CHAPTER : VI

ANALYSIS AND INTERPRETATION

The previous chapter presented the methodological details regarding this study. The data obtained were analysed using appropriate statistical techniques. A detailed report of the analysis carried out, is presented in this chapter. To facilitate a meaningful discussion of this aspect of the study, it has been considered necessary to examine the nature and treatment of the data obtained and recall more specifically the hypotheses stated for the study.

NATURE OF DATA OBTAINED :

It may be recalled here that there are 9 clusters of students for the study, each of which has three sections within it. This results in 9 clusters cut across by these sections. The three sections in each cluster areequated in terms of mean andstandard deviation on the pre pre-test. It

may therefore be inferred throggh the logic of summation that there are three main groups equated in terms of number, mean and standard deviation on the prepretest. There being 3 media to be experimented upon, each one of the groups has been exposed to one media. As per the design of the experiment, the data obtained are in terms of scores obtained by pupils on three tests, viz the pretest, the immediate post test and the retention test. Each test sampled items, from four categories of objectives namely, knowledge, understanding, application and skill. The total number of sets of scores obtained for statistical analysis is therefore, as follows :

3 media x 9 subsclusters = 27

3 tests x 4 categories of objectives = 12

This gives a total of 27 x 12 = 324 sets of scores. Further it may be stated here that the two instructional units selected for the study have been treated for analysis purpose separately, since there are 4 subunits in total and the tests have been given at the end of each subunit.

PRELIMINARY TREATMENT OF DATA :

It may be mentioned that there are 3 media to which 9 sub clusters have been exposed. Further, scores are obtained on the pretest, post test, and retention tests. The gain score on each post test is calculated by taking the difference

between each post test and the pre test. The scores obtained are therefore, gain scores. Since the objective of the study is to compare the relative effectiveness of three media, it was decided to post together the 9 sub-clusters exposed to each media for each objective category, thereby necessitating calculation of the pooled mean gain and standard deviation in each case. These have been denoted by M comb and σ comb respectively in the tables presented in this chapter.

TESTING OF HYPOTHESES :

For the sake of convenience the eight hypotheses formulated and presented in Chapter III, have been recalled here.

1. There is no significant difference in the mean achievement of the three groups of pupils on the knowledge objective, when taught through three different media.

2. There is no significant difference in the mean achievement of three groups of pupils on the objective understanding, when taught through three different media.

3. There is no significant difference in the mean achievement of the three groups of pupils on the objective application, when taught through three different media.

4. There is no significant difference in the mean achievement of the three groups of pupils on the objective skill when taught through three different media.

5. There is no significant difference in the mean achievement of the three groupsof pupils on the objective knowledge in the retention test.

6. There is no significant difference in the mean achievement of the three groups of pupils on the objective understanding in the retention test.

7. There is no significant difference in the mean achievement of the three groups of pupils on the objective application in the retention test.

8. There is no significant difference in the mean achievement of the three groups of pupils on the objective skill in the retention test.

Each of these hypotheses have been tested in the order presented above. The F test is computed to test whenther the three media groups differed significantly, wherever the F value is found significant, specific hypotheses are stated. The 't' tests have been computed to test these hypotheses.

As has been mentioned earlier, in each case, the gains in terms of the difference between pretest and the respective post test in achievement scores, have been computed. The gain in respect of each subject in the sample is computed, the mean gain and standard deviation for each sub cluster calculated,

and in turn the pooled mean gain and pooled standard deviation arrived at, for each medium group. To test the difference in the mean gain between the medium groups, the analysis of variance technique is used. In the presentation of the analysis, the two hypotheses pertaining to each objective category, namely, one related to immediate post test and the second related to the retention test are treated together to facilitate meaningful interpretation.

KNOWLEDGE OBJECTIVE :

Hypotheses under test under knowledge objective are 1 and 5 respectively. Table 6.1 presents thedetails regarding the analysis of variance for the gain on immediate post test for the knowledge objective which tests hypothesis 1, which states that there is no significant difference in the achievement on knowledge objective, when taught through three difference media.

TABLE No. 6.1

Analysis of variance table for gain on immediate post test for knowledge objectives

S.No.	Lesson	Source of variation	df	Sum of squares	Variance	F
1.	Buddhism I	Between groups	2	1392.3	695.15	266.72**
		Within groups	762	1986.45	2.61	
2.	Buddhism II	Between groups	2	1858.95	929.48	367.38**
		Within groups	762	1925.24	2.53	
3.	Jainism I	Between groups	2	3998.4	1999.2	595**
		Within groups	762	2562.75	3.36	
4.	Jainism II	Between groups	2	3962.7	1981.35	400.27**
		Within groups	762	3771.45	4.95	

** Significant at .01 level.

As can be seen from the above table the obtained 'F' values are highly significant at .01 level in the case of all

the four sub-units. This means that the null hypothesis is rejected as there is significant difference in the mean gain amqg the three medium groups. To determine specifically where these differences exist, a series of hypotheses are formulated relatively to testing whether differences exist in mean gain scores when any two media are considered. These specific hypotheses are :

1. There is no significant difference in the mean gain on the post tests for the knowledge objective between medium I group and medium II group.

2. There is no significant difference in the mean gain on the post tests for the knowledge objective between medium II group and Medium III group.

3. There is no significant difference in the mean gain on the post tests for the knowledge objective between medium II group and medium III group.

The critical ratio test is used to test the above stated hypotheses. A consolidated table giving the critical ratio values is presented in table 6.2.

TABLE No. 6.2

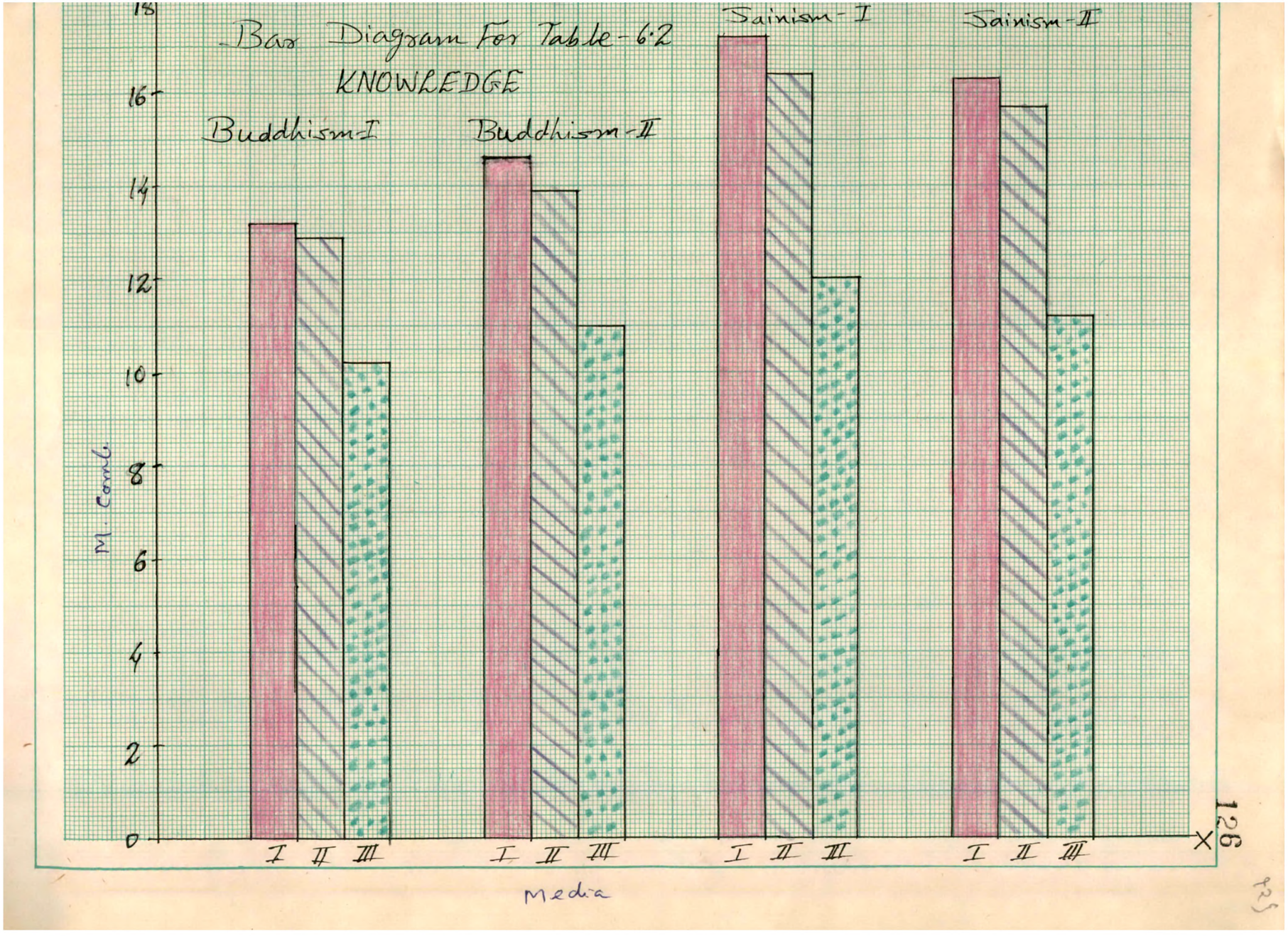
Table showing the critical ratio in respect of the three medium groups' mean gain for the knowledge objective on the immediate post test

S.No.	Lesson	Medium	N	M Comb	σ Comb	Critical Ratio I&II	Critical Ratio II&III	Critical Ratio I&III	Significance
1.	Buddhism I	I	255	13.2	1.39	2.31			.05
		II	255	12.9	1.5		18		.01
		III	255	10.2	1.9			20	.01
2.	Buddhism II	I	255	14.6	1.42	5.39			.01
		II	255	13.9	1.44		19.33		.01
		III	255	11.0	1.86			24	.01
3.	Jainism I	I	255	17.2	1.4	6.15			.01
		II	255	16.4	1.41		24.4		.01
		III	255	12	2.47			28.89	.01
4.	Jainism II	I	255	16.3	1.95	1.5			NS
		II	255	15.7	1.76		21.43		.01
		III	255	11.2	2.81			24.29	.01

Medium : I Programmed filmstrip + teacher

Medium : II Programmed filmstrip only

Medium : III Teacher only


Bar Diagram For Table - 6.2
KNOWLEDGE
Buddhism-I
Buddhism-II
Jainism-I
Jainism-II
M. Comb.
18
16
14
12
10
8
6
4
2
0
I II III
I II III
I II III
I II III
X
Media

ANALYSIS AND INTERPRETATION OF TABLE 6.2 :

Table 6.2 records the comparative gain of the three medium groups in the objective knowledge. The performance of the groups in four lessons are shown in four separate columns.

In the lesson Buddhism I the combined mean of medium I group is 13.2 with S.D. of 1.39. The mean and σ of medium II group is 12.9 and 1.5 respectively. Medium III group has scored a mean of 10.2 with σ 1.9. The mean difference between medium I and II is significant at .05 level andthe other two comparisions are significant at .01 level.

In the second lesson on Buddhism, Medium I has scored a mean of 14.6 with σ 1.42; medium II with a mean of 13.9 and σ 1.44 comes second and medium III with a mean of 11 and σ 1.86 ranks third in the list. The difference between the means is significant at .01 level in all the three comparisions.

In Jainism I, medium I has secured a mean of 17.2 with σ 1.4; medium II with a mean of 16.4 and σ 1.41 comes next to it and medium III with a mean of 12 and σ 2.47 ranks third. The difference between the means is significant at .01 level in all the three comparisons.

In the lesson Jainism II, medium I has secured thetop place with a mean of 16.3 and σ 1.95; medium II comes

second with a mean of 15.7 and σ 1.76 medium III comes third with a mean of 11.2 and σ 2.81. The mean difference between medium I and Medium II is not significant. The other two comparisons yield a significant difference at .01 level.

From this analysis it becomes evident that the pupils of medium I have acquired a greater gain than the other two groups. Visual and auditory senses were made use of in medium I and the higher mean and the significance of the difference between the means in three lessons indicate that it is comparatively a better combination of methods than the other two as far as this objective is concerned. It conforms with the findings of Roth and Issing (1970) where the combination of sound and picture, was found to be superior to the presentation of the same through one sensory channel. The study of Anderson (1969) also supports this finding when he says in his report that the pictorial spoken combination is seen as clear, easy and complete.

Another noteworthy feature in this table is that the medium II group comes close to medium I group in all the four lessons. In the lessons Buddhism II and Jainism I the difference is significant at .01 level and in Buddhism I at .05 level. In the last lesson (i.e.) Jainism II the difference is not significant. This shows that the programmed filmstrips are effective in imparting knowledge to a great

extent and the teacher pupil interaction enhances the mean score to some extent. The teacher's presence has improved the performance of pupils in similar studies conducted by Goddbeck, Shearer, Campalu and Willis (1962), Hatch and Flint (1962). But in the study of Shah (1964) the group which was taught through PLM performed better when compared with the group where the PLM was used with theteacher's help. In all the three above mentioned studies the programmed learning with or without teachers' help has produced better scores than the conventional the method.

The third noteworthy feature is that the conventional teaching group has secured the lowest mean in all the four lessons. This trend is uniform in all the nine schools and one is led to the conclusion that the methods of media I and II prove to be superior to the conventional classroom method.

VERIFICATION OF THE HYPOTHESES :

1. Specific hypothesis I which states that there is no significant difference in the mean gain on the post tests for the knowledge objective between medium I group and medium II group is confirmed.

2. Specific hypotheses 2 which states that there is no significant difference in the mean gain on the post

tests for the knowledge objective between medium II group and medium II group is rejected.

3. Specific hypothesis 3 which states that there is no significant difference in the mean gain on the post tests for the knowledge objective between medium I group and medium III group is rejected.

RETENTION TEST :

The following table (6.3) presents the details regarding the analysis of variance for the knowledge objective which tests hypothesis 5 which states that there is no significant difference in the mean achievement of the groups of pupils in the objective knowledge on the retention test.

TABLE No. 6.3

Analysis of variance table for gain on retention test for knowledge objective

S.No.	Lesson	Source of variation	df	SS	Variance	F
1.	Buddhism I	Between group	2	1053.15	526.58	156.26**
		Within group	762	2565.3	3.37	
2.	Buddhism II	Between group	2	2521.95	1260.98	510.52**
		Within group	762	1879.35	2.47	
3.	Jainism I	Between group	2	4062.15	2031.08	391.34**
		Within group	762	3952.5	5.19	
4.	Jainism II	Between group	2	5763	2881.5	697.69**
		Within group	762	3144.15	4.13	

** Significant at .01 level

INTERPRETATION OF TABLE (6.3) :

The obtained 'F' values are highly significant at .01 level in the case of all the four subunits. It means that the null hypothesis no.5 stated above is rejected as there is significant difference in the mean retention among the three medium groups. To determine specifically where these differences exist, the following three hypotheses are formulated. They are :

1. There is no significant difference in the mean retention of the gain on the retention test for the knowledge objective between medium I group and medium II group.

2. There is no significant difference in the mean retention of the gain on the retention test for the knowledge objective between medium II group and medium III group.

3. There is no significant difference in the mean retention of the gain on theretention tests for the knowledge objective between medium I group and medium III group.

The critical ratio test is used to test the above stated hypotheses. A consolidated table giving the critical ratio is presented in table 6.4.

TABLE No. 6.4

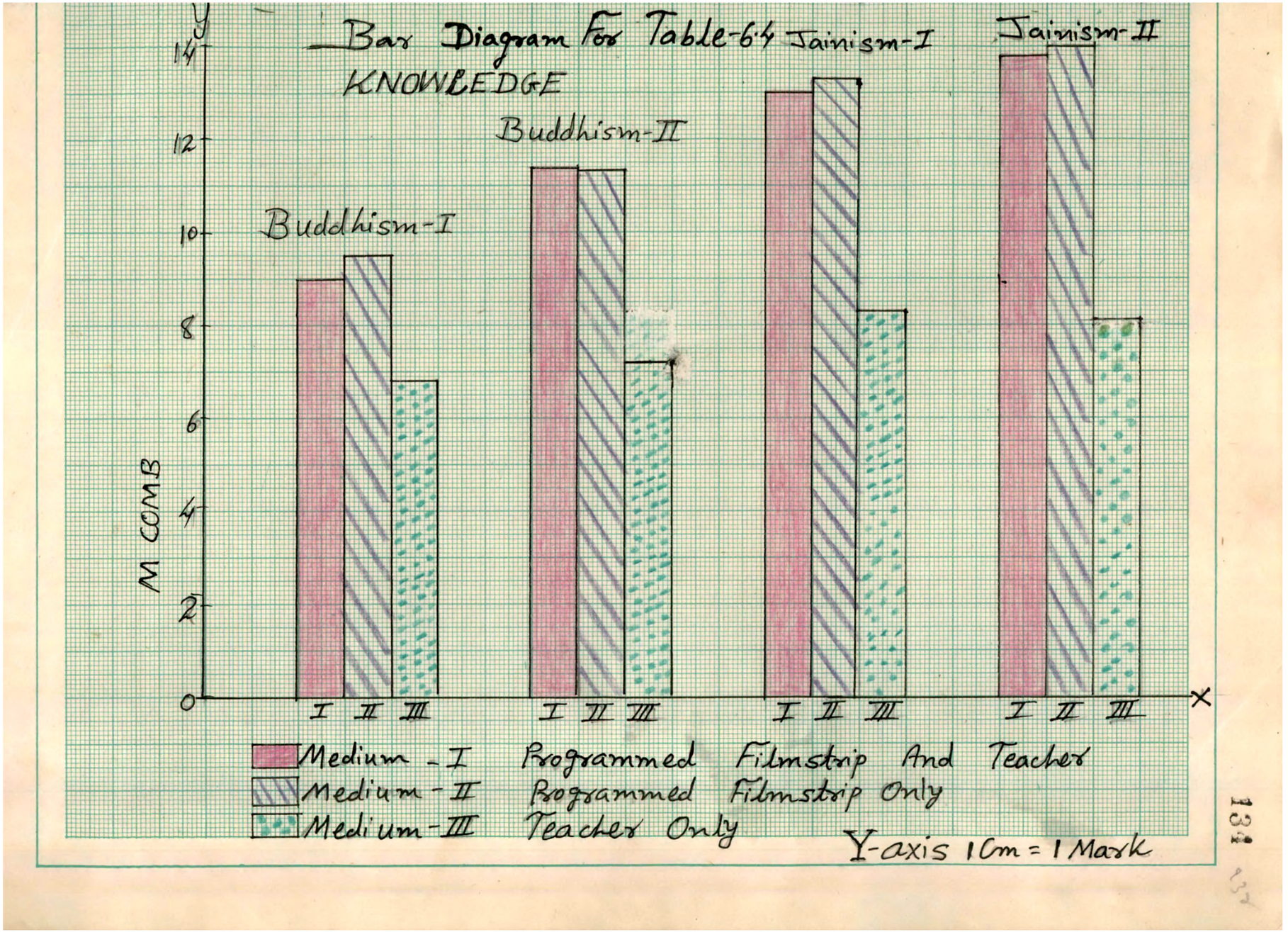
Table showing the critical ratio in respect of the three medium groups' mean gain for the knowledge objective on the retention tests :

S.No.	Lesson	Medium	N	M Comb	σ Comb	Critical Ratio I&II	Critical Ratio II&III	Critical Ratio I&III	Significance
1.	Buddhism	I	255	8.98	1.77	2.9			.01
	I	II	255	9.46	1.98		16.21		.01
		III	255	6.79	1.73			14.12	.01
2.	Buddhism	I	255	11.35	1.5	.42			NS
	II	II	255	11-29	1.5		28.67		.01
		III	255	7.24	1.65			29.32	.01
3	Jainism	I	255	12.99	2.48	1.48			NS
	I	II	255	13.27	1.7		26.24		.01
		III	255	8.25	2.5			21.5	.01
4.	Jainism	I	255	13.8	1.95	1.13			NS
	II	II	255	14	2.03		32.37		.01
		III	255	8.08	2.09			31 .9	.01

Medium : I Programmed filmstrip + teacher

Medium : II Programmed filmstrip only

Medium : III Teacher only


Bar Diagram For Table-6.4
KNOWLEDGE
Buddhism-I
Buddhism-II
Jainism-I
Jainism-II
M COMB
y
x
0
2
4
6
8
10
12
14
I II III
Medium - I Programmed Filmstrip And Teacher
Medium - II Programmed Filmstrip Only
Medium - III Teacher Only
Y-axis 1 Cm = 1 Mark

ANALYSIS OF TABLE 6.4 :

The table 6.4 shows the comparative retention of the pupils' gain in the objective knowledge. The maximum score is 20. The combined means and combined standard deviations of the three medium groups spread over nine schools are reported in this table.

In the lesson Buddhism I, medium I has scored the mean of 8.98, medium II 9.46 and medium III 6.79. The mean of medium II is the highest andit is followed by media I and III respectively. The mean difference between the groups is significant at .01 level in all the three comparisons.

In the lesson Buddhism II, medium I tops the list with a mean of 11.35. The second place is occupied by medium II whose mean is 11.29. The lead of medium I over medium II is slender and is not significant. Medium III is at the bottom with a mean of 7.24. The mean difference between medium II and III and medium I and III are significant at .01 level.

In the third lesson with the title Jainism I, medium I has secured a mean of 12.99 and medium II 13.27 and medium III 8.25. Medium II has scored more than medium I and medium II. The difference between the means of medium I and II is not statistically significant.

In the same way, in the fourth lesson with the title, Jainism II, medium II tops the list with a mean of 14, and is followed by medium I with a mean of 13.8 and medium III with 8.08. The difference between the means of media I and II is not significant while the other two mean differences are significant at .01 level.

DISCUSSION :

In all the four lessons media I and II have secured higher means than medium III. The difference between their means and that of medium III is also statistically significant at .01 level. The reason for this may be the programmed filmstrip which is a common element between media I andII.

In three lessons the mean retention of medium II is higher than that of medium I. Thedifference in all the four lessons is statistically not significant. But one cannot fail to notice the slightly better performance of medium II than the other two media.

In medium I the lesson was presented through the programmed filmstrip and the teacher expelained the frames. In medium II no such explanation was given and the pupils had to redd the information by themselves. The explanation offered by theteacher might have slackened the effort of the pupils to acquire information by themselves. Though it is not seen in thetest administered immediately after the lesson, the delayed retention test has brought but the

difference though it is not much.

This leads one to the conclusion that the programmed filmstrip used with or without the teacher results in better retention than the conventional methods.

VERIFICATION OF HYPOTHESES :

1. Specific hypothesis I which states that there is no significant difference in the mean ~~between of the~~ retention of gain on the retention tests for the objective knowledge between medium I and medium II group is confirmed.

2. Specific hypothesis 2 which states that there is no significant difference in the mean retention of the gain on the retention tests for the objective knowledge, between medium II group and medium III group is rejected.

3. Sp-ecific hypothesis 3 which states that there is no significant difference in the mean retention of the gain on the retention tests for the objective knowledge, between medium I group and medium III group is rejected.

OBJECTIVE UNDERSTANDING :

The following table 6.5 presents thedetails regarding the analysis of variance for the gain on immediate post test for the objective understanding which tests hypothesis 2 which states that there is no significant difference in the

mean achievement of the three groups of pupils on the objective understanding, when taught through three different media.

TABLE No. 6.5

Analysis of variance table for gain on immediate post test for the objective understanding

S.No.	Lesson	Source of variation	Df	S.S.	Variance	F
1.	Buddhism I	Between groups	2	461.55	230.78	259.3**
		Within groups	762	680.85	.89	
2.	Buddhism II	Between groups	2	441.15	220.58	165.85**
		Within groups	762	1014.9	1.33	
3.	Jainism I	Between groups	2	321.3	160.65	110.03**
		Within groups	762	1114.35	1.46	
4.	Jainism II	Between groups	2	573.75	286.88	163**
		Within groups	762	1343.85	1.76	

** Significant at .01 level

As can be seen from the above table (6.5) the obtained 'F' values are highly significant at .01 level in all the four sub units. This means that the hypothesis which states that there is no significant difference in the mean achievement

of the groups of pupils on the objective, Understanding, when taught through three differed media is rejected as there is significant difference in the mean gain among the three medium groups. To determine specifically where these differences exist, the following hypotheses are formulated relating to testing whether the differences exist in mean gain scores when any two media are considred. These specific hypotheses are :

1. There is no significant difference in the mean gain on the post test for the objective understanding, between medium I group and medium II group.

2. There is no significant difference in the mean gain on the post tests for the objective understanding between medium II group and medium III group.

3. There is no significant difference in the mean gain on the post test forthe objective understanding between medium I group and medium III group.

The critical ratio test is used to test the above stated hypotheses. A consolidated table giving the critical ratio values is presented in table 6.6.

TABLE No.6.6

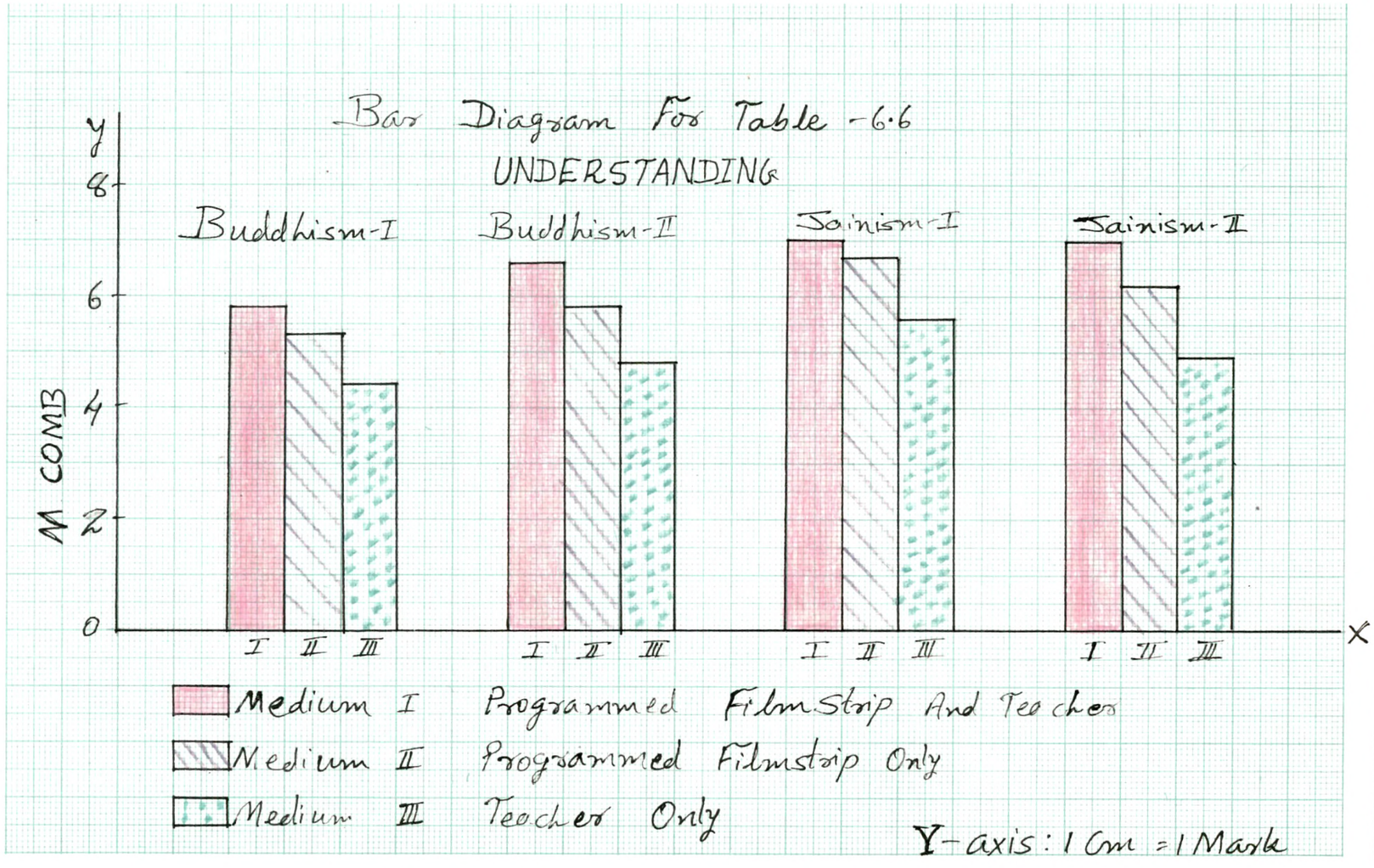
Table showing the critical ratio in respect of three medium groups' mean gain for the objective understanding in the immediate post test

S.No.	Lesson	Medium	N	M Comb	σ Comb	Critical Ratio I&II	Critical Ratio II&III	Critical Ratio I&III	Significance
1.	Buddhism I	I	255	5.82	.86	6.39			.01
		II	255	5.33	.86		10.49		.01
		III	255	4.42	1.08			15.16	.01
2.	Buddhism II	I	255	6.64	1.29	7.53			.01
		II	255	5.84	1.1		10.93		.01
		III	255	4.8	1.05			17.65	.01
3.	Jainism I	I	255	6.97	1.26	2.9			.01
		II	255	6.66	1.12		10.6		.01
		III	255	5.55	1.24			12.86	.01
4.	Jainism II	I	255	7.04	1.22	7.3			.01
		II	255	6.24	1.25		11.42		.01
		III	255	4.85	1.49			18.18	.01

Medium I = Programmed filmstrip + Teacher

Medium II = Programmed filmstrip only

Medium III = ~~Prmogr~~ Teacher only.


Bar Diagram For Table -6.6
UNDERSTANDING
Buddhism-I
Buddhism-II
Jainism-I
Jainism-II
y
8
6
4
2
0
M COMB
X
I II III
I II III
I II III
I II III
Medium I Programmed Filmstrip And Teacher
Medium II Programmed Filmstrip Only
Medium III Teacher Only
Y-axis: 1 Cm = 1 Mark

ANALYSIS AND INTERPRETATION OF TABLE 6.6 :

In table 6.6 is tabulated the combined means and σ of the three medium groups in the four lessons on the objective understanding. The maximum score for the test is 10.

In Buddhism I, medium I has secured a mean of 5.82 with σ .86. Medium II has got a mean of 5.33 with σ .86 and medium III has a mean of 4.42 with σ 1.08. The difference between the means is significant at .01 level in all the three comparisons.

In Buddhism II, medium I grouphas scored a mean of 6.64 with σ 1.29. The mean of medium II is 5.84 with σ 1.1 and the mean of medium III is 4.8 with σ 1.05. The mean difference is significant at .01 level in all thethree comparisons.

In Janism I, the mean and σ of medium I are 6.97 and 1.26 respectively. Medium 11 has scored a mean of 6.66 with σ 1.12 and medium III has scored a mean of 5.55 with σ 1.24. The difference between the means is significant in all the three comparisons.

In Jainism II, the mean and σ of medium I are 7.04 and 1.22. For medium II they are 6.24 and 1.25 and for medium III 4.85 and 1.49.

Medium I has secured the top place in all the four lessons. It is a clear indication that the understanding is more when the programmed filmstrip teacher combination is made use of.

Medium II has secured the second place and its means are higher than that of medium III. The difference is significant at .01 level and it proves that programmed filmstrips develop understanding better than the conventional classroom technique.

Medium III is at the bottom of the list in all the four lessons. The mean difference is significant at .01 level and so of the three combinations used in this study it is the latest effective method in developing the understanding of the pupils.

Developing understanding through programmed learning materials has been attempted by other researches also. In the study conducted by Kannabiran (1978) there was no significant difference between the groups in the objective understanding. His programme was aprinted linear programme on the Unit Akbar. But in this study the programmed filmstrips have developed understanding and this may be ascribed to the projected pictures and charts. In a semi dark room the screen is the only lighted area which compels attention. Moreover pictures and colour attract the attention better.

So such a combination has achieved better understanding than was done by a printed booklet used in Kannabiran's study. Vernon (1962) points out that people infer meaning from pictures and that this inference may be more or less correct. Providing a verbal commentary ensures that the correct interpretation is directly achieved. Indeed at one point Vernon remarks that it may be more instructive to show still pictures or good diagrams with a good verbal commentary than to show a film without one. Laner (1954, 1955) demonstrated that thecommentary ensures better understanding, so it is probably due to the commentary and the colourful pictures, better understanding is achieved in this study.

VERIFICATION OF SPECIFIC HYPOTHESES :

The specific hypotheses 1, 2 and 3 which state that there is no significant difference in the mean achievement of groups I and II, medium groups II and III and medium groups I and III are rejected.

RETENTION TEST :

The following table 6.7 presents thedetails regarding the analysis of variance for the objective understanding on the retention tests conducted after four weeks. Hypothesis 6 which states that there is no significant difference the mean achievement of the three groups of pupils on the objective understanding in the retention tests is tested here.

TABLE No. 6.7

Analysis of variance table for gain on retention test for the objective understanding

S.No.	Lesson	Source of variation	Df	S.S.	Variance	F
1.	Buddhism I	Between groups	2	354.45	177.23	127.5**
		Withing groups	762	1058.25	1.39	
2.	Buddhism II	Between groups	2	795.6	397.8	268.78**
		Withing groups	762	1124.55	1.48	
3.	Jainism I	Between groups	2	464.1	232.05	134.91**
		Within groups	762	1310.7	1.72	
4.	Jainism II	Between groups	2	844.05	422.03	203.88**
		Withing groups	762	1573.35	2.07	

** Significant at .01 level.

Interpretation of table 6.7 :

The obtained F values are highly significant at .01 level in the case of all the four sub units. It means that the hypothesis No.6 stated above, is rejected as there is significant difference in the mean retention among the three medium groups.

To determine specifically where these differences exist, the following three hypotheses are formulated. They are :

1. There is no significant difference in the mean retention of the gain on the retention tests for the objective understanding between medium I group and medium II group.

2. There is no significant difference in the mean retention of the gain on the retention tests for the objective understanding between medium II group and the medium III group.

3. There is no significant difference in the mean retention of the gain in the retention tests for the objective understanding between medium I group and medium III group.

4

The critical ratio test is used to test the above stated hypotheses. A consolidated table giving the critical ratio is presented in table 6.8.

TABLE No. 6.8

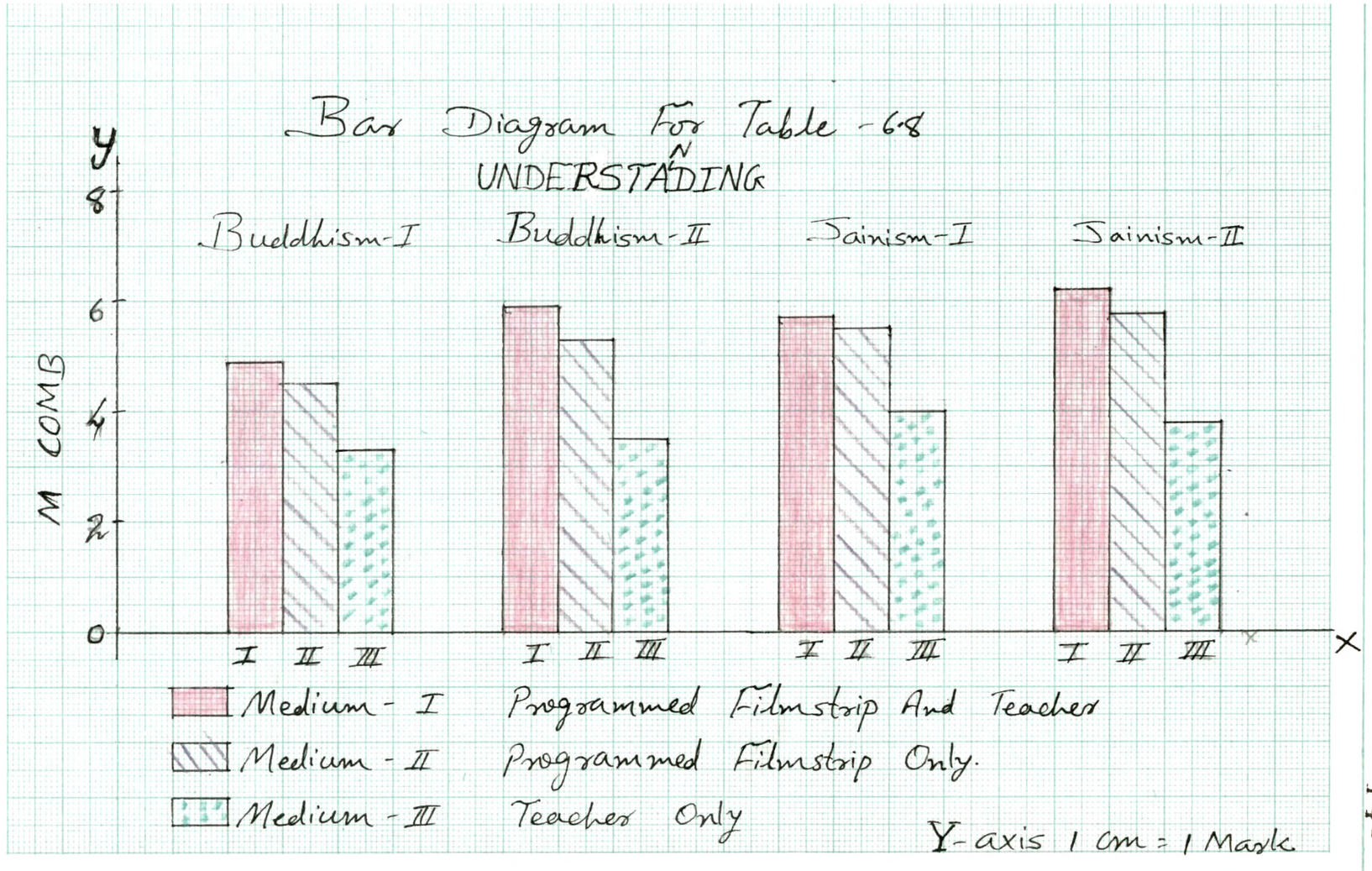
Table showing the comparative retention of gain of the three medium groups in the objective understanding in the retention tests

S.No.	Contents	Medium	N	M Comb	σ Comb	Critical Ratio I&II	Critical Ratio II&III	Critical Ratio I&III	Significance
1.	Buddhism	I	255	4.85	1.13	3.49			.01
	I	II	255	4.5	1.13		11.57		.01
		III	255	3.27	1.26			14.92	.01
2.	Buddhism	I	255	5.93	1.2	5.6			.01
	II	II	255	5.32	1.24		17.04		.01
		III	255	3.5	1.17			22.86	.01
3.	Jainism	I	255	5.74	1.14	.58			NS
	I	II	255	5.64	1.18		13.53		.01
		III	255	3.98	1.6			14.18	.01
4.	Jainism	I	255	6.17	1.18	3.04			.01
	II	II	255	5.82	1.4		15.12		.01
		III	255	3.75	1.7			18.88	.01

Medium : I = Programmed filmstrip + Teacher

Medium : II = Programmed filmstrip only

Medium : III = Teacher only


Bar Diagram For Table - 6.8
UNDERSTANDING
Buddhism-I
Buddhism-II
Jainism-I
Jainism-II
Y
8
6
4
2
0
M COMB
X
I II III
I II III
I II III
I II III
Medium - I Programmed Filmstrip And Teacher
Medium - II Programmed Filmstrip Only.
Medium - III Teacher Only
Y-axis 1 cm = 1 Mark.

ANALYSIS OF TABLE 6.8 :

Table 6.8 shows the comparative retention of the mean gain of the three medium groups in the objective understanding. The maximum score of the test is 10.

In the lesson Buddhism I, medium I has secured mean of 4.85, medium II 4.5 and medium III 3.27. Thetop place goes to medium I and then come medium II and medium III groups. The mean difference is significant at .01 levelin all the three comparisons.

In the lesson Buddhism II, the sameorder continues. The top place goes to medium I with a mean of 5.93, the second to medium II with 5.32 and the third place to the medium III group with a mean of ⁂ 3.5. The difference between the means in all the three comparisons is significant at .01 level.

In the Jainism I, medium I tops the list again with a mean of 5.7. The second place goes to medium II group with a mean of 5.64 and the third place to medium III group with a mean of 3.98. The difference between the means of medium I and II is not significant while the other two mean differences are significant at .01 level.

In the fourth lesson, which is Janism part II medium I has secured a mean of 6.17, medium II a mean of 5.82 and medium III 3.75. The difference between the means in all the three comparisions is significant at .01 level.

In the objective understanding medium I group tops the list. In the delayed retention test also, it tops the list though the difference is not significant in one lesson. The better retention of media I and II may be ascribed to the use of programmed filmstrips. The medium groups which learned morein the first cycle have retained more. From thisstudy it is clear that the proglammed filmstrip is a better method when used with or without the teacher's explanation, than its conventional method.

VERIFICATION OF SPECIFIC HYPOTHESES :

1. Specific hypothesis which states that there is no significant difference in the mean retention of group in the retention tests for the objective understanding, between medium I group and medium II group is confirmed as the difference in a lesson is not satistically significant.

2. Specific hypothesis which states that there is no significant difference in the mean retention of gain on the retention tests for the objective understanding between medium II group and medium III group is rejected.

3. Specific hypothesis 3 which states that there is no significant difference in themean retention of gain on the retention tests for the objective understanding between medium I group and medium III group is rejected.

3. APPLICATION OBJECTIVE :

Table 6.9 presents details regarding the analysis of variance for the gain on immediate post test for the objective Application which tests hypothesis 3 which states that there is nosignificant difference in the mean achievement of the three groups on the objective Application, when taught through three different media.

TABLE No. 6.9

Analysis of Variance table for gain on immediate post test for the objective application

S.No.	Lesson	Source of Variation	DF	S.S.	Variance	F
1.	Buddhism I	Between groups	2	216.75	108.38	106.25**
		Within groups	762	777.75	1.02	
2.	Buddhism II	Between groups	2	211.65	105.83	93.65**
		Within groups	762	859.35	1.13	
3.	Jainism I	Between groups	2	298.35	149.18	123.29**
		Within groups	762	923.1	1.21	
4.	Jainism II	Between groups	2	372.3	186.15	126.88**
		Within groups	762	1173.0	1.54	

** Significant at .01 level.

As can be seen from the above table the obtained 'F' values are highly significant at .01 level in the case of all four sub units. This means that the hypothesis No.3 stated above is rejected as there is a significant difference in the mean gain among the three medium groups. To determine specifically where these difference exist, the following three hypotheses are formulated, relating to testing whether differences exist in mean gain scores when any two media are considered. These specific hypotheses are :

1. There is no significant difference in the mean gain on the post tests, for the objective Application, between medium I group and medium III group.

2. There is no significant difference in the mean gain on the post tests, for the objective Application between medium II group and medium III group.

3. There is no sigificant difference in the mean gain on the post tests, for the objective Application, between medium I group and Medium III group.

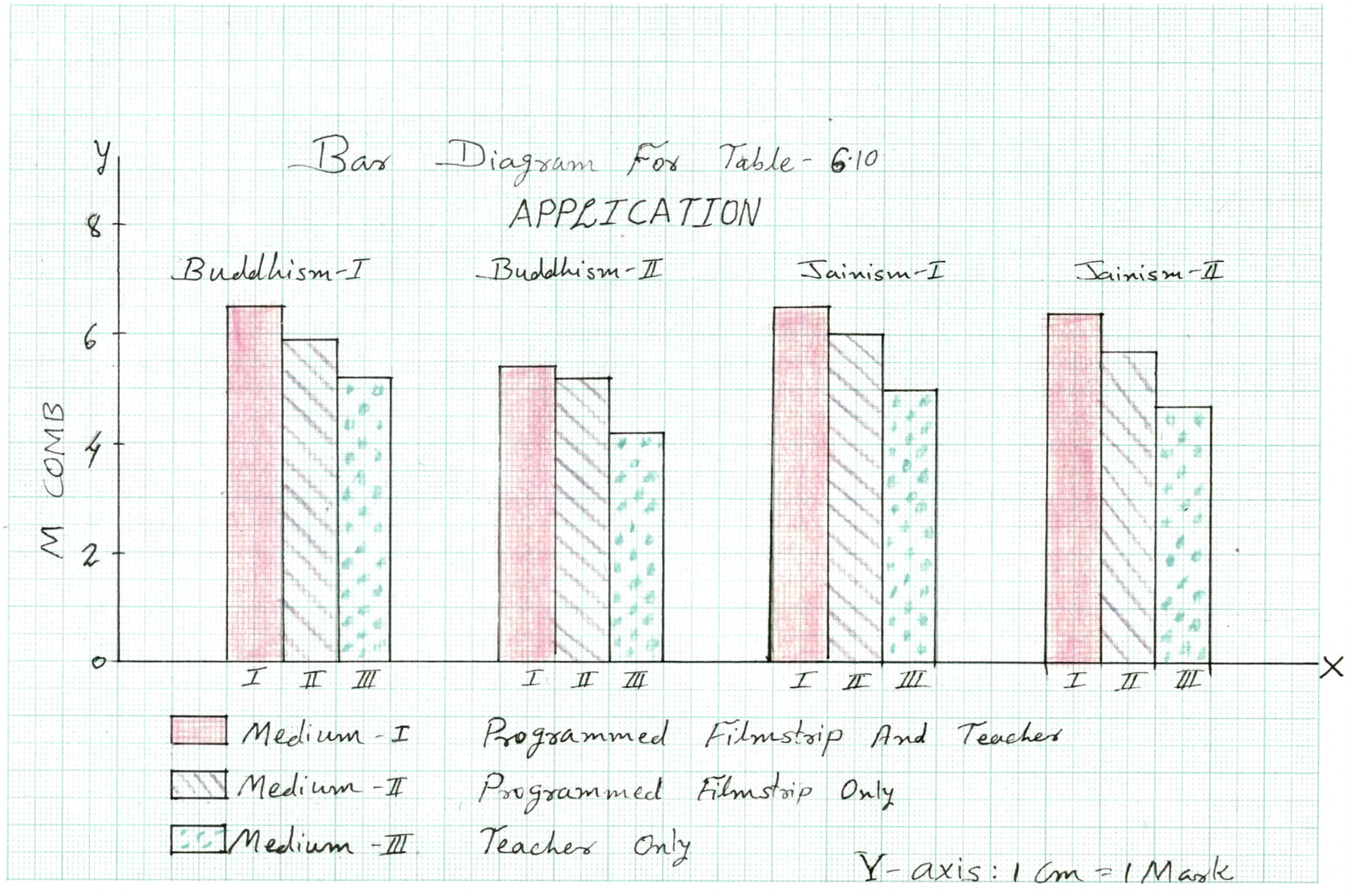
The critical ratio test is used to test the above stated hypotheses. A consolidated table giving the critical ratio values, is presented in table 6.10.

TABLE No. 6.10

Table showing the critical ratioo in respect of the three medium groups' mean gain for the objective Application the immediate post test

S.No.	Content	Medium	N	M Comb	σ Comb	Critical Ratio I&II	Critical Ratio II&III	Critical Ratio I&III	Sign-ifi-cance
1.	Buddhism	I	255	6.49	1	6.78			.01
	I	II	255	5.89	1		7.94		.01
		III	255	5.18	1.02			14.6	.01
2.	Buddhism	I	255	5.43	.97	2.35			.05
	II	II	255	5.21	1.14		10.57		.01
		III	255	4.18	1.06			13.84	.01
3.	Jainism	I	255	6.47	1	5.25			.01
	I	II	255	5.96	1.18		9.7	15.93	.01
		III	255	4.98	1.1			15.93	.01
4.	Jainism	I	255	6.35	1.14	6.3			.01
	II	II	255	5.68	1.25		8.8		.01
		III	255	4.68	1.3			15.32	.01

Medium I = Programmed filmstrip + Teacher
Medium II = Programmed filmstrip only
Medium III = Teacher only.


Bar Diagram For Table - 6.10
APPLICATION
Buddhism-I
Buddhism-II
Jainism-I
Jainism-II
Y
X
8
6
4
2
0
M COMB
I II III
Medium - I Programmed Filmstrip And Teacher
Medium - II Programmed Filmstrip Only
Medium - III Teacher Only
Y-axis : 1 Cm = 1 Mark

ANALYSIS AND INTERPRETATION OF TABLE 6.10 :

Table 6.10 shows the tabulated mean scores of the three medium groups in the four lessons on the objective Application. The maximum score of the test is 10.

In the lesson Buddhism I the medium I has scored a mean of 6.49 and σ 1; medium II a mean of 5.89 and σ 1 and medium III a mean of 5.18 with σ 1.02. The difference between the means is significant at .01 level is all the three comparisons.

In the lesson Buddhism II the medium I group has secured 5.43 as mean and .97 as σ ; medium II 5.21 as mean and 1.14 as σ ; and medium III group 4.18 as mean and 1.06 as σ The difference between two means of groups I andII is significant at .05 level. The other two comparisons show that the difference is significant at .01 level.

In the lesson Jainism I, medium I has secured a mean of 6.47 with σ 1; medium II a mean of 5.96 with σ 1.18 and medium III a mean of 4.98 with σ 1.1. The difference between the means is significant at .01 level in all the three comparisons.

~~As seen~~

In the lesson Jainism II medium I group's mean is 6.35 with σ 1.14 medium II groups mean 5.68 with σ 1.25 and medium III group mean 4.68 with σ 1.13. The difference between the means is significant at .01 level in all three comparisons.

As seen from the table themedium I group has secured significantly higher means in all the four lessons. This can safely be ascribed to the combination of methodology used. The teacher and the programmed filmstrip combination has resulted in such a result.

The medium II, group's performance is higher than that of the medium III group. Programmed filmstrips can develop understanding is proved by it though the better method is to combine it with theteacher.

Medium III group is at the bottom in all the four lessons. It clearly shows that the auditory lessons used in the conventional classroom techniques are less effective than visual and audio visual methods.

VERIFICATION OF SPECIFIC HYPOTHESES :

1. Specific hypothesis 1 which states that there is no significant difference in the mean gain on the post tests, for theobjective Applications, between medium I, group and Medium II group is rejected.

2. Specific hypothesis 2 which states that there is no significant difference in the mean gain on the post tests, for the objective Application, between medium II group and medium III group is rejected.

3. Specific hypothesis 3 which states that there is no significant difference on the mean gain onthe post test, for the objective Application between medium I group and medium III group is rejected.

RETENTION TEST :

The following table 6.11, presents the details regarding the analysis of variance for the objective Application which tests hypothesis 7 which states that there is no significant difference in the mean achievement of the three groups of pupils on the objective application on the retention test.

TABLE No. 6.11

A nalysis of Variance table for gain on retention test for the objective Application

S.No.	Lesson	Source of Variation	df	SS	Variance	F
1.	Buddhism I	Between groups	2	198.9	99.45	58.5**
		Within groups	762	1297.95	1.7	
2.	Buddhism II	Between groups	2	657.9	328.95	236.65**
		Within groups	762	1060.8	1.39	
3.	Jainism I	Between groups	2	739.5	369.75	232.55**
		Within Groups	762	1208.7	1.59	
4.	Jainism II	Berween groups	2	441.15	220.58	107.6**
		Within groups	762	1563.15	2.05	

** Significant at .01 level.

INTERPRETATION OF TABLE 6.11 :

The obtained 'F' values are highly significant at .01 level in the case of all the four sub-units. It means that the hypothesis 7 stated above, is rejected as there is significan

difference in the mean retention among the three medium groups. To determine specifically where these differences exist, the following hypotheses are formulated. They are :

1. There is no significant difference in the mean retention of the gain on the retention tests for the objective application, between medium I group and medium II group.

2. There is no significant difference in the mean retention of the gain on the retention tests for the objective application, between medium II group and medium III group.

3. There is no significant difference in the mean retention of the gain on the retention tests for the objective application, between medium I group and medium III group.

The critical ratio test is used to test the above stated hypotheses. A consolidated table giving the critical ratio is presented in table 6.12.

TABLE No. 6.12

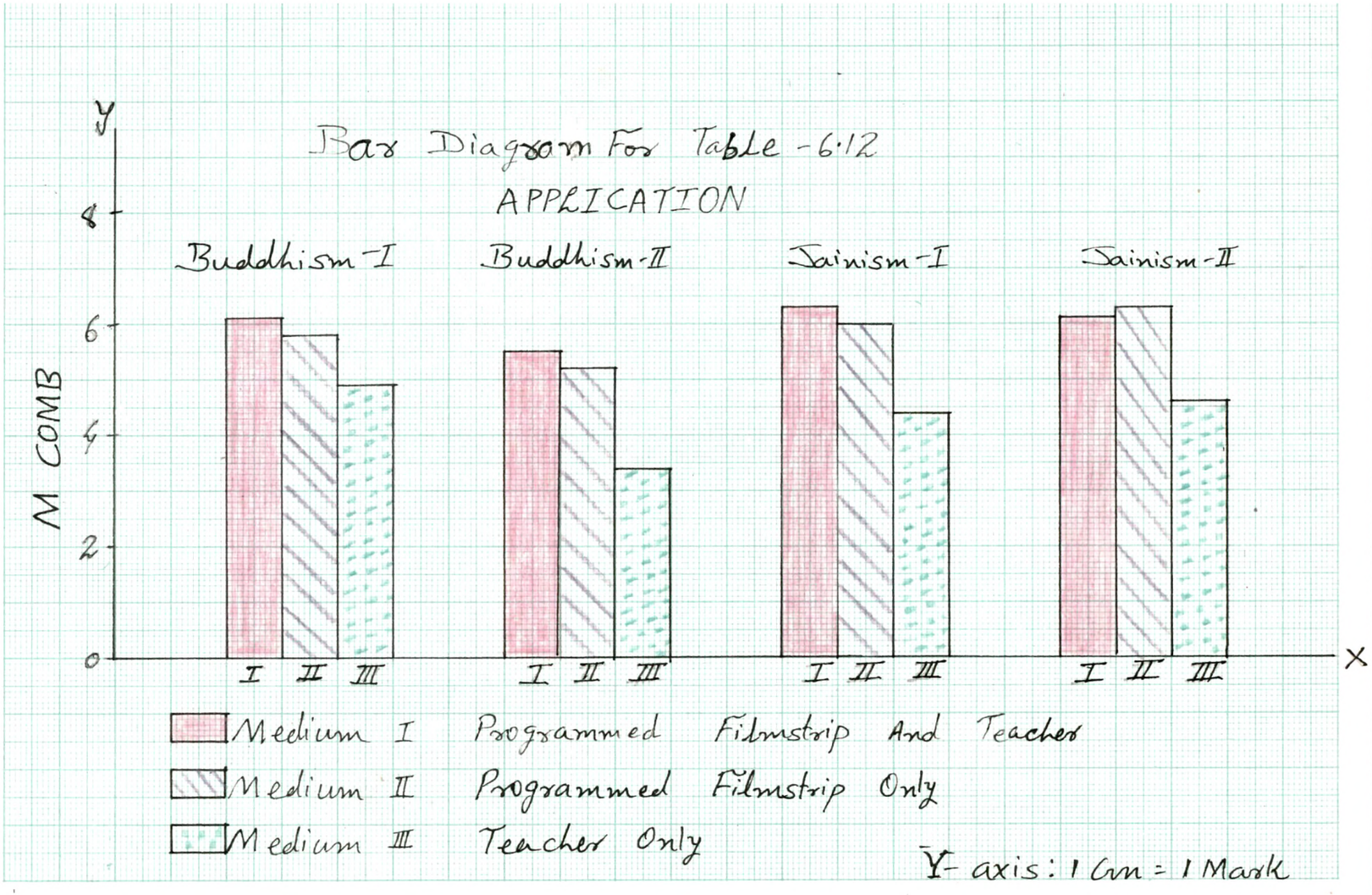
Table showing the critical ratio in respect of three medium groups' retention of gain for the objective application on the retention test

S.No.	Content	Medium	N	M Comb	σ Comb	Critical Ratio I&II	Critical Ratio II&III	Critical Ratio I&III	Significance
1.	Buddhism I	I	255	6.1	1.19	3.18			.01
		II	255	5.75	1.3		7.1	[illegible]	.01
		III	255	4.9	1.4			10.39	.01
2.	Buddhism II	I	255	5.5	1.2	2.88			.01
		II	255	5.2	1.14		17.56	[illegible]	.01
		III	255	3.4	1.18			19.8	.01
3.	Jainism I	I	255	6.3	1.14	2.75			.01
		II	255	6.	1.32		12.89		.01
		III	255	4.5	1.3			16.62	.01
4.	Jainism II	I	255	6.1	1.27	1.75			NS
		II	255	6.3	1.3		12.75		.01
		III	255	4.6	1.68			11.42	.01

Medium I : Programmed filmstrip + Teacher

Medium II : Programmed filmstrip only

Medium III : Teacher only.


Bar Diagram For Table - 6.12
APPLICATION
Buddhism-I
Buddhism-II
Jainism-I
Jainism-II
Y
X
0
2
4
6
8
M COMB
I II III
Medium I Programmed Filmstrip And Teacher
Medium II Programmed Filmstrip Only
Medium III Teacher Only
Y- axis: 1 Cm = 1 Mark

ANALYSIS AND INTERPRETATION OF TABLE 6.12 :

In table 6.12 is tabulated the consolidated retention score of the three medium groups in four lessons in the objective application. The maximum score for thetest is 10.

In the lesson Buddhism I themeans of the three medium groups are 6.1, 5.74 and 4.9 respectively. The mean difference is significant at .01 level in all the three comparisons.

In the lesson Buddhism II the means of groups I, II and III are 5.5, 5.2 and 3.4 respectively. In all the three comparisions the mean difference is significant at .01 level.

In the lesson Jainism I the same order continues. Medium I, II and III have secured means of 6.3, 6 and 4.5 respectively. The mean difference is significant at .01 level in all the three cases.

In the lesson Jainism II the order is slightly changed. Medium II has secured the highest mean 6.3 and medium I comes close behind with a mean of 6.1 and medium III is at the bottom with a mean of 4.6. The mean difference between media I and II is not significant but the other two mean differences are significant at .01 level.

From this table it is evident that the two groups which had received instruction through programmed filmstrips

have retained, better than the control group. It is clear that teacher's explanations add more to the successful retention to some extent when they learn through programmed filmstrips. It is not suprising that the conventional method is at the bottom probably and it appears as through the auditory memory is not as strong as that of visual memory. Further researches in this field may throw light on this.

VERIFICATION OF SPECIFIC HYPOTHESES :

1. Specific hypothesis I which states that there is no significant difference in the mean retention of the gain on the retention tests for the objective application, between medium I group and medium II group is confirmed.

2. Specific hypothesis 2 which states that there is no significant difference in the mean retention of gain on theretention tests for the objective application, between medium II group and medium III group is rejected.

3. Specific hypothesis 3 which states that there is no significant difference in the mean retention of gain on the retention tests for the objective application, between medium I group and medium III group is rejected.

SKILLS OBJECTIVE :

Table 6.13 presents the details regarding the analysis

of variance for the gain in immediate post test for the objective skill, which tests hypothesis 4 which states that there is no significant difference in the mean achievement of the three groups of pupils on the objective skill, when taught through three different media.

TABLE No. 6.13

Analysis of variance table for gain on immediate post test for the objective skill

S.No.	Lesson	Source of variation	Df	S.S.	Variance	F
1.	Buddhism I	Between groups	2	183.6	91.8	63.3**
		Within groups	762	1104.15	1.45	
2.	Buddhism II	Between groups	2	436.05	218.025	149.33*
		Within groups	762	1109.25	1.46	
3.	Jainism I	Between groups	2	512.55	256.28	180.48**
		Within groups	762	1078.65	1.42	
4.	Jainism II	Between groups	2	298.35	149.18	102.88**
		Within groups	762	1101.6	1.45	

** Significant at .01 level.

From the above table at it is clearly seen that the obtained 'F' values are highly significant at .01 level in the case of all the four sub-units. This means that hypothesis 4 stated above is rejected as significant difference is seen in themean gain among the three mdium groups. The determine specifically where these difference exist, the following three hypotheses are formulated relating to testing whether differences exist in mean gain scores when any two media are considered. These specific hypotheses are :

1. There is no significant difference in the mean gain on the post tests for theobjective skill, between medium I group and medium II group.

2. There is no significant difference in the mean gain on the post tests forthe objective skill, between medium II group and medium III group.

3. There is no significant difference in the mean gain on the post tests for the objective skill between medium I group and medium III group.

The critical ratio is used to test the above stated hypotheses. A consolidatedtable giving the critical ratio values is presented in table 6.14.

TABLE No. 6.14

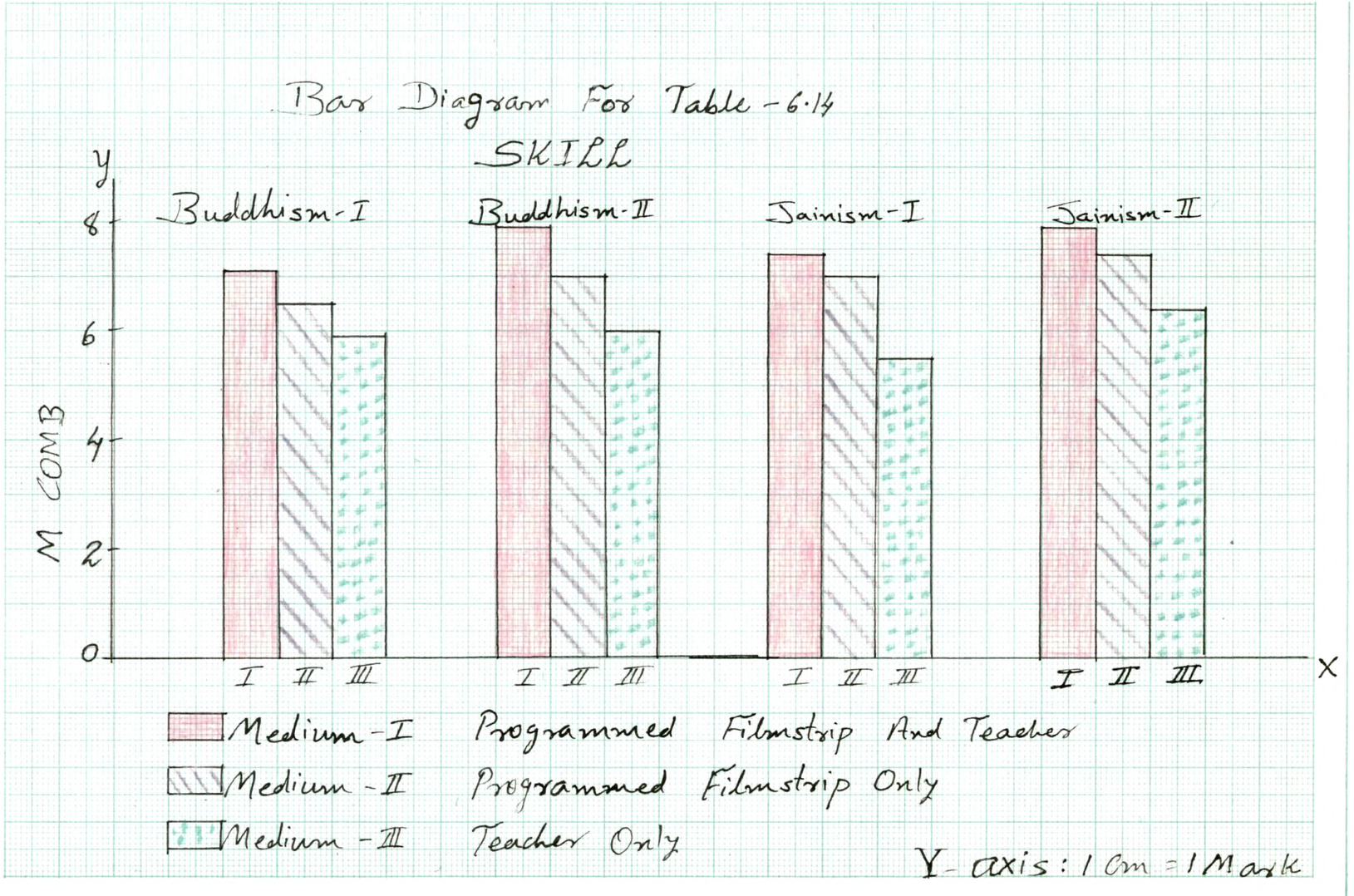
Table showing the critical ratio in respect of the medium groups' mean for the objective skill on the immediate post test

S.No.	Content	Medium	N	M Comb	σ Comb	Critical Ratio I&II	Critical Ratio II&III	Critical Ratio I&III	Significanc
1.	Buddhism	I	255	7.11	1.26	5.5			.01
	I	II	255	6.5	1.3		6.1		.01
		III	255	5.89	1			12.2	.01
2.	Buddhism	I	255	7.88	1.16	8.8			.01
	II	II	255	7.02	1.06		8.93		.01
		III	255	6.05	1.37			16.28	.01
3.	Jainism	I	255	7.42	1.02	4.88			.01
	I	II	255	6.95	1.15		12.78		.01
		III	255	5.52	1.36			17.82	.01
4.	Jainism	I	255	7.92	1.2	5.36			.01
	II	II	255	7.39	1.02		9.69		.01
		III	255	6.36	1.35			13.78	.01

Medium I = Programmed filmstrip + teacher
Medium II = Programmed filmstrip only
Medium III == Teacher only.

ANALYSIS AND INTERPRETATION OF TABLE 6.14 :

The comparative performance of the medium groups in the objective skill in shown in table 6.14. The maximum score of the test is 10 marks.


Bar Diagram For Table - 6.14
SKILL
y
8
6
4
2
0
M COMB
Buddhism-I
Buddhism-II
Jainism-I
Jainism-II
I II III
I II III
I II III
I II III
X
Medium-I Programmed Filmstrip And Teacher
Medium-II Programmed Filmstrip Only
Medium-III Teacher Only
Y-axis: 1 Cm = 1 Mark

In the lesson Buddhism I, the medium I group has secured a mean of 7.11 with σ 1.26. Medium II group has got a mean of 6.5 with σ 1.3 and the medium III group, a mean of 5.89 with σ 1. The difference between the means is significant at .01 level in all the three comparisons.

In the second lesson on Buddhism the same order continues. Medium I with a mean of 7.88 and σ 1.16 stands first followed by medium II group with a mean of 7.02 and σ 1.06 and medium III group with a mean of 6.05 and σ 1.37. The mean difference between the group is significant at .01 level in all the three comparisons.

In the third lesson which is Jainism I, medium I group comes first with a mean 7.42 and σ 1.02 followed by medium II group with a mean of 6.95 and σ 1.15 and medium III group with a mean 5.52 with σ 1.36. Like theprevious lessons the mean difference is significant at .01 level in all the three cases.

In the fourth lessonJainism II the same ranking continues. Medium I with a mean of 7.92 and σ 1.2 stands at the top. The next place is occupied by medium II with a mean of 7.39 and σ 1.02 and the third place by the medium III gropp with a mean of 6.36 and σ 1.35. The mean difference between the groups is significant at .01 level is all three cases.

From thisanalysis it is evident that skills can be developed through programmed filmstrips. The combination of

programmed filmstrip with the teachers' explanations seem to be a better combination than the other two methods used in this study. It may probably be due to the interest of the pupils in the programmed filmstrip which was seen in their enthusiasm shown for the lesson during the experiment. The teacher's explanation, drawing attention to the salient points of the maps and charts and hisdirection to work on them in the score sheets must have made them acquire theskill better than the control group where the teacher only showed the places in a printed map.

Kannabiran (et-al 1978) has reported in his study that there had been no significant difference between the means of the groups in the objective skill. His programme on Akbar tried to develop map reading skill only. But in this study along with map making and map reading skill, the skill in preparing charts, time lines etc. etc. aretested. Developing timeline chart is easier than making maps. The inclusion of another specification must have made the differencein the scores. Besides, Kannabiran's frames showed the development of Akbar's empire through series of maps spread over many frames. But the pupils were not made to mark them on the outline map. In this study outline maps were provided andboth medium groups I and II were made to mark on the maps provided or draw the charts. The control groups was not given such a training and the teacher only showed the places in the printed map.
Thus it proves that skills can be developed by practice only. The study Vasantha (1978) confirms this, as in her study she developed

skills relating to chemistry throggh her programme on oxides. The study of Adler (1969) confirms that even complex motor skills can be developed by the programmed learning method.

VERIFICATION OF HYPOTHESES :

Specific hypotheses 1, 2 and 3 which state that there is no significant difference in the mean gain on the post tests for the objective skill, between medium I group and medium II group, between medium II group and medium III group; and between medium I group and medium III group, are rejected.

RETENTION TEST :

The following table 6.15 presents the details regarding the analyses of variance for the objective skill which tests hypothesis 8 which states that there is no significant difference in the mean achievement of the three groups of pupils on the objective skill on the retention test.

TABLE No. 6.15

Analysis of Variance table for gain on retention test for the objective skill.

S.No.	Lesson	Source of Variation	df	S.S	Variance	F
1.	Buddhims I	Between groups	2	206.55	103.28	64.96**
		Within groups	762	1218.9	1.59	
2.	Buddhism II	Between groups	2	441.15	220.58	151.08**
		Within groups	762	1114.35	1.46	
3.	Jainism I	Between groups	2	685.95	342.98	225.64**
		Within groups	762	1160.25	1.52	
4.	Jainism II	Between groups	2	583.95	291.98	159.55**
		Within groups	762	1394.85	1.83	

** Significant at .01 level.

INTERPRETATION OF TABLE 6.15 :

The obtained 'F' values are highly significant at .01 level in the case of all the four sub-units. It means that hypothesis stated above, is rejected as there is significant difference in the mean retentionamong the three medium groups. To determine

specifically where these differencesexist, the following three hypotheses are formulated. They are :

1. There is no significant difference in the mean retention of the gain on the retention tests, for the objective skill, between medium I group and medium II group.

2. There is no significant difference in the mean retention of the gain on the retention tests for the objective skill, between medium II group and medium III group.

3. There is no significant difference in the mean retention of the gain on the retention tests for the objective skill, between medium I group and medium III group.

The critical ratio test is used to test the above stated hypotheses. A consolidated table giving thecritical ratio is presented in table 6.16.

TABLE No. 6.16

Table showing the critical ratio in respect of three medium groups' mean gain for the objective skill, on the retention test.

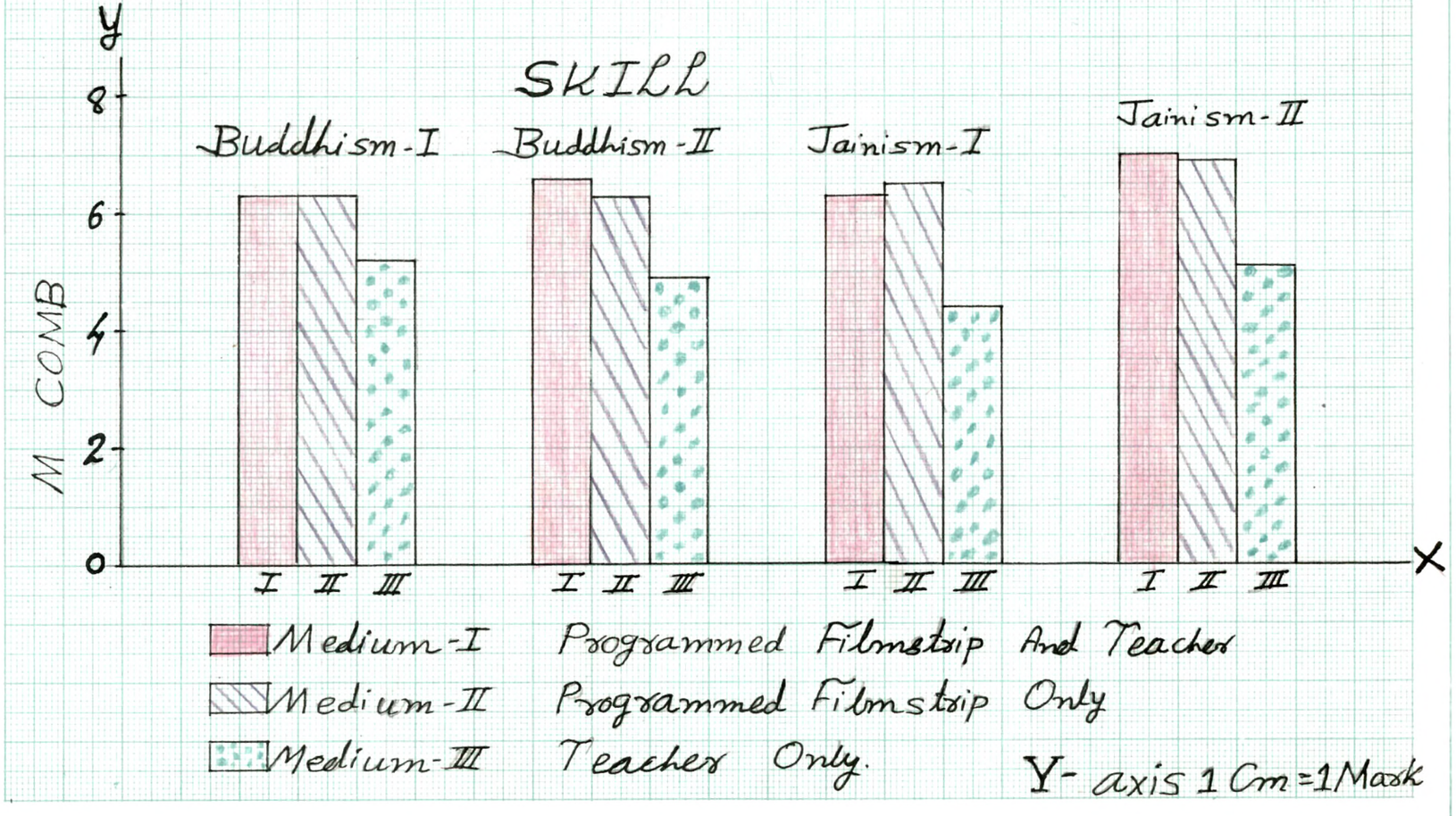
S.No.	Content	Medium	N	M Comb	σ Comb	Critical Ratio I&II	Critical Ratio II&III	Critical Ratio I&III	Significance
1.	Buddhism I	I	255	6.3	1.24	0			N.S.
		II	255	6.3	1.2		9.7		.01
		III	255	5.2	1.3			9.6	.01
2.	Buddhism II	I	255	6.6	1.09	1.9			N.S.
		II	255	6.4	1.25		13.34		.01
		III	255	4.9	1.26			16.2	.01
3.	Jainism I	I	255	6.3	1.09	1.9			N.S.
		II	255	6.5	1.26		18.29		.01
		III	255	4.4	1.3			17.6	.01
4.	Jainism II	I	255	6.96	1.28	.53			N.S.
		II	255	6.9	1.29		14.7		.01
		III	255	5.1	1.47			15.24	.01

Medium I = Programmed fiomstrip + Teacher

Medium II = Programmed filmstrip only

Medium III == Teacher only.

Bar Diagram For Table 6.16



INTERPRETATION OF TABLE 6.16 :

The table 6.16 shows the tabulated scores of the three medium groups in the four delayed retentiontests in the objective skill. The maximum for the test is 10 marks.

In the lesson Buddhism I both medium I and medium II have secured a mean of 6.3 and so the mean difference is zero. Medium III has secured a lesser mean of 5.2 and the difference is significant at .01 level in both the comparisons.

In the lesson Buddhism II, medium I has secured a mean of 6.6 and medium II 6.4. Medium III has secured 4.9. The mean difference between medium I and II is not significant whereas the other two mean differences are significant at .01 level.

In the lesson Jainism I, medium II has secured the highest mean of 6.5 and is closly followed by medium I with 6.3. Medium III has secured a mean of 4.4. The mean difference between media I and III are not significant and the other two mean differences are significant at .01 level.

In the lesson Jainism II medium I has registered a mean of 6.96. Medium II has secured 6.9 and medium III 5.1. The difference is not significant in the comparison between media I and II and significant at .01 level in the other two comparisons.

This table reveals that the skills taught through the

programmed filmstrip are retained better than the conventional method. The probable cause is that the pupils were made to mark the places in the map or draw the time line while they learn through the programmed learning method. The demand forpupil response andthe immediate feedback must have contributed to their better retention.

Another noteworthy feature in this tableisthat the difference between medium groups I andII is not significant in all four lessons. The additional input brought in by the presence of the teacher has not helped themedium I group to have significant advantage over medium II group. The visual memory is considered to be stronger than the auditory memory and when the pupils do not slacken their effort their memory may be strengthened. In the medium I thepupils would not have taken much pains to observe the details because theteacher was there to explain. Since no such facility was available to the medium group II and pupils must have taken more effort to observenote and learn from the maps and charts and it must have caused better retention in medium II.

VERIFICATION OF SPECIFIC HYPOTHESES :

1. Specific hypothesis 1 which states that there is no significant difference in the mean retention of gain on the retention test, forthe objective skill, between medium I groupand medium II group is confirmed.

2. Specific hypothesis 2 which states that there is no significant difference in the mean retention of gain on the retention tests, for the objective skill, between medium II group and medium III group is rejected.

3. Specific hypothesis 3, which states that there is no significant difference in the mean retention of gain on theretention tests, for the objective skill, between medium I group and medium III group is rejected.

DISCUSSION AND FINDINGS :

The analysis ofdata reveals that programmed filmstrips with or without teacher is more effective than conventional teaching. This has been the trend in respect of all the objectives, namely, knowledge, understanding, application and skill. The possibilities of using programmed filmstrips to develop cognitive abilities like application has also been visualised through the present study. The superiority of programmed filmstrip with or without the teacher over the conventional teachingindicates that the integration of programmed learning principles with the attributes of visual media, has rich potentialities for effective organisation of the teaching learning process in the field of history.

A related significant finding is that between programmed filmstrip with teacher and programmed filmstrip alone, the former is more effective. Thishighlights the role of the teacher

in the instructional process. The findings related to the teacher involvement in the instructional process indicates the need for making learning arrangements wherein the role of the teacher promotes thepossibilities of generating candidations favourable to learning, by providing scope for interaction, giving most meaningful directions to learning.

Further, the gains evidenced with regard to even higher cognitive abilities like applicabion indicate positive directions in which such a medium as programmed filmstrips can be used in the realisation of these abilities.

The analysis of data regarding retention of learning too iddicate that retention is greater in case of programmed filmstrips with teacher andprogrammed filmstrip without teacher in comparison with the conventional teaching provide evidence to the effect that more meaningful learning accrues through the former two media.

GENERAL OUTCOMES :

This investigation has led us to the following conclusions.

1. It is possible to develop programmed learning materials in history. Though much work is not done in this subject area, this investigation has indicated that similar programmed learning materials can be developed to the various units in history.

2. It has proved the possibilities of group pacing in programmed learning. Very few studies have been done in group pacing and the successful learning and retention of the groups show that group-paced programmes can be developed along with other types of programmes.

3. It has proved beyond doubt that the programmed learning materials can be integrated with media like filmstrips.

4. It has led to the conclusion that picture, charts, timelines etc. can be incorporated into the programmed learning schemes. Though these are presented through filmstrips in this study they can be incorporated in the ordinary programmes also to provide for better learning.

5. It has proved beyonnd doubt that programmed learning materials can be designed in a way as to incorporate teacher pupil interaction too. The programmed filmstrips offer another valuable tool in the hand of the teacher to ensure better learning.

6. It has also proved that the higher cognitive abilities can be developed through programmed filmstrips.

7. It has also proved that the programmed filmstrips result in better retention in learning.

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CHAPTER : VI

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