CHAPTER – V

ANALYSIS AND INTERPRETATION

OF THE DATA

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V.1. INTRODUCTION

This chapter is devoted to the analysis and interpretation of the data on effectiveness of the Multimedia Instructional Package collected through experimentation. It covers the analysis and interpretation of the data obtained by administering content achievement test, pre-test and the post-test.

V.2. ANALYSIS AND INTERPRETATION OF THE DATA OBTAINED IN CONTENT ACHIEVEMENT TEST

As already discussed in chapter IV, two parallel groups were formed with the help of content achievement test. The scores obtained by the students were further analysed and interpreted in the following paragraphs.

The objectives behind this analysis were to confirm the enquivalency of the two groups, to test the significance of difference between boys and girls. To test the significance of difference between S.Ds of boys and girls, the confirmation was done in the following manner.

Table V.1

FREQUENCY DISTRIBUTION TABLES OF THE SCORES CONTAINED BY THE STUDENTS FROM CONTROL AND EXPERIMENTAL GROUPS IN CONTENT ACHIEVEMENT TEST.

C.I.	CONTROL GROUP (A1)			EXPERIMENTAL GROUP(A2)		
	B1	B2	T	B1	B2	T
35-39	1	1	2	1	1	2
30-34	8	8	16	7	9	16
25-29	5	5	10	6	4	10
20-25	1	1	2	1	1	2
Total	15	15	30	15	15	30

Scores are out of 50,

B1 = Boys

B2 = Girls

T = Total

The table V.1 is based on the data given in the Appendix J and K.

Table V.2

MEANS AND S.D.s OF THE SCORES OBTAINED BY THE STUDENTS FROM CONTROL AND EXPERIMENTAL GROUPS IN CONTENT ACHIEVE-MENT TEST.

C.I.	CONTROL GROUP (A1)			EXPERIMENTAL GROUP(A2)		
	B1	B2	T	B1	B2	T
M	30	30.50	30.33	30	30.33	30.16
σ	2.5	2.9	2.7	2.7	2.2	2.4

Means and S.D.s of data given in Table V.1 were calculated and is given in Table V.2.

Table V.3

SIGNIFICANCE OF THE DIFFERENCE BETWEEN MEANS OF THE STUDENTS FROM CONTROL AND EXPERIMENTAL GROUPS IN THE CONTENT ACHIEVEMENT TEST.

	Control Group (A1)	Experimental Group (A2)
N	30	30
M	30.33	36.16
δ	2.7	2.4
D means	0.17	
t value	NS 0.402	
df (N1 − 1) + (N2 − 1) = 59.		

NS : not significant of 0.05 and 0.01 levels of significance.

Standard error of difference δD_δ was calculated by using the formula

$$\delta D_\delta = \sqrt{\delta\delta_1^2 + \delta\delta_2^2} \ , \ \delta\delta_1 = \frac{0.71\delta_1}{\sqrt{N1}} \ , \ \delta\delta_2 = \frac{0.71\delta_2}{\sqrt{N2}}$$

The difference between the means of control and experimental group in content achievement test was 0.17 which was found to be non-significant at 0.05 and 0.01 level of significance for the df 59.

$$(0.402 < 1.98 \text{ and } 2.68)$$

One can confidently interpret that as the difference in means was non-significant the control and experimental groups were equivalent in their achievements in content achievement test.

Table V.4

SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE MEANS OF BOYS AND GIRLS FROM CONTROL AND EXPERIMENTAL GROUPS IN "CONTENT ACHIEVEMENT TEST".

	CONTROL GROUP		EXPERIMENTAL GROUP	
	B1	B2	B1	B2
N	15	15	15	15
M	30	30.5	30	30.33
δ	2.5	2.9	2.7	2.9
D means -		0.5		
t values -		0.49 NS		
df = (N1 - 1) + (N2 - 1) = 28				

NS : not significant at 0.05 and 0.01 level of significance.

The difference between the means of boys and girls from control and experimental group in content achievement test was 0.50 which was found to be non-significant at 0.05 and 0.01 level of significance for the df 28 (0.490 $<$ 2.05 and 2.76) one can interpret that as the difference in means was non-significant, the control and experimental groups were equivalent in their achievement in content achievement test.

Table V.5

SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE S.D.s OF THE STUDENTS FROM CONTROL AND EXPERIMENTAL GROUPS IN CONTENT ACHIEVEMENT TEST.

	CONTROL GROUP (A1)	EXPERIMENTAL GROUP (A2)
N	30	30
M	30.33	30.16
δ	2.7	2.4
D. S.D.s	0.3	
t value	0.769 NS	
df (N1 - 1) + (N2 - 1) = 58		

NS : not significant at 0.05 and 0.01 level of significance.

The standard error of the difference D6 is calculated by the formula

$$\delta D\delta = \sqrt{\delta\delta_1{}^2 + \delta\delta_2{}^2}$$

$$\delta\delta_1 = \frac{0.716_1}{\sqrt{N_1}} \quad , \quad \delta\delta_2 = \frac{0.716_2}{\sqrt{N2}}$$

The difference between the S.D.s of control group and experimental group in content achievement test was 0.30, it was found to be non-significant at 0.05 and 0.01 level of significance for df 58 (0.769 $<$ 1.98 and 2.68).

One can interpret that control and experimental groups are equivalent.

Table V.6

SIGNIFICANCE OF THE DIFFERENCE BETWEEN S.D.s of BOYS AND GIRLS OF CONTROL AND EXPERIMENTAL GROUP IN CONTENT ACHIEVEMENT TEST.

	CONTROL GROUP (A1)		EXPERIMENTAL GROUP (A2)	
	B1	B2	B1	B2
N	15	15	15	15
M	30	30.50	30	30.33
δ	2.5	2.9	2.7	2.9
D.S.Ds	0.4		0.2	
t value	0.437 NS		0.186 NS	

df (N1 - 1) + (N2 - 1) = 58.

NS : not significant at 0.05 and 0.01 levels of significance.

The standard error of difference δ D was computed by the formula used in Table V.5. The difference between the S.D.s of Boys and Girls in control and experimental groups were found to be non-significant at 0.05 and 0.01 level of significance for the df 58 (0.137 < 2.00 and 2.66 : 0.186 2.00 and 2.66). It means that boys and girls do not differ in their variability in the scores on the content achievement test.

V.3. ANALYSIS AND INTERPRETATION OF THE DATA OBTAINED IN PRE-TESTING

Table V.7

OVERALL SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF CONTROL AND EXPERIMENTAL GROUPS IN PRE-TEST SCORES.

GROUPS	STATISTICAL MEASURES	OVERALL
A1	Mean	28.25
Control N1 = 30	S.D.s	4.45
A2		
Experimental	Mean	29.80
N2 = 30	S.D.s	4.40
	D means	1.55
	t values	0.686 NS
	df (N1 - 1) + (N2 - 1)	58

NS : not significant at 0.05 and 0.01 levels of significance.

Significance difference between the means of control and experimental groups in pre-test scores are non-significant at 0.05 and 0.01 level of significance for df 58 (0.686 $<$ 1.980 and 2.62). It can therefore interpreted that control and experimental groups are equivalent in their performance in the pre-test in Botany. The observed difference in the means may be due to sampling fluctuation by chance.

Table V.8

OVERALL SIGNIFICANCE OF DIFFERENCES BETWEEN THE S.D.s OF CONTROL AND EXPERIMENTAL GROUP IN PRE-TEST SCORES

	(df control 29)	(df experimental 29)
GROUP	STATISTICAL MEASURES	OVERALL
Control (A1) N1 = 30	σ_1	4.45
Experimental (A2) N2 = 30	σ_2	4.40
	F = 1.01 NS	

NS : not significant at 0.05 and 0.01 levels of significance.

F ratio is calculated by the formula $F = \dfrac{\sigma_1^2}{\sigma_2^2}$ by placing the greater variance in the numerator.

F values for 59 - 59 df are 1.50 and 1.79 at 0.05 and 0.01 level of significance respectively. The obtained F values are found to be non-significant at both the levels. (F value 1.01 < 1.50 and 1.79). It can therefore be interpreted that control and experimental groups do not differ significantly in variability of the scores in pre-test. The observed difference in S.D.s may be due to sampling fluctuation by chance. One can confidently say that two groups are equivalent w.r.t. variability measures before experimentation. Individual comparison of Boys and Girls in pre-test scores.

Table V.9

OVERALL SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE MEANS
OF THE SCORES OF BOYS AND GIRLS FROM THE CONTROL GROUP
IN THE PRE-TEST.

GROUP	STATISTICAL MEASURES	N	SEXES	OVERALL
C	Means	15	B1 (Boys)	28.50
O				
N		15	B2 (Girls)	28.00
T				
R	S.D.s	15	B1 (Boys)	4.4
O				
L		15	B2 (Girls)	4.3
(A1)	D means 0.500 t values = 1.718 NS df = (N1 - 1) + (N2 + 1) = 28			

NS : not significant at 0.05 and 0.01 levels of significance.

Significance difference between the means of the scores of Boys
and Girls from the control group was found to be non-significant
at 0.05 and 0.01 levels of significance. It means boys and girls
do not differ significantly from each other (M of Boys $\backsimeq$ M of
Girls). Hence Boys and Girls are nearly equal in the pre-test.

Table V.10

OVERALL SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE MEANS OF THE SCORES OF BOYS AND GIRLS FROM EXPERIMENTAL GROUP IN PRE-TEST.

GROUP	STATISTICAL MEASURES	N	SEX	OVERALL
E	Means	15	B1 (Boys)	30
X		15	B2 (Girls)	29.60
P				
E				
R	S.D.s	15	B1 (Boys)	4.5
I				
M		15	B2 (Girls)	4.3
E				
N	D means – 0.400			
T				
A	t values – 0.251 NS			
L				
(A2)	df = (N1 – 1) + (N2 – 1) 29			

NS : not significant of 0.05 and 0.01 levels of significicnace.

Overall significance difference between the means of the scores of Boys and Girls from experimental group in pre-test were found to be non-significant at 0.05 and 0.01 levels of significance. This means boys and girls do not differ significantly from each other (M of Boys ⌣ M of Girls). It means Boys and Girls are nearly equal in the pre-test.

Table V.11

OVERALL SIGNIFICANCE OF THE DIFFERENCES BETWEEN THE MEAN OF THE SCORES OF BOYS AND GIRLS FROM CONTROL AND EXPERIMENTAL GROUP IN PRE-TEST SCORES.

GROUP	STATISTICAL MEASUREMENT	N	SEX	OVERALL
Control (A1)	Means	15	B1 (Boys)	28.50
	S.D.s	15	B2 (Girls	4.4
Experimental (A2)	Means	15	B1 (Boys)	30
	S.D.s	15	B2 (Girls)	4.3
	D means	− 0.500		
	t values	= 0.329 NS		
	df	29		

NS : not significant at 0.05 and 0.01 levels of significance.

Overall performance between the means of the scores of the Boys and Girls from control and experimental group were found to be non-significant at 0.05 and 0.01 level of significance. It means that means of boys from both groups are nearly equal in pre-test.

Table V.12

OVERALL SIGNIFICANCE OF THE DIFFERENCES BETWEEN THE MEANS OF THE SCORES OF GIRLS FROM BOTH CONTROL GROUP AND EXPERIMENTAL GROUPS IN PRE-TEST.

GROUP	STATISTICAL MEASURES	N	SEX	OVERALL
Control	Means	15	B2 (Girls)	28.00
	S.D.s	15	B2 (Girls)	4.4
Experimental	Means	15	B2 (Girls)	29.60
	S.D.s	15	B2 (Girls)	4.3
	D means	1.60		
	t value	0.262 NS		
	df	29		

NS : not significant at 0.05 and 0.01 levels of significance.

Overall significance of difference between the means of the scores of Girls from control group and Girls from experimental group were found to be non-significant at any level of significance (M Girls (C) $\simeq$ M Girls (E)). It means Girls from both the groups are nearly equal in Pre-test.

Table V.13

OVERALL SIGNIFICANCE OF   THE   DIFFERENCES   BETWEEN   SDs
OF THE SCORES OF BOYS AND GIRLS IN PRE-TEST

GROUP	SEX	N	STATISTICAL MEASURES	OVERALL
Control (A1)	B1 (Boys)	15	σ_1	4.4
N1 = 30	B2 (Girls)	15	σ_2	4.3
	F	1.04 NS		

NS : not significant at 0.05 and 0.01 levels of significance.

Overall difference between S.D.s of the scores of Boys and Girls from the control group in pre-test do not differ significantly.

Table V.14

OVERALL SIGNIFICANCE OF THE DIFFERENCES BETWEEN THE S.D.s
OF THE SCORES OF BOYS AND GIRLS FROM EXPERIMENTAL GROUP
IN PRE-TEST.

GROUP	SEX	N	STATISTICAL MEASURES	OVERALL
Experimental	B1 (Boys)	15	$\delta 1$	4.5
	B2 (Girls)	15	$\delta 2$	4.3
	F	1.402 NS		

NS : not significant at 0.05 and 0.01 level of significances.

The table 14 shows overall significance of the differences between
S.D.s of the scores of Boys and Girls from Experimental group
in pre-test do not differed significantly.

Table V.15

OVERALL SIGNIFICANCE OF DIFFERENCES BETWEEN S.D.s OF THE
BOYS FROM BOTH CONTROL AND EXPERIMENTAL GROUP.

GROUP	SEX	N	STATISTICAL MEASURES	OVERALL
Control (A1)	B1 (Boys)	15	δ_1	4.4
Experimental (A2)	B1 (Boys)	15	δ_2	4.3
	F	=	1.097 NS	

NS : not significant at 0.05 and 0.01 level of significance.

Overall significance of the differences between S.D.s of the
scores of Boys from both control and Experimental Group in
pre-test were found to be non-significant at the both levels
of significance.

Table V.16

OVERALL SIGNIFICANCE OF DIFFERENCES BETWEEN S.D.s OF THE
SCORES OF GIRLS FROM BOTH CONTROL AND EXPERIMENTAL GROUP
IN PRE-TEST.

GROUP	SEX	N	STATISTICAL MEASURES	OVERALL
Control (A1)	B2 (Girls)	15	ζ1	4.3
Experimental (A2)	B2	15	ζ 2	4.3
	F =	1 NS		

NS : not significant at 0.01 and 0.05 level of significance.

Overall significance of differences between S.D.s of the scores
of Girls from both control and experimental group in pre-test
were found to be non-significant at 0.05 and 0.01 level of signi-
ficance.

V.4. ANALYSIS AND INTERPRETATION OF THE DATA OBTAINED IN POST-TESTING

Post-test was administered on control and experimental groups after the treatment was over. The data obtained in terms of scores were further analysed and interpreted in the following Tables.

Table V.17

OVERALL SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS OF CONTROL AND EXPERIMENTAL GROUPS IN POST-TEST

GROUP	STATISTICAL MEASURES	N	O
A1 Control (N=30)	Means	30	38.00
	S.D.s	30	4.3
A2 Experimental (N = 30)	Means	15	43.30
	S.D.s	15	4.2
	D means = 0.35		
	t values = 3.35 *		
	df 59		

*   Significant at 0.05 and 0.01 levels of significance.

Table V.17 indicated that overall significance of difference between the means of control and experimental groups in post-test scores are significant at 0.05 and 0.01 level of significance for df 59 (3.35 $>$ 1.98 and 2.62). It can, therefore, be concluded that experimental group was significantly better in overall performance than the control group. This indicates that instruction with Multimedia Instructional Package has a positive effect on the performance of experimental group than traditional method treatment on control group.

Individual comparison of Boys and Girls in Post-test scores.

The data regarding the means and S.D.s of Boys and Girls observed in Table No.17 is further analysed for individual comparison of Boys and Girls.

Table V.18

OVERALL SIGNIFICANCE OF THE DIFFERENCES BETWEEN THE MEANS OF THE SCORES OF BOYS AND GIRLS FROM CONTROL GROUP IN POST-TEST.

GROUP	STATISTICAL MEASURES	N	SEXES	OVERALL
C	Means	15	B1 (Boys)	38
O		15	B2 (Girls)	37.50
N				
T	S.D.s	15	B1 (Boys)	4.3.
R				
O		15	B2 (Girls)	4.00
L				
(A1)	D means ·500			
N1 = 30				
	t values ·312 NS			
	df 29			

NS : not significant at 0.01 and 0.05 level of significance.

Significance of the difference between means of the scores of Boys and Girls from control group was found to be non-significant at 0.05 and 0.01 level of significance. It means that means of boys and girls from control group in Post-test donot differ.

Table V.19

OVERALL SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF THE SCORES OF BOYS AND GIRLS FROM THE EXPERIMENTAL GROUP IN POST-TEST.

GROUP	STATISTICAL MEASURES	N	SEXES	OVERALL
Experimental (A2)	Means	15	B1 (Boys)	43.30
N2 = 30		15	B2 (Girls)	12.60
	S.D.s	15	B1 (Boys)	4.2
		15	B2 (Girls)	4.4
	D means = 0.700			
	t values = 0.440 NS			
	df 29			

NS : non significant at 0.01 and 0.05 level of significance.

Table V.19 reveals that Boys and Girls from Experimental group donot differ significantly in overall performance in post-testing. The results are identical with those results arrived at the time of pre-test. This means instruction given by using Multimedia Instructional Package used for Experimental group favoured both Boys and Girls in a similar direction.

Table V:20

OVERALL SIGNIFICANCE OF DIFFERENCES BETWEEN THE MEANS OF THE SCORES OF BOYS FROM BOTH CONTROL AND EXPERIMENTAL GROUPS IN POST-TEST

GROUP	STATISTICAL MEASURES	N	SEXES	OVERALL
Control (A1)	Mean	15	B1 (Boys)	38
	S.D.s	15	B2 (Boys)	4.3
Experi-mental (A2)	Means	15	B1 (Boys)	43.30
	S.D.s	15	B2 (Boys)	4.2
	D means = 5.30			
	t values = 3.375 *			
	df 29			

* Significant at 0.05 level of significance.

Performance of Boys from control group is compared with the performance of Boys from Experimental Group in Table V.20. The data reveals that overall differences between the scores of boys from both the groups are significant at 0.05 or 0.01 level of significance. Boys from experimental group performed better than the boys from control group.

It means that instruction given by using Multimedia Instructional Package used for experimental group favoured the boys treated with traditional method.

Table V.21

OVERALL SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE MEANS OF THE SCORES FROM CONTROL AND EXPERIMENTAL GROUPS IN POST-TEST.

GROUP	STATISTICAL MEASURES	N	SEXES	OVERALL
Control (A1)	Means	15	B2 (Girls)	37.50
	S.D.s	15	B2 (Girls)	4.00
Experimental (A1)	Means	15	B2 (Girls)	42.60
	S.D.s	15	B2 (Girls)	4.4
	D means = 5.10			
	t value = 3.566 *			
	df 29			

* Significant at 0.05 and 0.01 level of significance.

Table V.21, was prepared to compare the performance of Girls from control group with performance of Girls from experimental group. The data reveals that overall differences between the means of Girls from both the groups are significant at 0.05 and 0.01 levels of significance. Girls from experimental group performed better than the Girls from the control group. It means that instruction given by using Multimedia Instructional Package for experimental group favoured in that treated with tradition method in control group.

The results from Table V.20 and Tavle V.21 indicate that instruction by using Multimedia Instructional Package favoured the Boys as well as Girls from Experimental group.

Table V:22

OVERALL SIGNIFICANCE OF THE DIFFERENCES BETWEEN THE S.D.s
OF THE SCORES OF BOYS AND GIRLS FROM CONTROL GROUP IN
POST-TEST.

GROUP	SEXES	N	STATISTICAL MEASURES	OVERALL
Control (A1)	B1 (Boys)	15	$\delta 1$	4.3
N1 = 30	B2 (Girls)	15	$\delta 2$	4.00
		F = 1.15 NS		

NS : not significant at the 0.05 and 0.01 level of significance.

Table V.22 reveals that overall significance of differences between
the S.D.s of the scores of Boys and Girls from control group
donot differ significantly. These results are identical with those
arrived at pre-test.

Table V.23

OVERALL SIGNIFICANCE OF THE DIFFERENCES BETWEEN THE S.D.s OF THE SCORES OF BOYS AND GIRLS FROM THE EXPERIMENTAL GROUP IN POST TEST.

GROUP	SEXES	N	STATISTICAL MEASURES	OVERALL
Experimental (A2)	B1 (Boys)	15	σ_1	4.4
N2 = 30	B2 (Girls)	15	σ_2	4.2
	F = 1.38 NS			

NS : not significant at 0.05 and 0.01 level of significance.

F ratioes are calculated by the formula $F = \dfrac{\sigma_1^{2}}{\sigma_2^{2}}$ by placing greater variance in the numerator F values in the above table V.23 is 1.138 found to be non-significant at both the levels (1.138 $<$ 1.85 and 2.41).

Table V.24

OVERALL SIGNIFICANCE OF THE DIFFERENCE BETWEEN S.D.s
OF THE SCORES OF BOYS FROM CONTROL AND EXPERIMENTAL
GROUPS IN POST-TEST.

GROUP	SEXES	N	STATISTICAL MEASURES	OVERALL
Control (A1)	B1 (Boys)	15	ζ_1	4.3
Experimental (A2)	B1 (Boys)	15	ζ_2	4.4

$$F = 1.035$$
$$NS$$

NS : not significant at 0.05 and 0.01 level of significance.

Table V:25

OVERALL SIGNIFICANCE OF THE DIFFERENCES BETWEEN THE S.D.s OF THE SCORES OF GIRLS FROM BOTH CONTROL AND EXPERIMENTAL GROUPS IN POST-TEST.

GROUP	SEX	N	STATISTICAL MEASURES	OVERALL
Control (A1)	B2 (Girls)	15	δ_1	4.0
Experimental (A2)	B2 (Girls)	15	δ_2	4.2

F = 1.062
NS

NS : not significant at 0.05 and 0.01 level of significance.

Table V 25 was prepared to compare the performance of girls from control group with performance of girls from experimental group. The data reveals that overall differences between the means of Girls from both the groups are significant at 0.05 and 0.01 levels of significance. Girls from Experimental group performed better than the Girls from control group. It means, instruction given using Multimedia Instructional Package favoured in that group than that treated with traditional method in control group.

The above analysis and interpretation of the data regarding individual comparison of Boys and Girls in post test scores indicate that the differences between the means as well as in S.D.s are statistically non-significant and the results are identical with those arrived at pre-test.

Individual comparison of the two groups in pre over post-test scores.

The data regarding individual comparison of control and experimental groups in pre over post-test performances are tabulated in the tables V.23, 24 and V 25 and 26.

Tables V 23 and V 25 are related to the significance of difference between the means of pre and post test scores.

Table V 24 and V 26 are related to the significance of difference between the S.D.s of pre and post test scores.

Table V.26

OVERALL SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF PRE AND POST TEST SCORES OF THE STUDENTS FROM CONTROL GROUP (A1)

STATISTICAL	MEASURES	N	OVERALL
Mean	Pre Test	30	29.80
	Post Test	30	37.50
S.D.s	Pre Test	30	4.4
	Post Test	30	4.3
r between Pre and Post Test			0.917
	D means		7.70
	t values		20.92 *
	df		59

* Significant at 0.05 and 0.01 levels of significance.

Table V.26 shows that control group improved significantly in overall performance. It means, traditional method helped all the students in control group in improving their performance.

Table V.27

OVERALL SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS
OF PRE AND POST TEST SCORES OF THE STUDENTS FROM EXPERI-
MENTAL GROUP (A2)

STATISTICAL MEASURES		N	OVERALL
Means	Pre-Test	30	29.80
	Post-Test	30	42.95
S.D.s	Pre-Test	30	4.4
	Post-Test	30	4.2
r between Pre over Post-Test			0.867
	D means		13.15
	t values		32.15 *
	df		59

* Significant at 0.05 and 0.01 levels of significance.

Table V 26 shows that experimental group also improved significantly in performance. It means, instruction by using Multimedia Instructional Method favoured all the students from experimental group to improve their pre over post performance.

It is also notable that overall t values of the experimental group are far higher than the control group. This supports the superiority of the instruction by using Multimedia Instructional Package.

V.5. ANALYSIS OF INTERVIEWS

Interviews of the 3 Technology Experts and 20 science teachers were taken in the present study to develop the Multimedia Instructional Package. The investigator used as interview schedule during the interviews (Appendix C).

The objective of using this technique was to take guidelines from experts in how to develop Multimedia Instructional Package.

To collect information about present system of instruction, to help in analysing human and non-human factors involved in the present system, to chalk out the plan and design in preparing Multimedia Instructional Package to know methods, material and media for the new system.

The interview schedule covered all 20 questions related to the present system.

Analysis of data follows questionwise.

Q.1   First question was about difficulties that occurred while teaching science. The science teachers said, they have the following difficulties while teaching science.

1) Some concepts are difficult - for example trachieds - and xylem vessels.

2) They do not have well-equipped laboratories.

3) They do not have Audio/Visual aids in the schools.

4) They do not have specific educational aids for explaining specific concepts.

Q.2 - was about the teaching method used while teaching science. All 20 science teachers said that they are using only lecture method for teaching science.

Q.3 - was about change in method. 90% of the science teachers said, that there should be change in traditional method of instruction, but 10% of the teachers said to complete the syllabus the traditional method was satisfactory.

Q.4 - was regarding teachers - What should teachers do to encourage the 'observation method' in the students ?

The following points were brought out:

1) The students should be taken to 'Botanical garden' on excursions.

2) They should be taken for plant collection, to various places like Mahabaleshwar, Panhala etc.

3) They should be taken to the nurseries in the city.

4) Science exhibition should be arranged.

5) Every school should have 'science club'.

6) Video-cassettes about plants should be shown to the students.

Q.5 was, what science teachers should do to develop 'scientific attitude' and 'thirst of knowledge of science', in the students ?

The following points were brought out:

1) The teacher should arrange workshop and teach students to prepare A.V. aids.

2) Seminars, should be arranged.

3) Experts should be called for giving lectures on different topics of science.

4)   Slide-show related with science subject should be shown.

5)   Science exhibition.should be arranged.

6)   Science fair.snould be conducted.

7)   Science quiz/competitions. should be conducted.

Section B, was regarding the Hardware and software available in the school.

In reply to the 1st question about well-equiped laboratories all teachers said, that they do not have well-equipped laboratories. None of the school has overhead projector in Jaysingpur city. In Sangli 3 schools have over-head projector and slide projector, 12 schools do not have any A.V. aids. But all schools have microscopes and microscopic slides.

All schools had good light, electricity and water arrangement. None of the teachers had prepared charts or slides or filmstrips.

100% of the science teachers from Jaysingpur city had no knowledge about filmstrips/transparencies or other software.

Part C was about development of Multimedia Instructional Package, following points were brought out.

1)   The objectives of development of Multimedia Instructional
        Package were decided.

2)   For the preparation of educational aids in accordance
        with concepts were finalized.

3)   The role of personnel was decided.

4)   Methods of instruction were finalized.

5)   The steps of development of multimedia package were
        decided.

V.6. ANALYSIS AND INTERPRETATION OF THE QUESTIONNAIRE

Table V.28

M.M.I.P. AND SCIENCE CURRICULUM

Greater extent	To some extent	To little extent
100%	0%	o'/.

Table V.28 shows that 100% of science teachers have opined
that multimedia package is in accordance with the science
curriculum.

Table V.29

M.M.I.P. AND THE TEXT BOOK

Greater extent	To some extent	To little extent
89.70%	10.30%	0%

Table V.29 shows that 89.70% science teachers find that the Multimedia Instructional Package is in accordance with Std. IX Biology text book whereas 10.30% differ.

Table V.30

Appropriateness of M.M.I.P. to age of learner.

To Greater extent	To some extent	To little extent
78.26%	21.24%	0%

Table V.30 shows that 78.26% science teacher said that Multimedia Instructional Package is appropriate to the age of learner while 21.24% differ.

Table V:31

Content accuracy and uptodateness of M.M.I.P.

To Greater extent	To some extent	To little extent
91.30%	8.7%	0%

Table V.31 shows that 91.30% science teachers said that the M.M.I.P. having uptodate knowledge and accurate content but 8.7% differ.
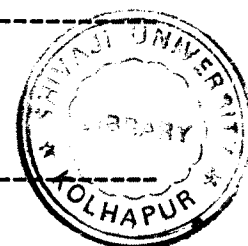
Table V:32

Organization of content of M.M.I.P.

To Greater extent	To some extent	To little extent
62.50%	37.50%	0%

Table V:33

Importance and usefulness of content to learner of M.M.I.P.

To large extent	To some extent	To little extent
91.30%	8.70%	0%

In table V.39 shows that 91.30% science teachers said that the content in Multimedia Instructional Package was important and useful but 8.70% science teacher differ in their opinion.

Table V.34

Checking of concepts accuracy of M.M.I.P.

To large extent	To some extent	To little extent
52.70%	47.30%	0%

Table V.34 shows that 52.70% science teachers opined that concepts are checked for accuracy but 47.30% science teachers differ in their opinion.

Table V.35

Selection of Media in accordance with need in M.M.I.P.

To large extent	To some extent	To little extent
95.65%	4.35%	0%

Table V.35 shows that 95.65% science teachers opined that selection of media is in accordance with need of Multimedia Instructional Package.

Table V.36

True representation of ideas in M.M.I.P.

To large extent	To some extent	To little extent
78.26%	21.74%	0%

Table V.36 shows that 78.26% teachers said that is true representation of ideas in M.M.I.P. but 21.74% donot agree with that.

Table V.37

Technical Quality of Educational aids in M.M.I.P.

To large extent	To some extent	To little extent
79.57%	20.43%	0%

Table V.38

Clarity of Images in M.M.I.P.

To large extent	To some extent	To little extent
79.57%	20.43%	0%

Table V.38 shows that 79.57% science teacher opined that images of educational aids in Multimedia Instructional Package are very clear but 20.43 science teacher differ in their opinion.

Table V.39

Colour appropriateness in M.M.I.P.

To large extent	To some extent	To little extent
86.96%	13.4%	0%

Table V.39, shows that 86.96% of science teacher opined that the colour combination in charts and other educational aids in Multimedia Instructional Package is appropriate.

Table V:40

Technical Quality of Instructional Material of M.M.I.P.

To large extent	To some extent	To little extent
69.57%	30.43%	0%

Table V.40 shows that 69.57% science teachers opined that technical quality of Instructional Material of Multimedia Instructional Package was good but 30.43% differ in the opinion.

Table V:41

Intelligible narration in audio-cassette.

To large extent	To some extent	To little extent
82.61%	17.39%	0%

Table V.41 shows that 82.61% science teacher opined that narration in the audio-cassette is intelligible. 17.39% science teacher differ in their opinion.

Table V.42

Consideration of school physical facilities for using M.M.I.P.

To large extent	To some extent	To little extent
86.96%	13.04%	0%

Table V.42 shows that 86.96% science teacher opined that schools have physical facilities for using Multimedia Instructional Package while 13.04% of science teachers differ in their opinion.

Table V.43

Availability of human Resources in school to use equipments

To large extent	To some extent	To little extent
55.50%	44.50	0%

Table V.43 shows that 55.50% of science teachers said that human resources are available in the school to use equipments but 45.50 of science teachers differ in their opinion.

Table V.44

Worthiness of M.M.I.P. in terms of Time and Expenses

To large extent	To some extent	To little extent
65.22%	34.78%	0%

Table V.44 shows that 65.22% of science teachers opined that Multimedia Instructional Package was worthy in terms of time and expenses. While 34.78% science teachers differ in their opinion.

V.7. ANALYSIS AND INTERPRETATION OF THE INVESTIGATOR'S TEACHING COMPETENCY MEASURED IN TERMS OF SCORES ON BGTC SCALE

The data regarding the teaching competency of investigator in teaching to the control groups and experimental groups alternatively were obtained in terms of scores on marathi version of BGTC scale. The 3 science teachers were provided with the scale and asked to observe the lesson, the original data is given in the appendix – P pp . Means and S.D.s of scores were calculated each lesson for both groups separately.

Means were calculated by using

$$M = \frac{\Sigma X}{N} \quad \text{formula}$$

and S.D. by

$$\sigma = \sqrt{\frac{\Sigma x^2}{N-1}} \quad \text{formula}$$

The significance of difference between the two means of scores in control and experimental groups were tested to see whether the teaching competency of teachers in experimental group was superior than those of control group resulting in better performance of the students of the experimental group.

The t values were calculated by

$$\text{formula} \quad = \quad t = \frac{D \cdot \text{means}}{\sigma D}$$

$$\sigma D = \hat{\sigma} \sqrt{\frac{1}{N_1} + \frac{1}{N_2}}$$

Where $\hat{\sigma}$ is pooled S.D.

Pooled S.D.s were calculated by formula

$$\sigma \text{pooled or } \hat{\sigma} = \sqrt{\frac{\Sigma x_1^2 + \Sigma x_2^2}{N_1 + N_2 - 2}}$$

Where X1 and X2 deviations of each score from their means of scores in control and experimental groups respectively N1 and N2 are the number of scorer into the two groups respectively.

Table V.45

SIGNIFICANCE OF DIFFERENCES BETWEEN THE MEANS OF THE
SCORES BY INVESTIGATOR FROM BOTH CONTROL AND EXPERIMENTAL
GROUP REGARDING THEIR TEACHING COMPETENCY OF BGTC SCALE.

Lesson No.	Group	Statistical Measures				t value
		N	M	S.D.	D means	
1	C	3	102	1.2	3	1.64 NS
	E	3	105	1.3		
2	C	3	104	1.6	4	1.22 NS
	E	3	108	1.2		
3	C	3	106	1.2	2	1.22 NS
	E	3	108	1.2		
4	C	3	106	1.2	3	1.20 NS
	E	3	109	1.8		
5	C	3	105	1.3	3	1.20 NS
	E	3	108	1.6		

NS : Not significant at 0.05 & 0.01 levels of significance.

The obtained t values for 5 df $\left[df = (N_1 - 1) + (N_2 - 1) = \right.$

$$[df = (N1 - 1) + (N2 - 1) =$$
$$(3 - 1) + (3 - 1) = 4)$$

is smaller than required at 0.05 and 0.01 levels of significance.

(All t values are less than 2.78 and 4.60)

Which means that teaching competency of investigator in both the groups was equal. It further means that

the Independent variable.

"Teachers and their teaching competence" did not affect the outcome of the result which proved that

"The performance of the students from experimental group was because of the use of Multimedia Instructional Package in their instruction.

V.8. CONCLUDING REMARKS

The investigator has analysed and interpreted the data regarding development and experimentation of Multimedia Instructional Package in Botany for 2 unit of standard IX. The conclusion based on the analysis and the interpretation of the data done in this chapter are presented in the next chapter.