enrichment programmes 20 to 50 percent. The average ratio given by the teachers for the two types of programmes was: (i) syllabus based 64.58 percent and (ii) enrichment programmes 35.42 percent.

2. Regarding the subjects on which they would like to have ETV programmes, all the twelve teachers wanted to have programmes on social studies and science; six on arithmetic, one each on general science, Indian culture and handwork.

3. For language of the programme the suggestions given were:

- language should be simple, easy and according to the level of children,
- English words should not be used and
- correct expression should be used.

4. Style of presentation: Eleven teachers had shown preference for dramatised form, seven for films, three for poems, songs and riddles and two for use of games in the programmes. All teachers were of the opinion that lecture format should not be used as it is not liked

by children. With regard to use of films in the programme, one teacher remarked, "Film is a good medium, provided speed of the commentary is not fast and use of English words is not there." It was also said that the TV programmes for children should be dominated by visuals related to their environment.

5. When the study was undertaken, it was found that sets in many of the Municipal Corporation Schools were not in working order. It was reported that contract for the repair of the TV sets could be given to one out of the four dealers whose names were approved by the Education Department. Teachers were not satisfied with the service given by these dealers. Therefore, they were asked to give their suggestions for quick repair of TV sets. Their suggestions are given below:

Six teachers suggested that Principal should have the authority to get TV repaired from any mechanic; four teachers were of the opinion that contract for the repair of TV set should be given to some workshop nearby to the school, two teachers suggested that there should be TV workshop of Municipal corporation, Delhi for the repair of TV sets. One teacher gave additional suggestion that TV incharge in school should be given training for the repair of TV set, so that minor repairs could be done by her.

6. All teachers were in favours of having notes for every programme in advance so that pre and post-telecast activities could be conducted.

7. The teachers liked the format of teacher guidance notes, giving day and time of the telecast, title of the programme, about the programme, and pre and post-telecast activities.

Somewhat similar suggestion have been given by teachers of Raipur (1981) in the meeting of custodian teachers and by the teachers of Sambalpur (Centre for Educational Technology, 1983c). About the choice of subjects on which the programmes should be broadcast, Samant et al (1978) found that 52 percent teachers wanted to have programmes on science and 47 per cent on social studies. This indicates that most favoured subjects on which teachers want the programmes are science and social studies. It may thus be concluded that teachers face difficulties in teaching science and social studies to students because of their limited amount of knowledge and lack of teaching aids. Therefore, they wish to have more TV programmes on these two subjects.

#### Implications

The findings of the study indicate that the educational television programmes have a positive effect on

language development of children and the relative effectiveness of educational television programmes increases with intervention programmes. The findings on acquisition and retention of information related to educational television programmes are also similar to the findings for language development. The implications of these findings are that educational television has the potentiality to contribute towards the development of language abilities. Therefore, the medium has to be better harrassed towards this end, by designing and producing software more suitable for the educational development of children.

As the relative effectiveness of educational television programmes increases with the active participation of teachers, it reinforces the idea that teachers should be trained in the proper utilisation of ETV programmes; and guidance notes for each programme should be sent to them well in advance.

In scholastic achievement, the results were not very conclusive. However, it appears that if more programmes related to syllabus are telecast, it may contribute more towards improving scholastic achievement of children. These views were expressed by the teachers during interview to get feedback on educational television programmes. It is thus clear that for ETV programmes to be effective, Education Department must play an important

part in laying down the policy for educational broadcasting, teachers must have a say, through their representatives, in determining the general character of the broadcasts. The detailed planning and production of the broadcast must be entrusted to men and women who are firmly grounded in education and are also trained and equipped with TV production techniques.

Besides the content and quality of programmes, organisational aspects should be taken care of. As may be seen from the review of studies carried out since the inception of educational television to date, there is ample evidence to state that television, is under utilised in our schools. One of the important reasons for the under utilisation of this medium is that a number of TV sets remain out of order. Therefore, there is a need to develop proper infra-structure for the maintenance of TV sets.

Other organisational aspects which should be taken care of are supply of guidance notes and counselling of teachers on the part of the supervisory staff. Merely beaming good programmes does not ensure their full utilisation. It is hoped that if all the aspects mentioned above are taken care of, it may help in fuller utilisation as well as increasing the effectiveness of educational television programmes.