CHAPTER V

FINDINGS AND INTERPRETATION

5.1 Introduction

The present study is an investigation to establish the suitability of PLM as a self study method, as an aid coupled with the selected conventional method of study independently as well as that when combined with certain selected personality variables for immediate and delayed retention. It is an experimental study using the three experimental conditions upon the selected IXth grade students opting for Home Science in Maharani High School for Girls of Baroda. The methods selected for use under the experimental study were those, use of programmed learning material for self study, programmed learning material combined with the lecture method of study, Lecture-cum-discussion as a conventional method of study. The personality variables considered in the present investigation were intelligence, time taken, extent of

preparation, adjustment to school, socio-economic status, overall achievement as well as achievement in home science. Intelligence and time taken were also studied as factors influencing the score on subjective and objective items of immediate as well as delayed retention tests.

Simple analysis of variance was carried out to study the effect of methods of study on achievement scores obtained on immediate as well as delayed retention test. Two way analysis of variance was computed to establish the suitability of PLM for students varying on account of selected personality variables with reference to overall immediate and delayed retention as well as immediate and delayed retention scores on objective and subjective items on the tests.

In this chapter the findings are reported and interpreted in the following manner :

- Characteristics of the sample under study according to the selected personality variables such as intelligence, overall class achievement as well as achievement in home science, socio-economic status, adjustment to school, extent of preparation and time taken to go through programmed learning material.
- Effect of experimental conditions namely, the lecture-cum-discussion, use of PLM for self study and PLM as an aid to lecture method on variations in the achievement scores on IRT and DRT to establish the suitability of these conditions.

- Effect of selected personality variables such as intelligence and time taken on overall variations in the achievement scores on IRT and DRT as well as on the subjective and objective items of the same and the other variables namely overall class achievement as well as achievement in Home Science, socio-economic status, adjustment to school and extent of preparation to go through the experimental conditions.

5.2 Characteristics of the Sample

Characteristics of the sample are presented in terms of the personality variables considered in the present investigation namely Intelligence and overall class achievement, extent of preparation and achievement in Home Science, socio-economic status, adjustment to school and time taken to go through programmed learning material.

Table 1 : Showing Distribution of the Students according to Intelligence and Class Achievement

	Extra-ordinary		Above average		Average	
	N	%	N	%	N	%
Intelligence	44	33	60	44	31	23
Overall class achievement	18	33.33	103	76.33	14	10.43

As indicated in the above table, the sample consisted of 60 percent of students representing above average

intelligence, 33 percent extraordinary students and 23 percent average students.

As per the class-achievement the sample represented that highest number (103) belonged to the middle category, followed by 18 who belonged to the highest category and 14 belonging to the third category.

In both the cases that is intellectually as well as class achievementwise the sample indicated larger number of students representing the middle category, followed by the highest and then the lowest category.

As for preparation for entering the experimental condition indicated by the scores on pretest and the achievement in Home Science the sample presented the following picture :

Table 2 : Showing Distribution of Students according to extent of Preparation and Achievement in Home Science

	High		Moderate		Low	
	N	%	N	%	N	%
Extent of preparation	10	7.05	99	73.71	26	19.26
Achievement in Home Science	22	17.00	95	70.37	18	13.33

As per the above table, the sample represented that majority of the students (99) were moderately prepared, there were highest number of students (95) representing

moderate achievement in Home Science too. However, 19.26 percent students represented low preparation whereas 7.05 percent of students were found to be highly prepared. In case of achievement in Home Science higher percentage of students (17 percent) had high achievement score as compared to 13.33 percent having low achievement score.

The distribution of students according to the socio-economic status was found as under :

Table 3 : Showing Distribution of Students according to SES

Socio-economic Status	N	%
High	21	15.55
Middle	72	53.33
Low	42	31.19

In general the students under study represented the middle socio-economic group. However amongst them there were 21 students representing high middle class, 53.33 % representing the middle middle class and 31.19 representing low middle class.

Adjustment to school on the basis of number of years spent in school revealed as under :

Table 4 : Showing Distribution of Students according to Extent of Adjustment

Adjustment	N	%
Well-adjusted	93	68.71
Not so well-adjusted	42	31.18

The sample of the study consisted of majority of the students who were well adjusted. Less than half of the well adjusted students (42) comprised of the not so well adjusted group.

Time taken on going through the PLM was studied only in terms of the two experimental groups who were treated with PLM for self study and PLM as an aid to conventional method of study.

Table 5 : Showing Distribution of Students according to Time Taken to go through PLM

Time Taken	N	%
More time	46	51.11
Less time	44	48.89

Distribution of the sample under study represented that little over the fifty percent of the sample (46) treated with experimental methods took more time. Almost equal number of students (44) took less time in going through the PLM under the two experimental conditions.

In conclusion, it can be said that in case of almost all variables namely the intelligence and overall achievement, the extent of preparation and the achievement in Home Science, and the socio-economic status the majority of the sample under the study belonged to the medium category. In case of

adjustment, double the number of not so well adjusted students were found to be well adjusted. Almost equal number of students tookmore time when compared to those taking less time to go through the programmed learning material under the two experimental conditions namely PLM for self study and PLM as an aid to conventional method of study.

5.3 Effect of Methods of Study on Variations in IRT and DRT Scores

It was hypothesized that the scores achieved by students under study on the immediate relation test (IRT) and delayed retention test (DRT) will not vary as a function of their methods of study. A simple analysis of variance was carried out to find the variations if any due to the methods of study in IRT and DRT scores of students under study.

The methods of study with which these students were treated were the conventional method using lecture-cum-discussion, PLM for self study and PLM as an aid to the conventional method of study.

Table 6 : Analysis of Variance for Immediate Retention Scores according to Three Selected Methods of Study

Source	df	SS	MSS	f value	Level of Confidence
Methods	2	115.97	57.98	2.22	-
Within	132	3448.89	26.12		
Total	134	3564.86			

As indicated in Table 6, the simple analysis of variance revealed that the calculated f value of 2.22 for immediate retention test scores was not significant when compared to the table f value at .01 and .05 level of confidence. This indicated that the IRT scores of the students under study did not vary as a function of selected methods of study.

Analysis of data to study the effect of these methods on the delayed retention test scores is presented in table below :

Table 7 : Analysis of Variance for Delayed Retention Test Scores according to the Three Selected Methods of Study

Source	df	SS	MSS	f value	Level of significance
Methods	2	1372.02	286.01	2.98	
Within	132	30299.36	229.54		
Total	134	31671.38			

The F value of 2.98 arrived at by simple analysis of variance for the delayed retention test scores was also not found to be significant when compared to the table of F value at .01 or .05 level of confidence. This indicated that the DRT scores of the students under study too did not vary as a function of their methods of study. The analysis therefore lead to conclude that the three

selected methods of study independently did not influence the variation in the IRT and DRT scores of the students under study.

In order to check which of the three selected methods affected the immediate as well as the delayed retention scores, the investigator studied the mean scores for the IRT and DRT independently for each method. The average mean for IRT and DRT scores as well as for each method too were compared. Table below gives a comparative picture of the average mean for the tests and methods independently as well as combined for each test under each of the three methods.

Table 8 : Distribution of Mean on IRT and DRT on the Basis of the Three Selected Methods of Study

	IRT	DRT	Column Mean
Conventional Method	60.20	61.60	60.90
PLM for Self-study	58.88	65.82	62.35
PLM on an Aid	61.22	58.02	59.62
Row Mean	60.10	61.81	

The examination of the data presented in Table 8 above revealed that the students under study scored higher average mean of 61.81 on delayed retention test when compared to the

mean score of 60.10 achieved on the immediate retention test.

The highest average mean score of 62.35 according to the methods of study, was found to be for those treated with PLM for self study. Students treated with conventional method of study scored higher average mean of 60.90 than those who were treated with the use of PLM as an aid having 59.62 as a mean score.

The individual mean scores under each of the methods for IRT and DRT indicated that students treated with use of PLM as an aid achieved highest mean score of 61.22 on IRT. Of the remaining two groups those treated with conventional method achieved higher mean of 60.20 score on IRT than those who studied with the help of PLM alone and achieved 58.88 as a mean score.

In case of DRT scores it was found that the students who used PLM for self study achieved highest mean score of 65.82. Those treated under conventional method achieved a mean score of 61.60 which was higher than those using PLM as an aid to conventional method who scored 58.02 as far as DRT scores were concerned.

The findings lead to conclude that students tend to score better on delayed retention test than immediate retention test irrespective of their methods of study. This

may be because they may get more time to study on their own, understand the content at their own pace of study, and then appear for the test. In immediate retention they are expectedt to appear as soon as the unit is over, which may or may not provide enough time to develop clearer understanding of the concepts taught or master the content taught.

As for the methods of study use of PLM for self study was found to be most beneficial. This may be because it allows students to study at their own pace, refer back to the content not very well understood till they can master it well and get the knowledge of the correct answer immediately on completion of a frame. Though the same also holds true for use of PLM as an aid the students under study were found to be scoring better under conventional method than under the method where PLM was used as an aid. The only justification for this in the present study could be that though they were allowed to supplement the information provided by the teacher through conventional method with PLM as an aid, the time available for use of PLM after the lecture was over probably was not enough to promote the desired learning. In case of this method only twenty minutes lecture was given by the teacher and instead of discussion the students referred to PLM and raised individual questions to the teacher during class hours.

The use of PLM for self study was found to be most suitable irrespective of immediate or delayed retention. For immediate retention its use as an aid was found to be most suitable whereas its use for self study was found to be most suitable for delayed retention. This definitely indicated that use of PLM was generally suitable when compared to other method of study. Its use as an aid to conventional method was superior to the conventional method of study alone as far as immediate retention was concerned. Its use for self study was more suitable than the conventional method of study for delayed retention.

The findings on the basis of the differences in mean scores according to the methods of study thus indicated that the inherent characteristics of PLM such as self paced learning, immediate knowledge of correctness of the response, opportunity to refer back to the frames till desired learning is acquired are the probable factors responsible for better achievement of students using PLM for self study purpose.

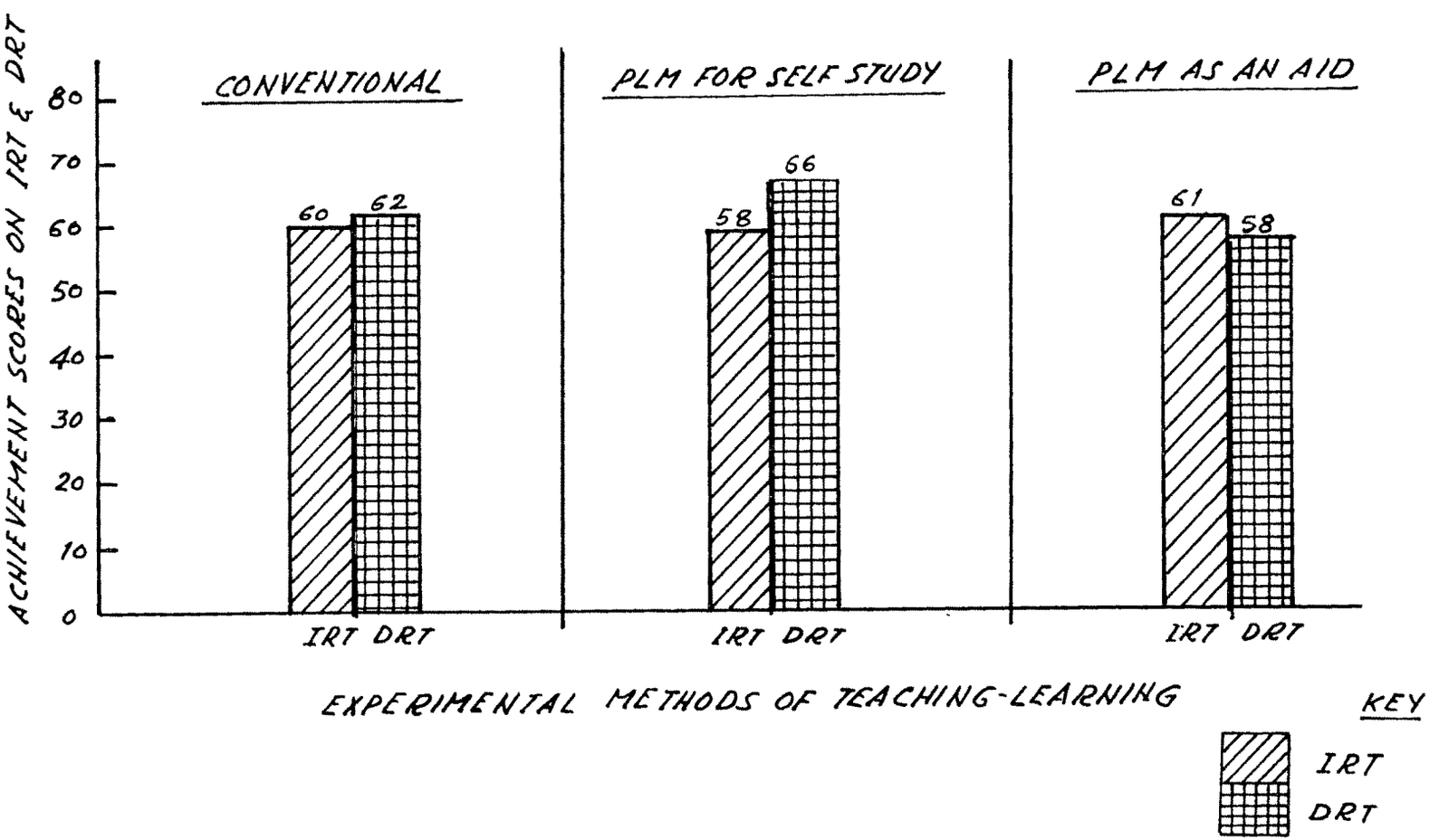
Thus the overall findings of the present investigation concerning use of methods alone provides enough evidence to conclude that PLM is suitable for promoting Home Science Education for the adolescent girls. In general it is most suitable as a self study method. It further indicated that its use as an aid to the conventional method of study is

more suitable for immediate retention whereas its use for self study helped in achieving more on delayed retention test.

The analysis of date concerning the independent effect of PLM for self study and as an aid revealed that PLM independently did not affect significantly the teaching - learning of a selected unit in Home Science. Although it clearly indicated its superiority as an aid and for self study over conventional method for immediate as well as delayed retention respectively.

In order to probe further to establish its suitability for students varying on the basis of selected input variables two way analysis was carried out. In this the effect of selected variable was studied on the scores achieved by students under each of the three selected methods. The findings thus arrived at will reveal the suitability of PLM as an aid and as self study method for a particular group of students as far as teaching - learning of Home Science is concerned.

FIG. 1 SUITABILITY OF EXPERIMENTAL METHODS FOR IMMEDIATE AND DELAYED RETENTION



PART I

5.4. Effect of Intelligence and Methods of Study on Immediate and Delayed Retention Test Scores in General and on those of Subjective and Objective Items in Particular

Intelligence is considered to be the important factor contributing to the process of learning both by educationists and educational psychologists. Experiments carried out to relate intelligences to learning as evidenced from the achievement have shown that these two variables are highly positively correlated.

Method of teaching - learning is also considered an important tool to promote desired learning. Studies establishing suitability of methods for promoting desirable learning have led to the conclusion that certain methods prove to be more superior in promoting certain kinds of learning than the other methods. These studies also revealed that some methods help some students who differ from the others in a group on the basis of their intelligence, general achievement or achievement in specific course to achieve better than the usual or conventional methods of study. That they also help in immediate retention as well as delayed retention.

In the present investigation, the investigator has studied the effect of intelligence independently as well as when combined with the methods of study for immediate as well as delayed retention. The report also presents the effect of intelligence and methods of study on the subjective and objective items on immediate and delayed tests. This is done in order to check whether students treated with the use of PLM can construct answers on their own or not. The usual criticism regarding use of PLM is that it can promote learning to the extent of recall and recognition of facts alone. It has limited contribution to the development of understanding or comprehension of the facts presented and presenting it in one's own word.

5.4.1 Effect of Intelligence and Methods of Study on the IRT Scores

Table 9 : Showing the Results of ANOVA for IRT Scores as Influenced by Intelligence as well as Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Intelligence	2	1361.4451	680.7224	9.2345	.01
Methods	2	40.0076	20.0038	3.6850	-
Interaction	4	147.1174	36.7294	2.0042	-
Within	126	9288.0625	73.7148		
Total	134	10836.6289	-	-	-

When the hypothesis that the IRT scores will not vary as a function of intelligence and methods of study was tested through the two way analysis of variance the data revealed as per the Table 9 on the previous page.

The calculated F-value of 9.2345 for intelligence was found to be highly significant when compared to the table F value at two degrees of freedom. However, the calculated F values for both the methods alone (3.6850) and for the combined effect of method and intelligence (2.0042) with two and four degrees of freedom respectively were not found to be significant at .01 or .05 level of confidence.

These results indicated that the variations in the immediate retention scores of the selected ninth grade students were mainly due to the varying levels of intelligence as indicated by IQ. They were not due to the methods of study alone or when combined with intelligence as far as IRT scores were concerned.

The null hypothesis that the IRT scores will not vary as function of intelligence was rejected. The variations in the IRT scores were attributed chiefly to the varying levels of intelligence independently.

Further investigations to study which group of students on the basis of their intelligence had higher mean score as indicated by the average mean scores according to intelligence and methods alone as well as in combination with each other revealed as per the following :

Table 10 : Distribution of Mean Scores on IRT according to Intelligence under the Three Selected Methods of Study

Intelligence	Methods			Row Mean
	Conventional	PLM for Self Study	PLM on an Aid	
Extra-ordinary	66.00	64.43	62.00	64.14
Above average	56.78	59.78	57.82	58.13
Average	55.91	55.17	59.50	56.86
Column Mean	59.56	59.76	59.77	

As evidenced in the table above the highest average mean score of 64.14 on IRT was found to have been scored by the extraordinary students. The above average scored 58.13 which was the second highest mean score. The average students scored 56.86 being the lowest average mean score.

The average mean score of students treated under the three selected methods indicated no difference.

However the mean scores for students differing on the basis of intelligence under each of the three methods of study revealed some variation ; attributing the variations to intelligence than to the methods of study.

The extra ordinary students who in general had highest average mean score, achieved a mean of 66.00 under conventional method of study. They scored higher mean of 64.43 under the second treatment where PLM was used for self study than the mean score of 62.00 under the third method of study where PLM was used as an aid.

The above average students on the other hand scored a highest mean of 59.78 under the second method where PLM was used for self study. They scored better mean scores of 57.82 under the third method where PLM was used as an aid. Their lowest mean score was 56.78 which was found to be under the conventional method of study.

The average students scored the highest mean of 59.50 under the third treatment where PLM was used as an aid. They scored almost equal mean score namely 59.56 and 59.77 on both the conventional methods as well as when PLM was used for self study respectively.

In conclusion one can therefore say that intelligence was chiefly responsible for variations in average mean scores as indicated by the extraordinary students achieving

highest, the above average following them and the average students achieving the lowest average mean score. However, it can be further concluded that though the extraordinary students were benefited chiefly with the conventional method of study, the above average students were benefited by use of PLM for self study and the average students with its use as an aid. The average students scored almost at par with the above average students using PLM for self study with the use of PLM as an aid. This indicated that use of PLM as an aid for average students can produce encouraging results.

It was hypothesized that the IRT scores on the subjective items will not vary as a function of intelligence and methods independently as well as when combined.

Table 11 : Showing ANOVA of IRT Scores on Subjective Items as Influenced by Intelligence and Methods of Study

Source	df	SS	MSS	F-value	Level of confidence
Intelligence	2	509.8364	254.9182	1.3010	-
Methods	2	478.7114	239.3557	1.2216	-
M X Int.	4	685.7261	176.4315	1.1430	-
Within	126	24688.3125	195.9390	-	-
Total	134				

The calculated F values for examining the effect of intelligence and methods of study independently as well as when combined revealed that they were not significant at .01 or .05 level of confidence. This led to conclude that the scores on the subjective items of IRT did not vary as a function of intelligence and methods independently or when combined. Thus, the null hypothesis was retained.

Further analysis of data was carried out to study which of the group of students achieved higher average mean score in the subjective items of IRT on the basis of intelligence and methods of study.

Table 12 : Distribution of Mean on Subjective Items of IRT according to Intelligence under Three Methods of Study

Intelligence	Conventional Method	PLM for Self Study	PLM as an Aid	Row Mean
Extraordinary	40.69	41.90	38.60	40.39
Above average	31.44	37.36	40.30	36.43
Average	32.61	34.50	49.50	38.87
Column Mean	34.91	37.98	42.80	

The examination of the data presented in the table above revealed that the extraordinary students scored the highest average mean of 40.39 followed by the average students who scored 38.87. The above average students had the lowest average mean of 36.43 on the subjective items of IRT as far as intelligence was concerned.

As for the effect of the methods of study the students using PLM as an aid scored highest average mean of 42.80 followed by these using it for self study having 37.98. The students treated with conventional method of study scored the lowest average mean of 34.91 on the subjective items of IRT.

The combined mean revealed that extraordinary students scored highest average mean of 41.99 on subjective items of IRT under the method where PLM was used for self study followed by those who were treated with conventional method of study having a mean of 40.69. The extraordinary students using PLM as an aid scored the lowest average mean of 38.60 for subjective item of IRT.

The above average as well as the average students scored highest mean scores of 40.30 and 49.50 respectively on the subjective items on IRT when PLM was used as an aid. They scored 37.36 and 34.50 under the treatment where PLM was used for self study. Both, the above average as well as average students scored the lowest mean scores of 31.44 and 32.61 respectively on subject items of IRT when they were treated under the conventional method of study.

The analysis of data provides enough evidence to conclude that intelligence and mean achievement on immediate scores retention test on subjective items are positively related as indicated by the increased level of intelligence leading to increased mean score on the subjective items of the IRT.

The results clearly indicate that the use of PLM both for self study as well as an aid is more benefited than use of conventional method as it led to achievement of higher mean score on subjective items on IRT. It further indicated that

the extraordinary students are benefitted more by use of PLM for self study. However, the above average and average students were benefitted more with the use of PLM as an aid.

It can be therefore concluded that in order to increase the achievement scores on subjective items in case of immediate retention use of PLM as self study method will be beneficial to the extraordinary students where as its use as an aid will be of value to the above average and average students.

5.4.1.2 Effect of Intelligence and Methods of Study on the Objective Items of IRT

In order to study the effect of intelligence and methods of study on the objective items of IRT two way analysis of variance was calculated. It was hypothesized that the scores on the objective items of IRT will not vary as a function of intelligence and methods of study independently as well as when combined.

Table 13 : Showing Results of ANOVA of IRT Scores on Objective Items as Influenced by Intelligence and Methods of Study

Source	df	SS	MSS	F Value	Level of Confidence
Intelligence	2	1131.8139	565.9067	3.2400	
Method	2	2771.5637	1385.7817	7.9341	.01
M X Int.	4	815.7488	203.9372	1.1676	
Within	126	22007.3125	174.6612		
Total	134	20720.4375			

The data presented earlier indicate that as far as intelligence was concerned, the extraordinary students achieved the highest average mean scores of 66.81 on the objective items of the IRT. The above average and average students scored almost the same average mean of 62.73 and 62.56 respectively on objective items of IRT.

As for the effect of methods of study on the average mean scores on objective items of IRT, the students treated with PLM as an aid scored a little higher (68.31) than those treated under conventional method of study having a mean of 68.01. They reported highest average mean. However those using PLM for self study scored the lowest average mean of 55.05 on the objective items of IRT.

The combined effect of intelligence and methods of study according the mean scores revealed that the extraordinary students scored the highest mean of 69.77 under conventional method of study, followed by those under third treatment where PLM was used as an aid having 67.90 as mean. The lowest mean of 62.26 was reported by those who used PLM for self study. The same pattern was observed for above average students having 69.44 for conventional, 63.03 on PLM as an aid and 55.72 on PLM for self study. However the average students scored highest mean scores of 74.00 under the third treatment where PLM was used as an aid. Their mean score under this method was even higher than that of the highest mean score of the 69.77 of the

extraordinary students under conventional method of study. They scored better mean of 65.00 under conventional method of study. Their scores under the treatment where PLM was used for self study, was the lowest being 46.67 only.

The findings lead to conclude that in general use of PLM as an aid is most beneficial - almost equal to that of conventional method of study. Use of PLM as an aid has special value for average students as it helped them to score even higher than the extraordinary students as far as objective items on IRT were concerned. However, use of PLM for self study as far as the scoring on objective items of IRT was concerned was found to be least beneficial to all the three groups based on intelligence. Only the extraordinary students could score better on it as compared to the other students. The average group of students were benefited almost equally with the extraordinary students by the treatment using conventional method of teaching as far as scores on objective items of IRT were concerned.

5.4.2 Effect of Intelligence and Methods of Study on the DRT Scores

Achievement on delayed retention testtoo is very important to indicate suitability of any method of study for longer retention of the content taught through it. When data were analysed to test the hypothesis that the DRT scores will not vary on account of intelligence and methods of study

independently as well as when combined is revealed as per the following.

Table 15 : Showing the Results of ANOVA for DRT Scores as influenced by Intelligence as well as Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Intelligence	2	2049.2727	1024.6342	4.9741	.01
Methods	2	2039.4602	1019.4800	4.9515	.01
M X Int.	4	1903.9148	475.9785	2.318	-
Within	126	25955.3750	205.4950		
Total	134	31948.5195			

As shown in the table above, the calculated F values of 4.9741 and 4.9515 for intelligence as well as methods of study respectively were found to be very highly significant when compared to the table F value at .01 level of confidence at two degrees of freedom. This indicated that the DRT scores of the students under study varied significantly on account of intelligence as well as methods of study independently.

The null hypothesis that the DRT scores will not vary on account of intelligence as well as methods of study independently was therefore rejected.

The calculated F value showing the interaction effect of intelligence and methods of study was, however, not found to be significant either at .01 level or at .05 level of

confidence at four degrees of freedom. This indicated that the combined effect of intelligence and methods of study was not responsible for the variations in the DRT scores of the students under study.

These findings led to conclude that the variations in the DRT scores of the students under study are chiefly due to their intelligence level and the method of study under which they were treated, independently.

The data were further examined to check which group of students on the basis of intelligence as well as methods of study achieved higher average means score on DRT. Table below presents the difference in the average mean scores on DRT of the students under study.

Table 16 : Distribution of Mean Scores on DRT according to Intelligence under Three Experimental Methods

Intelligence	Methods			Row Mean
	Conven-tional	PLM for Self Study	PLM as an aid	
Extraordinary	75.31	64.90	58.10	66.10
Above average	63.44	53.17	61.94	62.85
Average	61.48	49.17	75.50	61.38
Column Mean	66.74	55.75	64.51	

When the average means achieved on the basis of intelligence were checked it revealed that the extraordinary students achieved the highest average of 66.10 followed by the above average having 62.85. The lowest average mean of 61.38 was recorded for the average students. These finding about the average mean score on DRT according to intelligence represent the same pattern as revealed for the average mean for IRT. It clearly represented the fact that with the increase in the level of intelligence there was an increase in the average mean earned by the students.

As for average mean under the three different experimental treatment, the data revealed that those treated under conventional method had the highest average mean of 66.74 followed by those who used PLM as an aid to the conventional method of teaching having 64.51. The lowest average mean of 55.75 according to methods was reported for those who used PLM for self study. These findings indicate that for delayed retention the conventional method was most suitable for the students under study, when use of PLM for self study and as an aid were compared, its use as an aid to conventional method was found to be more suitable than its use as a method for self study as far as DRT scores were concerned.

The combined effect of method of study and intelligence however revealed that the average students can score as much or even higher than the highest mean achieved by the extraordinary students treated under conventional method if they use PLM as an aid to conventional method. The extraordinary students scored highest mean score of 75.31 under conventional method. However they also achieved higher mean score of 64.90 with the use of PLM for self study than the mean of 58.10 when it was used as an aid. The above average students too achieved highest mean score of 63.44 under the conventional method of study. They scored better that is 61.94 when PLM was used as an aid than when it was used for self study having only 53.17. On the other hand the average students scored 75.50 under the method where PLM was used as an aid thus scored as well as the extraordinary students under the conventional method. They scored 61.48 under conventional method which was better than the score of 49.17 achieved under the treatment where PLM was used for self study.

These findings indicate that the use of PLM as an aid is most suitable for the average students. It is more suitable as an aid than as a self study method for above average students. However, the extraordinary students are benefitted more by its use for self study. The habit of

studying under conventional method w/ coupled with self paced learning through PLM was probably responsible for the highest average mean under the third treatment. This shows that the complementary use of PLM with the conventional method of study could produce encouraging results leading to highest achievement by the lowest intelligent group in the present investigation. Use of PLM for self study was only suitable for the extraordinary students who could master the content in absence of a teacher. The use of PLM for self study may therefore be limited to this group of students as far as delayed retention of home science content was concerned.

5.4.2.1 Effect of Intelligence and Methods of Study on Subjective Items of DRT

As in case of IRT scores on subjective items, the DRT scores on subjective items were also examined in relation to the level of intelligence of the students and the methods of study under which they were treated. It was hypothesized that the DRT scores on the subjective items will not vary as a result of intelligence and methods of study.

Table 17 : Showing the Results of ANOVA of DRT Scores on Subjective Items as influenced by Intelligence and Methods of Study

Source	df	SS	MSS	F-value	Level of confidence
Intelligence	2	5385.832	2685.9160	8.4845	.01
Method	2	4171.2070	2085.6033	6.5955	.01
M X Int.	4	2410.6055	602.6514	1.9058	-
Within	126	39843.1250	310.2151		
Total	134	51790.7695			

The two way analysis of data leading to study the effect of intelligence and the three methods of study on the scores achieved on subjective items of DRT revealed that both of these variables significantly affected these scores. The calculated F values for these variables were found to be significant at .01 level of confidence at two degrees of freedom. These results indicate that the variations in the scores on subjective items of the delayed retention test were chiefly due to the methods of study, as well as the level of intelligence of students under study independently.

The calculated F value for the interaction of these two variables was not found to be significant either at .01 level or at .05 level of confidence. This led to conclude that the combined effect of intelligence and methods of study

was not responsible for the variations in the scores on subjective items of delayed retention test.

The null hypothesis that the DRT scores on subjective items will not vary as a result of intelligence and methods of study was rejected.

In order to find out which group of students had the highest average mean according to intelligence and methods of study when the data were examined it revealed as per the following.

Table 18 : Distribution of Mean for Subjective Items on DRT according to Intelligence under the Three Methods of Study

Intelligence	Methods			Row Mean
	Conventional	PLM for Self Study	PLM as an aid	
Extraordinary	59.31	46.24	32.30	45.98
Above average	40.00	29.67	28.24	32.60
Average	41.04	25.83	51.50	39.12
Column Mean	46.78	33.91	37.34	

The table presented above for the average mean according to intelligence revealed that the extraordinary students achieved the highest average mean of 45.98 followed by those with average intelligence having 39.12 as an average

mean. Above average students had the lowest average mean of 32.60 on the subjective items of delayed retention test.

Comparison of average mean according to methods of study revealed that those treated with conventional method of study had the highest average mean of 46.78 followed by those treated with use of PLM as an aid having an average of 37.34. Those who used PLM for self study scored the lowest mean of 33.91 on the subjective items of delayed retention test.

The data further indicated that the extraordinary and above average students scored highest average mean of 59.31 and 40.00 respectively under conventional method followed by a mean score of 46.24 and 29.67 respectively on the method where PLM was used for self study. They reported lowest mean scores of 32.30 and 28.24 respectively under the third method where PLM was used as an aid. The average students scored highest mean of 51.50 when PLM was used as an aid to conventional method, followed by those treated under the conventional method of study having a mean score of 41.04. However those who used PLM for self study had a mean of only 25.83 as compared to those under conventional method of study. These results indicated that the extraordinary students were most benefitted by conventional method of study. Average students were benefitted most by

use of PLM as an aid as they were quite close to the highest mean score of the extraordinary students under the conventional method of study and much higher than their mean score under second method where PLM was used for self study. They scored higher mean score than that of above average students under all the three experimental treatments. It can, therefore, be concluded that though for extraordinary and above average students conventional method was best, use of PLM as an aid to conventional method was suited best to the average student under study as far as the scores on subjective items of delayed retention test were concerned. It was found that on an average the scores on subjective items of DRT were very poor compared to the mean scores on subjective items of immediate retention test.

5.4.2.2 Effect of Intelligence and Methods of Study on the Objective Items of DRT

When data were analyzed to study the effect of intelligence and methods of study on subjective items of the delayed retention test the data revealed as per the following. It was hypothesized that the scores on objective items of delayed retention test will not vary as a function of intelligence and methods of study.

Table 19 : Showing the Results of ANOVA for the Scores on Objective Items of DRT as a Result of Intelligence and Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Intelligence	2	1764.7532	882.3765	5.1009	.01
Method	2	711.3782	355.6890	2.0562	-
M X Int.	4	897.4343	249.3586	1.4415	
Within	126	21795.9375	172.9836		
Total	134	25269.5000			

According to the data presented in the table above the calculated F value of 5.1009 was found to be highly significant when compared to table F value. However the calculated F value of 2.0562 for method alone and 1.4415 for the combined effect of intelligence and method were not found to be significant. These findings clearly indicated that intelligence was mainly responsible for variations of scores on objective items of DRT. The methods of study independently as well as when combined with intelligence did not affect the variations in scores achieved on the objective items of delayed retention test.

The null hypothesis that the scores on objective items of DRT will not vary as a function of intelligence was thus rejected.

Further comparison of the data to check which of the group of students according to intelligence and methods of study achieved better mean scores independently as well as when combined, lead to the following :

Table 20 : Distribution of Mean for Objective Items on DRT according to Intelligence under the Three Methods of Study

Intelligence	Methods			Row Mean
	Conventional	PLM for Self Study	PLM as an aid	
Extraordinary	72.31	65.81	62.90	67.00
Above average	66.00	57.61	64.61	62.40
Average	58.17	55.50	72.50	62.07
Column Mean	65.49	59.64	66.67	

When the effect of intelligence on the average mean score for objective items on DRT was studied the data revealed that the extraordinary students scored the highest average mean of 67.00 whereas the above average and the average students scored almost equal mean score of 62.40 and 62.07 respectively in the objective items of the delayed retention test. As for the effect of methods of study the data revealed that students under the treatment where PLM was used as an aid scored highest average mean of 66.67 followed by those treated under conventional method scoring a mean of 65.49. However, those using PLM for self study scored the lowest

average mean of 59.64 only.

The combined effect of intelligence and methods of study revealed that the average students under the method where PLM was used as an aid scored almost equal (72. 50) mean score when compared to the mean score (72.31) of extraordinary students under the conventional method of study. The extraordinary students were benefitted by the use of PLM for self study as they scored a higher mean of 65.81 under that method than under the method where PLM was used as an aid (62. 90). The above average students were highly benefitted by the conventional method of study having scored the highest average mean of 66.00 under it. However they seemed to be also benefitted by the use of PLM as an aid where the mean score of 64.61 was higher than that (57.61) under the treatment where PLM was used for self study.

It can be, therefore, concluded that conventional method of study was most suitable to the extraordinary and above average students. Use of PLM as an aid was highly suitable for the average students which could lead them to achieve at par with the extraordinary students. The use of PLM for self study was not found to be suitable for above average and average students as far as the scores on

objective items of DRT were concerned.

The overall findings in the present investigation revealed that intelligence significantly affected the variation in the scores achieved on immediate retention as well as delayed retention. Though it did not significantly affect the variations in the scores achieved on subjective as well as objective items of immediate retention test, the variation of scores on subjective as well as objective items of delayed retention test were highly affected by it. The usual trend revealed by the effect of intelligence on the average mean score was that showing increase in the average mean along with increase in the level of intelligence. This indicated that the achievement and intelligence had positive correlation in case of the present investigation.

In case of effect of treatment on the scores the analysis of data in the present investigation analysis of data revealed that methods of study significantly affected the scores on objective items on immediate retention test. As for the delayed retention test methods of study significantly affected the scores both in general and on the subjective items in particular. The combined effect of intelligence and methods of study in case of immediate retention in general showed higher gain for extraordinary students on all

the three experimental methods. However further probing regarding immediate retention scores on subjective items showed that intellectually average group of students scored highest achievement scores under the treatment where PLM was used as an aid. They even scored higher than the extra-ordinary students under the conventional method of teaching. As for the delayed retention, methods of study significantly affected the scores of students. Though the extraordinary students achieved higher mean in general the average students treated with PLM as an aid scored at par with the extra-ordinary students under conventional method of study not only in general but also in case of the scores on the objective items of DRT. The average group of students also scored almost equal on the subjective items of DRT when compared to the mean score of extraordinary students under conventional method. Thus, the results of the present study revealed that the comparatively less intelligent students are benefitted with the use of PLM as an aid as far as Home Science subject matter is concerned.

In general students under conventional methods scored highest on subjective items of DRT. Students using PLM as an aid scored better than those using it for self study for those items of DRT. Combination of intelligence and methods of study revealed that though extraordinary students were highly benefited by conventional methods as well as by use of

PLM for self study, the average students were highly benefited by use of PLM as an aid followed by conventional method as far as subjective items were concerned. The average mean achievement on the subjective items was low compared to the average mean achievement on objective items. The reason for this could be attributed to the construction of criterion frames in the programme itself. Throughout in the PLM used in the present investigation the criterion frames called only for objective response. Thus, the students probably felt at home with those responses calling for recall or recognition of a word or a phrase than construct their own answer. However, the use of PLM as an aid to conventional method did help average students to score higher than students who were above average and about equal to those with extraordinary intelligence in case of subjective items on delayed retention.

In general it can be concluded that though intelligence was chiefly responsible for variations in the achievement scores, methods of study also significantly affected the achievement. Though conventional method of study was found to be more suitable for the extraordinary and above average students, they were also benefited by use of PLM for self study. The average students were very highly benefited by use of PLM as an aid in case of both immediate and delayed retention for both subjective as well as objective items.

5.5 General Conclusions

(1) The sample under study represented the average category in terms of intelligence, overall achievement, extent of preparation, achievement in Home Science and the socio-economic status. In case of adjustment double the number of not so well adjusted were found to be well adjusted. Almost equal number of students took more time than those who took less time.

(2) Programmed learning material was found to be suitable for promoting information regarding the selected unit on 'Savings' in Home Science education. Use of PLM for self study was found to be most suitable in general. Its use as an aid to conventional method was found to be more suitable for immediate retention, whereas its use for self study was found to be more suitable for delayed retention.

(3) Intelligence was independently found to be affecting the variations of scores on immediate as well as delayed retention tests. Further analysis indicated that as the level of intelligence increased the average mean score on these tests too increased.

(4) In case of immediate retention, methods of study did not affect the variations in the score. However, in case of delayed retention the methods of study significantly affected the variations in the scores. Those under the conventional methods scored the highest mean, followed by those treated with PLM as an aid. The lowest mean was achieved by those who used PLM for self-study.

(5) The combined effect of intelligence and methods of study was not found to be significant in case of both IRT and DRT scores. However, comparison of means revealed that the above average students were more benefited by use of PLM for self study. Use of PLM as an aid was found most suitable for the average students who were found to be achieving a mean score at par with the highest mean score achieved by extraordinary students under conventional method of study as far as IRT scores were concerned.

The same trend held true for DRT scores. However, in case of DRT scores the above average students were benefited more by conventional method followed by use of PLM as an aid than its use for self study.

(6) In case of the scores on subjective items on IRT and DRT the data revealed that intelligence and methods of study independently as well as when combined did not affect the variations in scores on immediate retention test. However, in case of delayed retention scores both the intelligence as well as methods of study significantly affected these scores independently. Their combined effect was not found to be significantly affecting these scores. The highest average score on subjective items was found to be for the extraordinary students. The above average students had higher average mean score than the average students.

(7) In case of methods of study those using PLM as an aid achieved highest mean scores followed by those using it for self study. Students under conventional method scored the lowest average mean on subjective items of IRT. In case of DRT average mean scores increased with increase in the level of intelligence. As for the methods of study those under conventional method achieved highest average mean, followed by those using PLM as an aid. The students using PLM for self study scored the lowest average mean score.

(8) In case of the objective items on IRT and DRT the data revealed that methods of study significantly affected the variations in the scores achieved on IRT independently whereas intelligence affected the variations in the scores achieved as objective items of DRT. The students treated with PLM as an aid to conventional method and those under conventional method reported higher average mean than those using PLM for self study, the average mean of the former being even higher than the later.

The combined effect of intelligence and methods of study was not found to be significantly affecting the variations in scores on objective items of IRT as well as DRT.

FIG. 2 SUITABILITY OF METHODS ACCORDING TO INTELLIGENCE ON IRT AND DRT ITEM SCORES

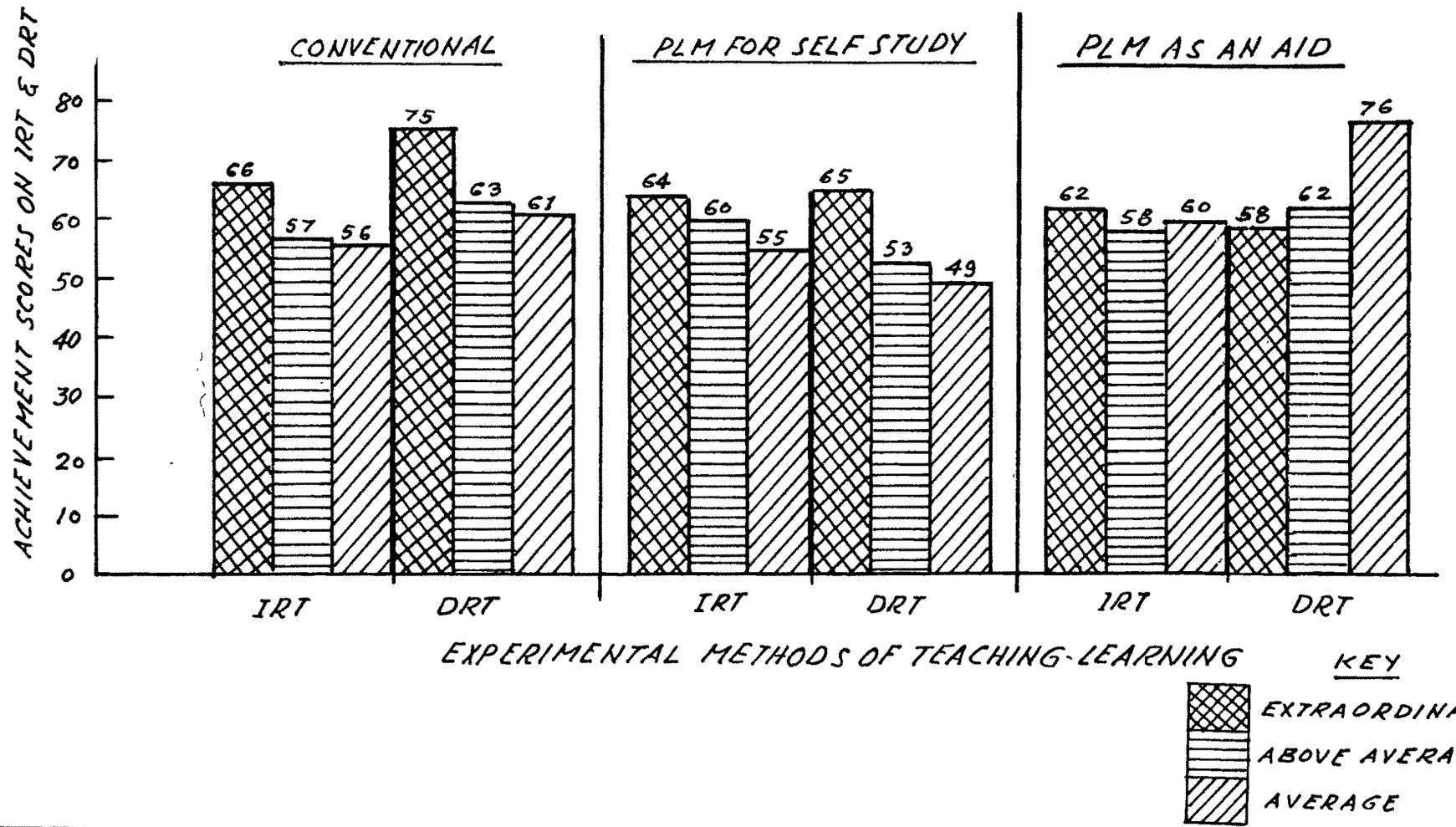


FIG. 3 EFFECT OF INTELLIGENCE ON IRT AND DRT

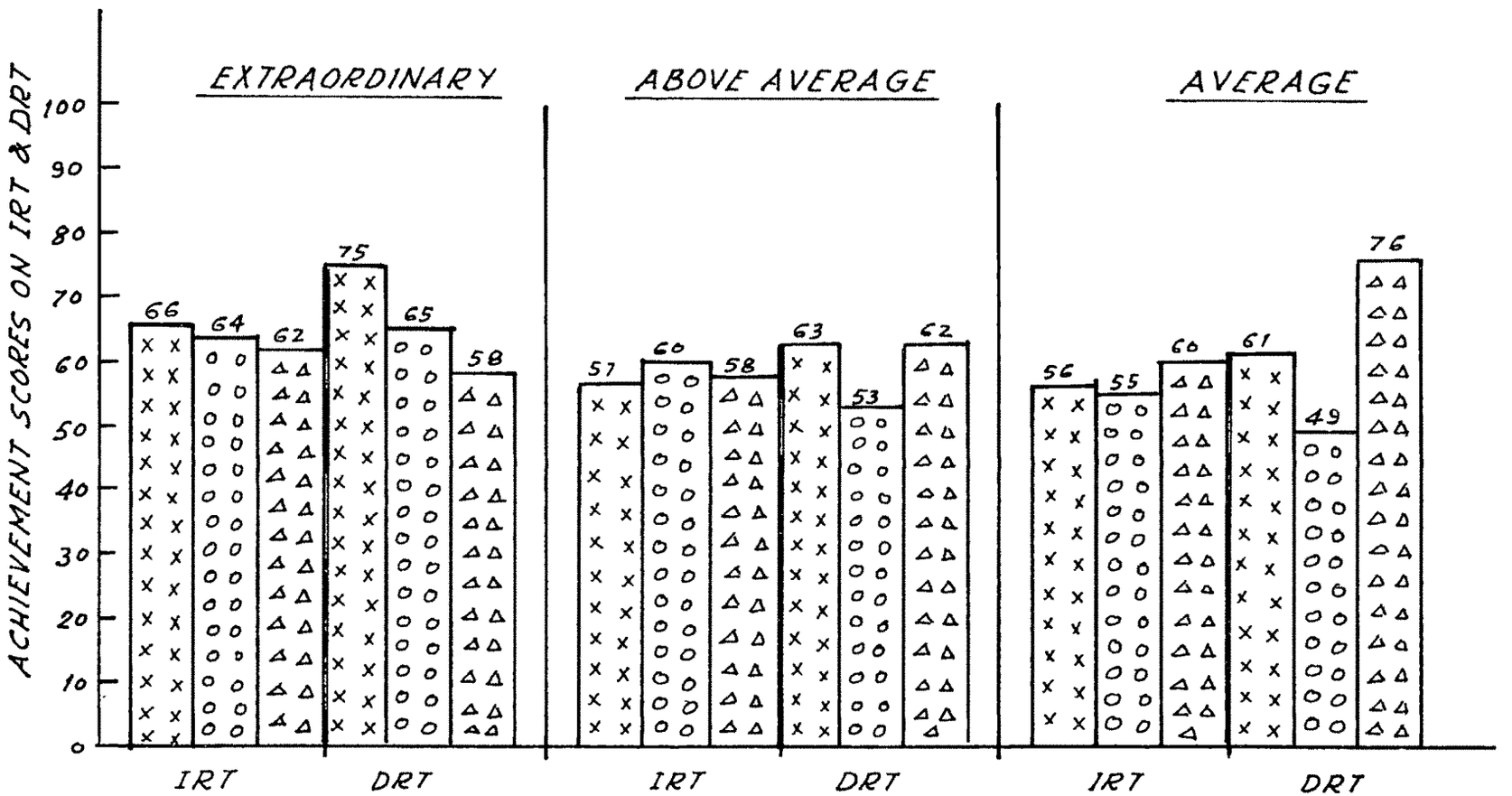


FIG. 4 SUITABILITY OF METHODS ACCORDING TO INTELLIGENCE FOR SUBJECTIVE & OBJECTIVE ITEM SCORES

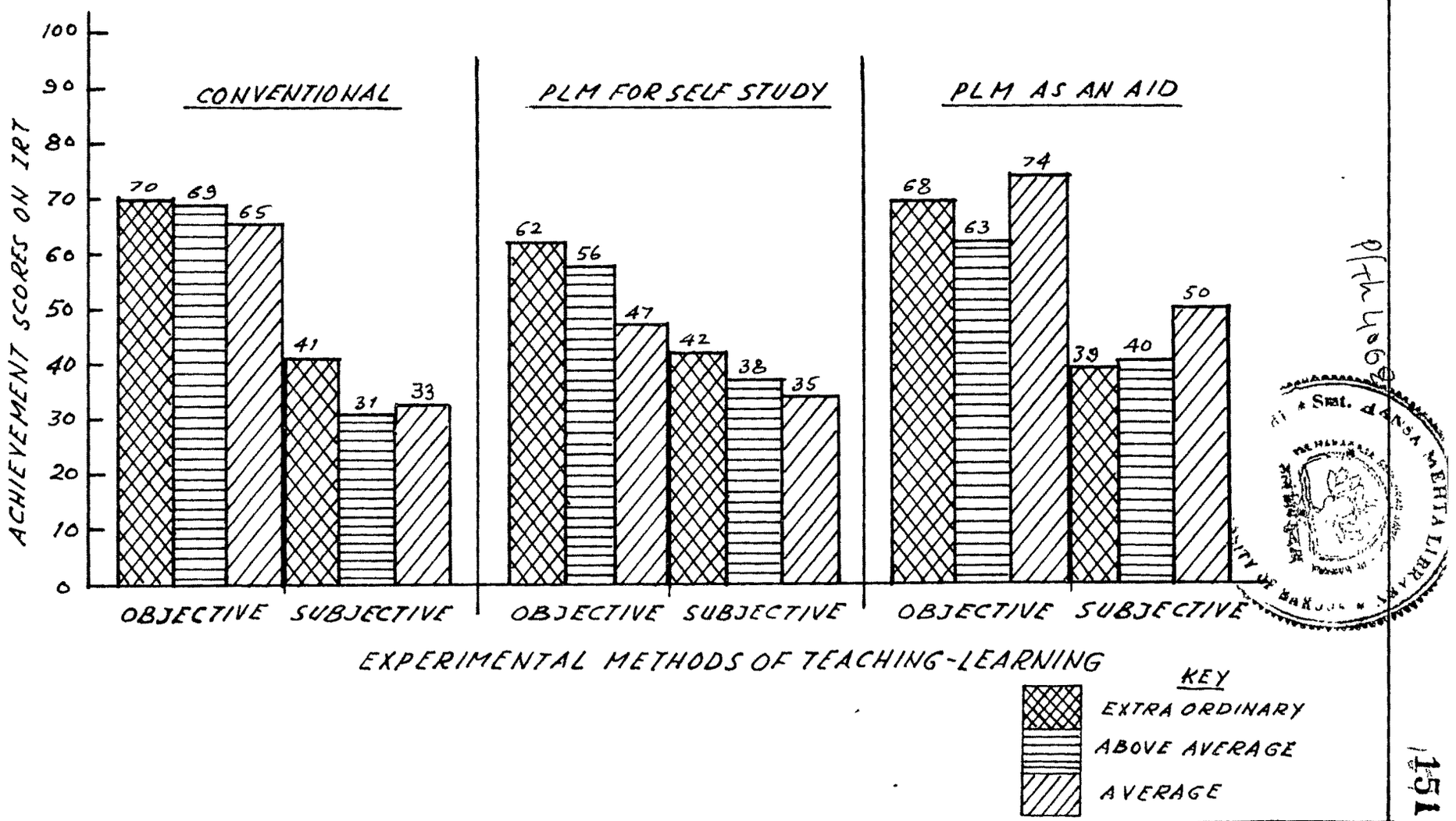


FIG. 5 EFFECT OF INTELLIGENCE ON SUBJECTIVE & OBJECTIVE ITEMS OF IRT

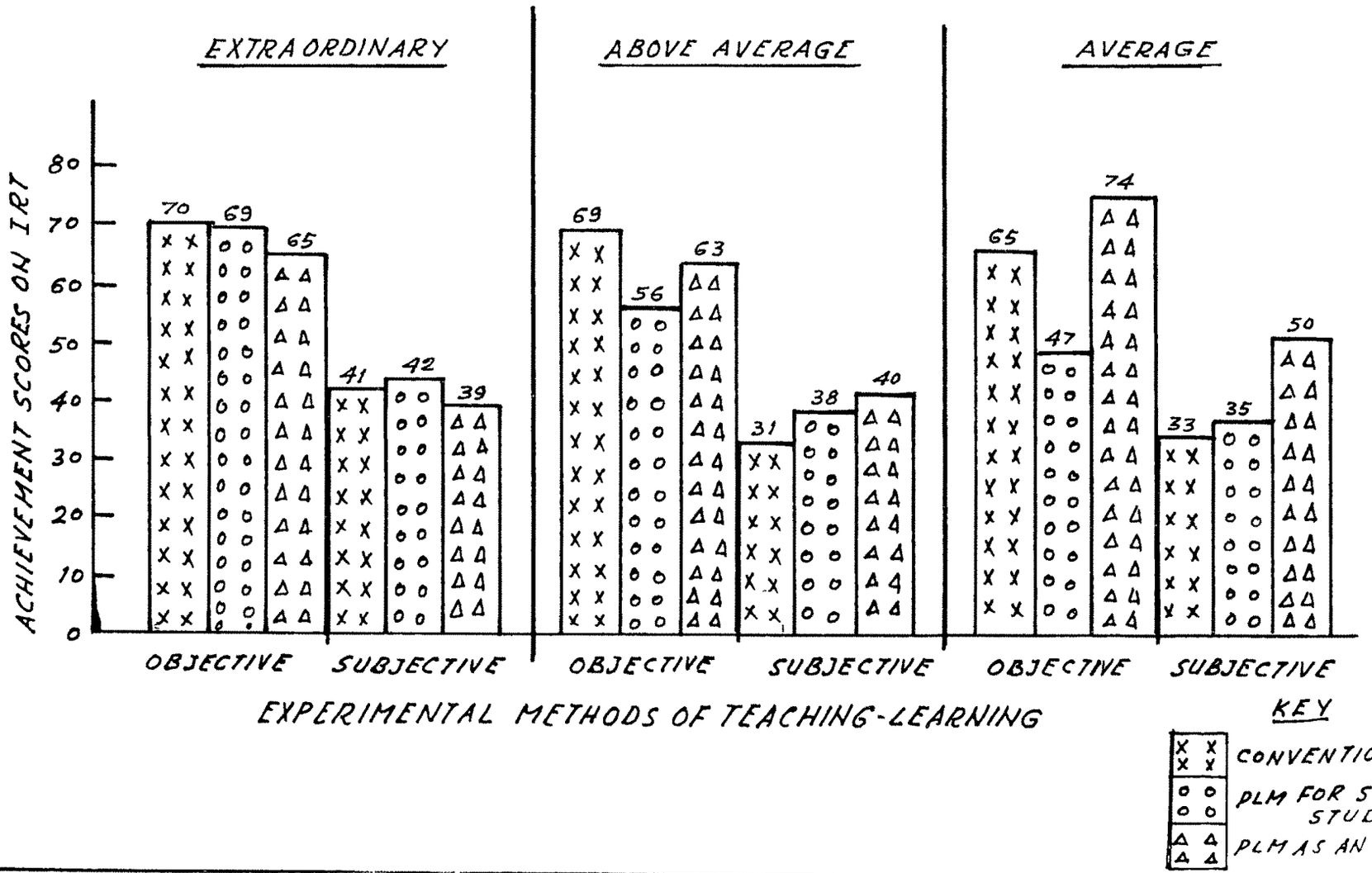


FIG. 6 SUITABILITY OF METHODS ACCORDING TO INTELLIGENCE FOR SUBJECTIVE & OBJECTIVE ITEM SCORES

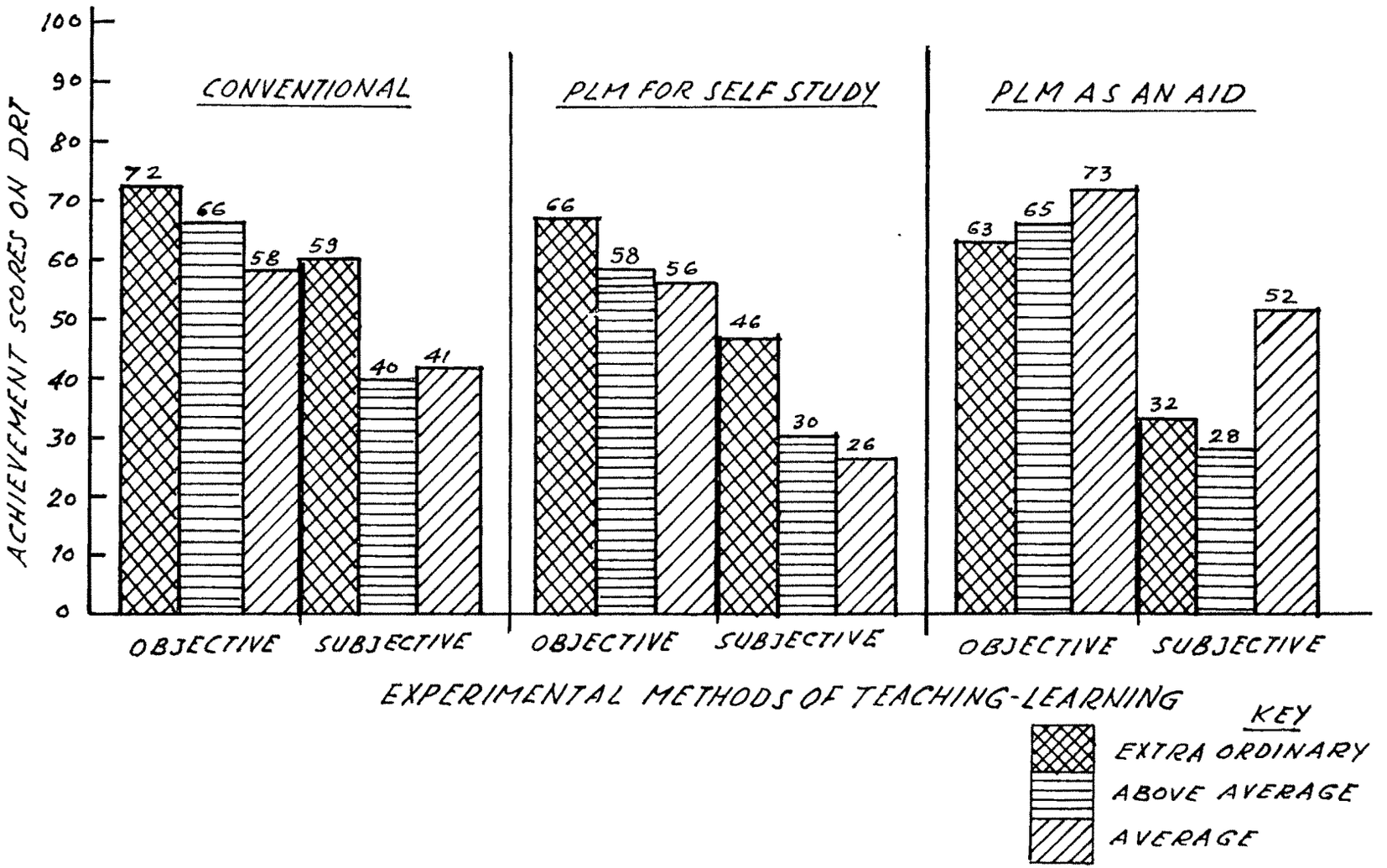
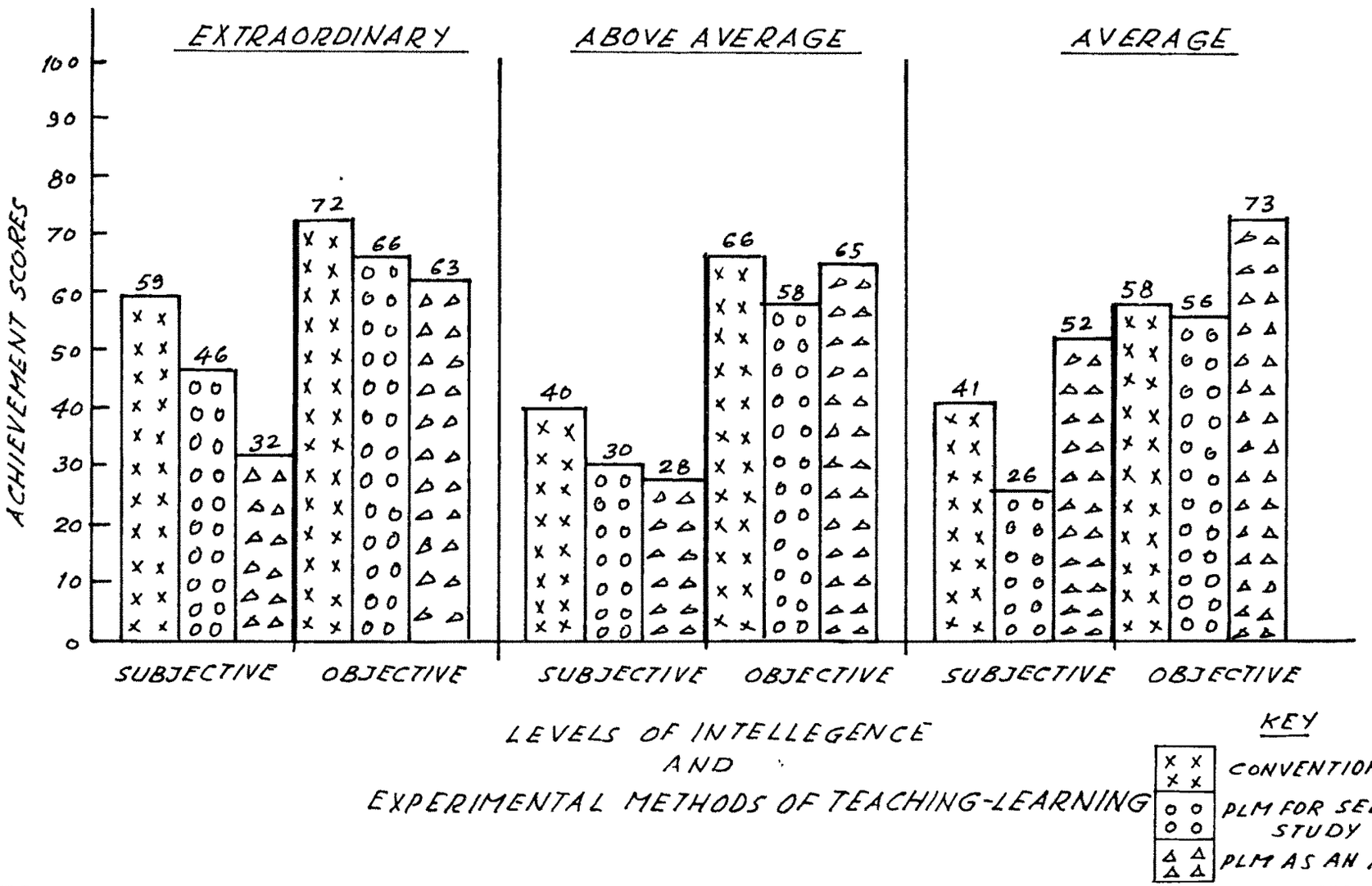


FIG. 7 EFFECT OF INTELLIGENCE ON THE SUJECTIVE & OBJECTIVE ITEMS OF DRT



PART II

5.6 Effect of Overall Class Achievement, Achievement in Home Science and Extent of Preparation to enter the Experimental Condition on the IRT and DRT Scores in General

Class achievement and achievement in Home Science were the indicators of the distribution of sample according to the scores achieved in overall subjects and in Home Science particularly at the time of the final examination conducted in the previous year. The extent of preparation to enter the experimental condition was indicated by the scores achieved on pretest prepared by investigator and administered just before the experiment was started. The effect of these three factors on IRT and DRT scores is discussed in the following pages.

5.6.1.1 Effect of Class Achievement and Methods of Study on IRT Scores

It was hypothesized that the IRT scores achieved by the sample under study will not vary as a function of class achievement and methods of study independently as well as when combined together. The two-way analysis of variance calculated to test the above hypothesis indicated as per the following.

Table 21 : Showing Results of ANOVA for IRT Scores as influenced by Class achievement and Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Class achievement	2	2493.8276	1246.9338	19.1932	.01
Method of study	2	104.8901	52.4451	-	-
Method and Class Achievement	4	52.7974	13.1993	-	-
Within	126	8184.7500	64.9663	-	-
Total	134	10837.2617	-	-	-

As evidenced in Table 21 the calculated F value of 19.1932 for class achievement was found to be highly significant. This indicated that the immediate retention test scores of the sample under study varied significantly according to their class achievement independently. The reciprocal F value of 4.9219 for thec combined effect of methods of study as well as class achievement and the calculated F value of 1.2387 for the methods of study were found to be insignificant when compared to the table F value indicating that the immediate retention test scores of the sample did not vary significantly due to their methods of study independently as well as when combined with their class achievement.

Thus, the null hypothesis that the immediate retention test scores of the sample under study will not vary as a function of their class achievement independently was rejected. These findings lead to conclude that the variations in the IRT scores were mainly due to the differences in the levels of class achievement independently. However, methods of study alone as well as when combined with class achievement did not affect the variations in the IRT scores.

Further analysis of the data to examine which group of students on the basis of varying levels of class achievements had higher mean indicated as per the following table.

Table 22 : Distribution of Mean Scores on IRT according to Class Achievement under Three Methods of Study

Levels of Class	Three Methods of Study			Row Mean
	Conventional	PLM for Self Study	PLM as an aid	
High	70.00	72.86	72.48	71.75
Medium	57.41	59.06	58.25	58.24
Low	55.80	59.20	54.50	56.50
Column Mean	61.07	63.70	61.74	

The average mean on the basis of the class achievement showed significant differences as indicated by the row mean in the above table whereas the column means did not

indicate significant differences due to methods of study.

As per class achievement the row mean indicated that the high achievers achieved highest average mean of 71.75 followed by the medium achievers having a mean of 58.24. The lowest average mean was achieved by the low achievers having a mean of 56.50 only. The trend was found to be that of increase in achievement on IRT on the basis of increase in the levels of class achievement. Thus, indicating positive relationship between the class achievement and the scores on IRT.

The combined effect of class achievement under each methods of study indicated that high class achievers achieved highest IRT score of 72.56. When PLM was used for self study, they achieved better (72.48) under the method where PLM was used as an aid to conventional method of study than under the conventional method of study where they achieved on 70.00 as IRT score. These findings indicated that the high achievers on the basis of class achievement achieved best when PLM was used for self study and achieved better when it was used as an aid to conventional method of study. These achievement as well as IRT scores under the third method of study were slightly higher than that under the conventional method of study.

As for the medium achievers these under the second method where PLM was used for self study scored the highest.

IRT score of 59.06 followed by those who used it as an aid to conventional method of study having a score of 58.25. Those under conventional method scored 57.41 on the IRT. This too indicated that the medium achievers achieved best when they used PLM for self study and better when they used it as an aid. However their score under conventional method was less when compared to that under the two conditions where PLM was used.

In case of the low class achievers the use of PLM for self study was found to be most suitable. They scored highest IRT scores of 59.20 under this method. However, they were benefited by the conventional method of study more than the method where PLM was used as an aid as indicated by their scores 55.80 and 54.50 under each of these two conditions respectively.

The column mean giving average mean according to methods of study alone indicated that the sample under study scored highest average mean of 63.70 when PLM was used for self study, scored higher average mean of 61.74 when PLM was combined as an aid to conventional method of study as compared to the average mean of 61.07 under the conventional method of study.

The findings lead to conclude that majority of the students scored highest average mean when PLM was used for self study. This indicated that PLM for self study was most

suitable method of study irrespective of the class achievement, followed by its use as an aid to the conventional method of study. In general the use of conventional method of study was less suitable as far as IRT scores were concerned.

The high and the medium achievers seemed to be more benefited by use of PLM for self study as well as an aid when compared to the conventional method of study indicating that it is most suitable for these students both as a self study method and as aid as far as IRT scores were concerned. This may be because of the fact that these students can proceed at their own pace, get immediate knowledge of the results of correctness of their responses and thus may feel more motivated to learn further and master the content effectively. Whereas higher score of low achievers under the conventional method indicates that the familiarity with the typical class room situation itself is responsible for high achievement under this method as compared to combination of PLM as an aid with this method. However, their highest score under the second experimental method where PLM is used for self study indicates that self paced learning which is provided by use of PLM for self study is more suitable for low achievers. Their achievement of 59.20 under this method was slightly more than the highest achievement of 59.06 of the medium class achievers.

Conclusions

1. The immediate retention scores of the sample under study differed significantly due to class achievement independently. The combined effect of their class achievement with methods of study as well as methods of study were alone not responsible for these variations.

2. As the class achievement increased the achievement scores on IRT also increased.

3. The high achievers achieved the highest average mean followed by the medium achievers. The low achievers had the lowest average mean.

4. Use of PLM for self study was found to be most suitable as indicated by the highest average mean of 63.70 achieved by the sample under study under this method. This method was found to be most beneficial to the high achievers who scored highest mean under this condition. It was also found to be beneficial to the low achievers who achieved slightly better than the medium achievers under this condition.

5. Use of PLM as an aid was found to be more beneficial to the high and medium achievers than the low achievers. In that the former who achieved better under this condition when compared to their scores under the first method were conventional method was used. However, the low achievers were more benefited by use of conventional method alone than the use of PLM as an aid to this method of study as far as IRT scores were concerned.

5.6.1.2 Effect of Class Achievement and Methods of Study on DRT Scores

It was hypothesized that the DRT scores of the sample under study will not vary as a function of class achievement and methods of study independently as well as when combined.

Table 23 : Showing Results of ANOVA for DRT Scores as influenced by Class Achievement and Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Class achievement	2	8052.8359	4026.4180	23.6406	.01
Methods	2	1376.6484	688.3242	4.0414	.05
Methods and Class achievement	4	1428.1016	357.0254	2.0962	-
Within	126	21460.0625	170.3179	-	-
Total	134	32317.6484	-	-	-

As indicated in table above the calculated F value of 23.6406 for class achievement was found to be highly significant when compared to the table F value indicating that variations of DRT scores were chiefly due to the class achievement. The calculated F value of 4.0414 for methods of study too was found to be significant indicating that the DRT scores of the population under study also varied

As indicated in table above the average mean according to class achievement were to be highest (81.03) for the high achievers. The medium achieved better average mean of 57.37 when compared to that of 55.68 achieved by the low achievers. The data indicated positive relationship between class achievement and achievement on delayed retention test. The average mean score on DRT increased with the increased level of class achievement.

When the average mean under each method of study were compared the data revealed that those treated with the conventional method of study scored the highest mean of 68.05 on the delayed retention test. Between the two groups using PLM, those using it as an aid had a higher average mean of 65.04 than those using it for self study. The later scored an average mean of 64.13 only.

The combined effect of class achievement and methods of study revealed that the high achievers were highly benefited by use of PLM for self study as they scored the highest mean of 86.72, followed by the conventional method of study under which the mean achieved was 82.17. They seemed to be less benefited by its use as an aid to the conventional method of study under which they achieved a mean of 74.20 only.

The medium achievers were highly benefited by conventional method of study as they scored a mean of 64.18 under this

in better learning. The mean scores on delayed retention were found to be distributed as 86.72 for high achievers with use of PLM for self study, 67.25 for low achievers when it was used as an aid and 64.18 for medium achievers under conventional methods of study. This itself indicates superiority of PLM. It helped the low achievers to achieve higher mean when it was used as an aid, when compared to the highest mean achieved by medium achievers under conventional method of study.

Conclusions

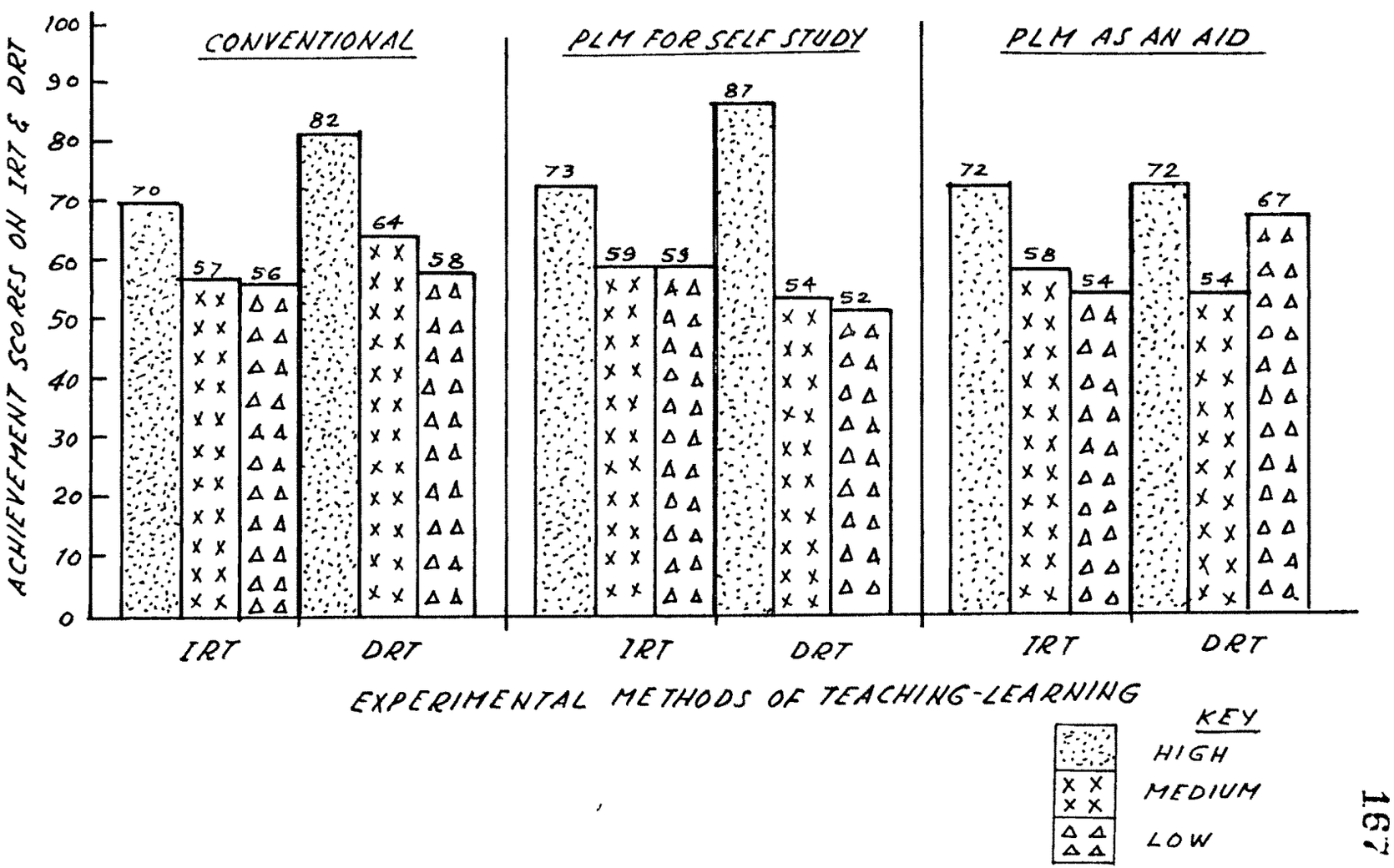
1. The delayed retention test scores were significantly affected by the class achievement and the methods of study independently. The combined effect of class achievement and methods of study was not found to be significant.

2. As was the case with IRT score, the average mean score on DRT also increased with the increase in the level of class achievement.

3. The high achievers achieved the highest average mean, followed by the medium achievers. The low achievers had the lowest average mean on delayed retention test.

4. Conventional method of study was found to be most suitable. Between the two methods using PLM, one in which it was used as an aid was found to be more suitable than the method where it was used for self study.

FIG. 8 SUITABILITY OF METHODS ACCORDING TO OVERALL CLASS ACHIEVEMENTS



170

As indicated by the table above the calculated F value of 11.0696 for achievement in Home Science was found to be highly significant as far as variations on IRT scores of the sample under study was concerned. Thus, indicating that achievement in Home Science significantly affected the variations in IRT scores independently. The calculated F value of 1.0262 for methods of study was not found to be significant, indicating that IRT scores did not vary as a function of their methods of study.

The null hypothesis that the immediate retention test scores of the sample under study will vary as a function of achievement in Home Science was rejected. When the data were further examined to find out which group of students on the basis of their achievement in Home Science and methods of study independently as well as when combined varied in their IRT scores, it indicated as per the following :

Table 26 : Distribution of Mean Scores on IRT according to Achievement in Home Science under Three Methods of Study

Achievement in Home Science	Three Methods of Study			Row Mean
	Conventional	PLM for Self Study	PLM as an aid	
High	63.75	71.25	66.85	67.28
Medium	57.97	59.97	57.58	58.51
Low	57.75	55.14	57.67	56.85
Column Mean	59.52	62.12	60.69	

As per Table 26, the high achievers in Home Science scored the highest average mean of 67.78 followed by the medium achievers scoring a mean of 58.51 and the low achievers scored the lowest average mean of 56.85 on the immediate retention test according to their achievement in Home Science. This indicated positive relation between achievement in Home Science and achievement in IRT scores.

As for the methods of study, the data indicated that students using PLM scored higher average mean than those treated under conventional method of study. In this those using PLM for self study scored the highest average mean of 62.12 and those using it as an aid scored 60.69 on the immediate retention test. Those treated with conventional method of study had 59.52 as an average mean. The scores indicated increase with use of PLM as an aid leading to highest score with its independent use. This leads to conclude that use of PLM for self study was most suitable, followed by its use as an aid as compared to the conventional method of study as far as immediate retention was concerned.

The combined effect of the achievement in Home Science and methods of study indicated that the high and medium achievers obtained highest average mean of 71.25 and 59.97 respectively when PLM was used for self study. The medium achievers and the low achievers scored almost equally under

the conventional method alone having a score of 57.97 and 57.75 respectively. Under the method where PLM was used as an aid to conventional method of study they scored a mean of 57.58 and 57.67 respectively which too was almost equal.

Use of PLM for self study was not found to be suitable for low achievers in Home Science as they scored a mean of only 55.14 under it. For them its use as an aid helped them to achieve almost equal mean score when compared to the conventional method of study. Effectiveness of PLM in general as a self study method and as an aid over the conventional method as far as immediate retention was concerned could be because of its characteristic of self-pacing and reinforcing the behaviour by knowledge of correct response. The former leads to better understanding of the content and the later provides greater motivation individually. In case of conventional method used in the experiment though discussion may allow for reinforcement it will be more in terms of group than individual. The pace of learning under lecture method may result in non-learning or less learning of certain concepts.

Conclusions

1. The immediate retention tests scores of the sample under study varied significantly due to their achievement in Home Science independently. The methods of study independently as well as when combined was not responsible for this variation.

2. The achievement in Home Science and achievement on IRT had positive relationship as indicated by increase on IRT scores according to increase in the level of achievement in Home Science.

3. As for methods of study the scores seemed to increase with introduction of PLM as an aid to its independent use as indicated by the average mean scores under conventional method of study alone, when combined with PLM and use of PLM independently. Thus the increase in IRT score was attributed to use of PLM. Use of PLM for self study was most suitable followed by its use as an aid. Conventional method of study was not found to be very suitable.

4. As for the combined effect of achievement in Home Science and methods of study, the high and medium achievers were most benefited by use of PLM for self study whereas the low achievers were more benefited by its use as an aid to conventional method of study.

5.6.2.2 Effect of Achievement in Home Science and Methods of of Study on DRT Scores

It was hypothesized that the DRT scores of the sample under study will vary due to their achievement in Home Science and method of study independently as well as when combined.

Table 27 : Showing the Results of Analysis of Variance on DRT as influenced by the Achievement in Home Science and Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Achievement in Home Science	2	4650.2500	2325.1250	12.7690	.01
Methods of Study	2	1584.1250	792.0625	4.3498	.05
Methods X Achievement in Home Science	4	735.5000	183.8750	1.0098	-
Within	126	22943.5625	182.0918		
Total	134	29913.4375			

As indicated in table above the calculated F value of 12.7690 for achievement in Home Science was found to be very highly significant. The calculated F value of 4.3498 for methods of study too was found to be significant. This indicated that the DRT scores of the sample under study varied due to achievement in Home Science and methods of study independently. The insignificant F value (1.0098) for combined effect of methods of study and achievement in Home Science indicated that these two factors when combined together were not responsible for the variations in DRT scores of the sample under study.

When data were further examined to find out which group of students on the basis of their achievement in Home Science and methods of study achieve better it revealed as per the following :

Table 28 : Distribution of Mean Scores on DRT according to Achievement in Home Science under Three Methods of Study

Achievement in Home Science	Three Methods of Study			Row Mean
	Conventional	PLM for Self Study	PLM as an aid	
High	74.75	77.00	72.17	74.64
Medium	63.03	53.47	59.75	58.75
Low	67.25	52.43	62.67	60.78
Column Mean	68.34	60.97	64.87	

Examination of data, according to achievement in Home Science indicated that high achievers in Home Science had the highest average mean of 74.64. As for the medium and the low achievers, the later achieved a higher mean of 60.78 as compared to the mean of 58.75 achieved by the medium achievers.

As for the method of study those treated with conventional method achieved the highest average mean of 68.34. As for those who used PLM, those treated with its use as an aid to conventional method of study scored a better mean of 64.86 as compared to the mean of 60.97 scored by those using it for

The finding lead to conclude that the high achievers are benefited more by use of PLM for self study as it allows for self paced learning resulting in better understanding and higher motivation. Though the medium and low achievers were comfortable under conventional method of study, they achieved higher when it was used as an aid than when it was used for self study as it might have provided for better understanding through PLM as an aid to teachers teaching.

Conclusions

1. The delayed retention test scores of the sample under study varied significantly due to their achievement in Home Science as well as methods of study indicating that the variations in DRT scores were mainly due to these two factors independently. The combined effect of these two factors was not found to be affecting these variations.

2. As in case of TRT scores the high achievers achieved highest average mean but in case of DRT the low achievers achieved higher mean than the medium achievers.

3. For delayed retention in general the conventional method of study was found to be most suitable. However, use of PLM as an aid was found to be superior than its use for self study as far as delayed retention was concerned.

FIG. 10 SUITABILITY OF METHODS ACCORDING TO ACHIEVEMENT IN HOME SCIENCE

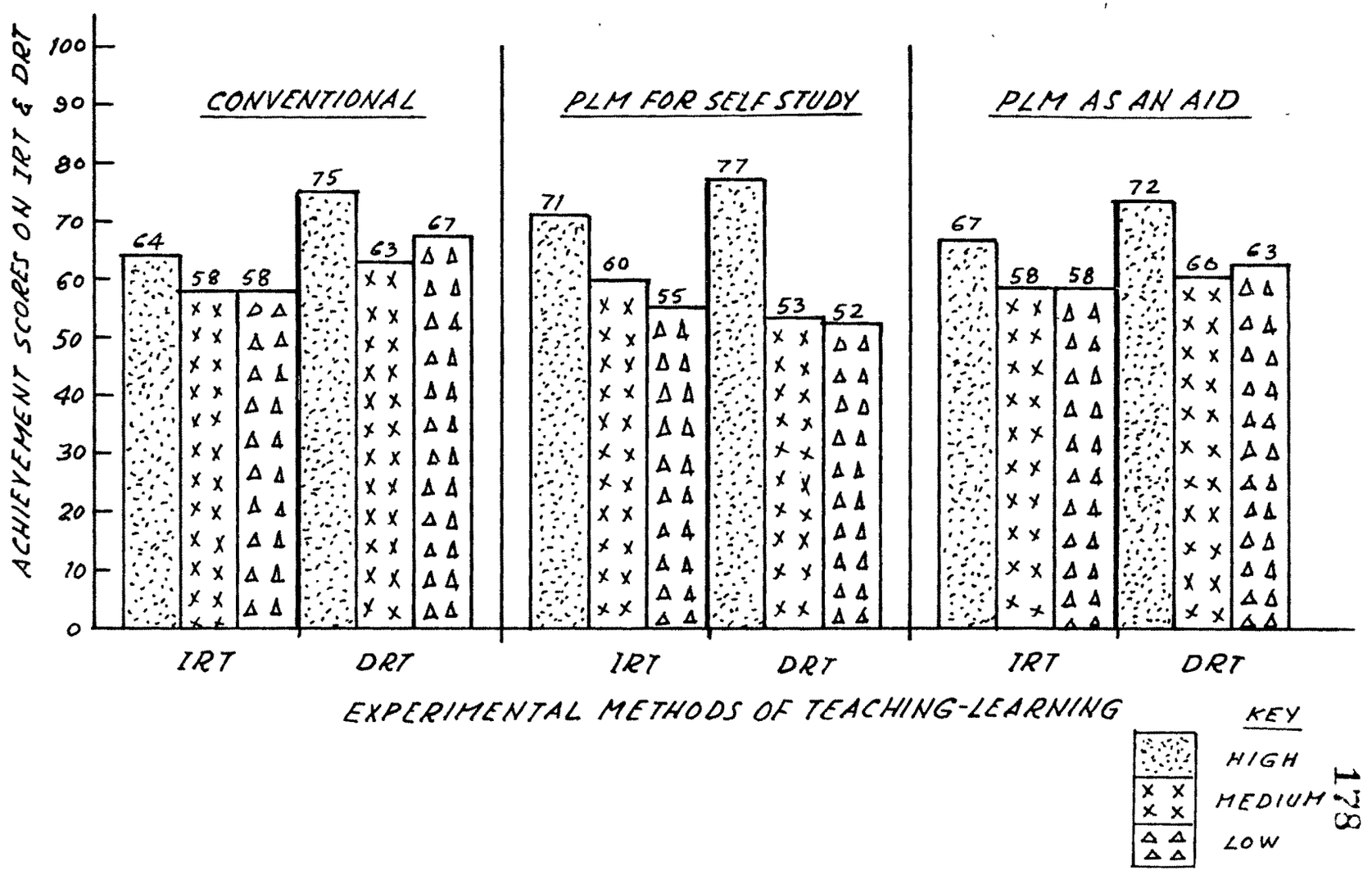
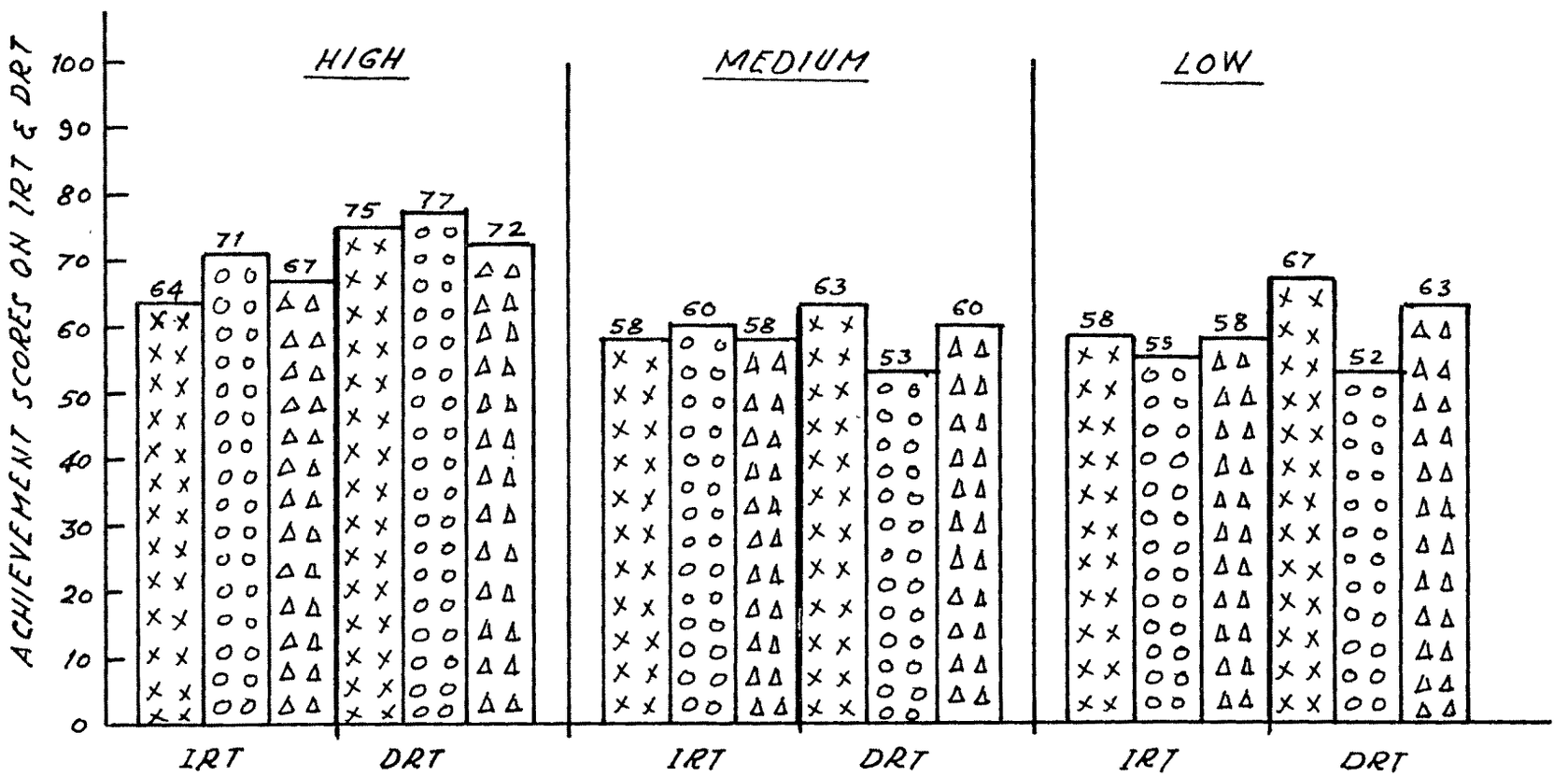


FIG. 11 EFFECT OF ACHIEVEMENT IN HOME SCIENCE ON IRT & DRT



LEVELS OF ACHIEVEMENT IN HOME SCIENCE
AND
EXPERIMENTAL METHODS OF TEACHING-LEARNING

KEY

- CONVENTIONAL
- PLM FOR SELF-STUDY
- PLM AS AN AID

4. The combined effect revealed that the high achievers were most benefited by use of PLM for self study, they gained less by its use as an aid when compared to the conventional method of study.

5. As for the medium and the low achievers the conventional method of study seemed to be most suitable. However use of PLM as an aid was found to be more beneficial than its use for self study for these two groups. In fact, the low achievers were benefited more by its used as an aid when compared to the achievement of medium achievers on DRT under that method.

5.5.3 Extent of preparation indicates the immediate position of the students at the time of entering an experimental situation. It is considered an important factor in the studies concerning PLM as it helps in indicating the suitability of PLM both in an auto-study method and an aid.

5.6.3.1 Effect of Preparation and Methods of Study on IRT Scores

It was hypothesized that the IRT scores of the sample under study, will not vary on the basis of their extent of preparation and methods of study independently as well as when combined.

Table 29 : Showing Results of Analysis of Variance on IRT as influenced by Preparation and Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Preparation	2	499.0422	249.5211	4.4916	.05
Methods of Study	2	143.2297	71.6149	1.0021	-
Methods of Study X Preparation	4	1214.9578	303.7393	4.2503	.05
Within	126	9004.2500	71.4623	-	-
Total	134	10861.4797			

As indicated in Table 29 the calculated F value of 4.4916 for preparation was found to be significant indicating that the IRT scores of the sample under study varied due to their extent of preparation independently. The calculated F value of 1.0021 for methods of study was not significant which indicated that the variations in IRT scores were not due to their methods of study independently. However, the F value of 4.2503 for combined effect of preparation and methods of study was found to be significant indicating that variations in IRT scores were also due to the combination of extent of preparation and methods of study.

The null hypothesis that the IRT scores of the sample under study will not vary on the basis of their extent of preparation independently as well as when combined with the methods of study was thus, rejected.

Further examination of data to find out which group of students on the basis of preparation as well as methods of study achieved better on immediate retention test revealed the following :

Table 30 : Distribution of Mean Scores on IRT according to Preparation under the Three Methods of Study

Preparation	Three Methods of Study			Row Mean
	Conventional	PLM for Self Study	PLM as an aid	
Well prepared	57.67	69.16	61.00	62.61
Fairly prepared	59.44	63.21	58.00	60.31
Less prepared	57.80	51.10	63.67	57.52
Column Mean	58.30	61.16	60.83	

As indicated in the Table 30 above, the well prepared students achieved highest mean score of 62.61 followed by fairly prepared achieving a mean of 60.31 and the less prepared having a mean of 57.52. The extent of preparation and achievement on IRT was positively related as indicated by increase in achievement score on IRT with increasing levels of preparation.

As for the methods of study those using PLM for self study achieved highest average mean of 61.16 followed by those using it as an aid having a mean of 60.83. Those treated with conventional methods of study had a mean of 58.30 which was the lowest average mean. There was a steady increase in average mean score with introduction of PLM as an aid to its use for self study starting with conventional method of study.

The combined effect of preparation and methods of study on IRT revealed that the well prepared students were highly benefited by use of PLM for self study as indicated by their highest mean score of 69.17 compared to those treated with conventional method. Those using PLM as an aid to it scored a higher mean that those using it independently in this group of well prepared students. Their means were 57.67 for conventional method and 61.00 for use of PLM as an aid to it.

As for the fairly prepared too use of PLM for self study proved to be most suitable as they had a highest mean of 63.21. However, the position was reverse in their case when the mean of fairly prepared students under conventional method alone were compared to the mean of those who used PLM as an aid. Their means were 59.44 and 58.00 respectively under these methods.

The less prepared students were benefited most by use of PLM as an aid as indicated by their highest mean score of 63.67. This study was almost equal to the score of fairly prepared students under second experiment. They scored better mean score (57.800) under conventional method of study when compared to the mean score of 51.10 under the method where PLM was used for self study.

Keeping in line with the previous findings those concerning effect of preparation and methods of study too indicated that well prepared students were highly benefited by use of PLM for self study indicating that this experimental method was found most suitable to them probably due to its inherited characteristics of self-paced learning and reinforcement. The average as indicated by fairly prepared group of students were once again in line with the well prepared ones. However, the less prepared were benefited most by combination of the conventional method with use of PLM as an aid.

Conclusions

1. The immediate retention test scores of the sample under study varied significantly on the basis of their extent of preparation. There was positive relation between extent of preparation and achievement on IRT scores as indicated by increase in IRT scores with increase in the level of preparation.

2. Method of study did not significantly affect the variations in the IRT scores. However, the scores increased as the methods of study changed from conventional to PLM as an aid and PLM for self study. PLM for self study was found to be most suitable method of study.

3. Combined effect of methods of study and extent of preparation was found to be significantly affecting the variations in the IRT scores. In that the well and fairly prepared were highly benefited by use of PLM for self study. The less prepared scored highest mean on IRT with use of PLM as an aid.

5.6.3.2 Effect of Preparation and Methods of Study on DRT Scores

It was hypothesized that the delayed retention test scores of the sample will vary on the basis of their extent of preparation and methods of study independently as well as when combined. The following table shows the results of analysis of variance according to these two variables.

Table 31 : Showing the Results of Analysis of Variance on DRT as influenced by Preparation and Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Preparation	2	1071.3726	535.6563	2.5418	-
Methods of Study	2	1476.6226	738.3113	3.5032	.05
Methods of Study and Preparation	4	1541.7524	385.4380	1.8289	-
Within	126	26554.6875	210.7515	-	-
Total	134	30644.4336	-	-	-

The examination of Table 31 above indicated the calculated F value of 2.5418 for preparation was not found to be significant whereas the calculated F value of 3.5032 for methods of study was significant at .05 level of confidence. This lead to conclude that though the extent of preparation of the sample did not affect the variation in DRT scores, the methods of study significantly affected the DRT scores independently. The combined effect of preparation and methods of study too was not found to be insignificant as per the calculated F value of 1.8289 indicating that it had no effect on the variations of DRT scores of the sample under study.

Thus, the null hypothesis that the DRT scores of the sample under study will not vary on the basis of their methods of study was rejected.

Further checking of the data to find out which group of students on the basis of their preparation and methods of study indicated as per the following :

Table 32 : Distribution of Mean Scores on DRT according to Preparation under the Three Methods of Study

Preparation	Three Methods of Study			Row Mean
	Conven-tional	PLM for Self Study	PLM as an aid	
Well prepared	80.33	64.67	67.00	70.66
Fairly prepared	64.41	60.69	60.42	61.80
Less prepared	65.20	47.00	66.83	59.80
Column Mean	69.98	57.42	64.75	-

Extent of preparation and achievement on DRT seemed to be positively related as evidenced by the increase in the average mean according to the extent of preparation. The well prepared achieved the highest mean of 70.66, followed by the fairly prepared having a mean of 61.80 and the less prepared having 59.89 as their mean.

As for the methods of study the indication was reverse than the one on IRT that is students achieved least as

indicated by a mean of only 57.42 when PLM was used for self study, achieved a higher mean of 64.75 when it was used as an aid but the highest mean of 69.98 was achieved by those treated under conventional method of study. Of the two conditions where PLM was used, one using it as an aid was found to be more suitable than the one where it was used for self study as far as delayed retention was concerned.

The combined effect indicated that well prepared and fairly prepared students gained highest mean of 80.33 and 64.41 respectively under conventional method of study. Well prepared were benefited by use of PLM as an aid as indicated by a mean of 67.00 then its use for self study as indicated by a mean of 64.67. The fairly prepared achieved almost equal mean under both the conditions where PLM was used for self study and as an aid. However, the less prepared were benefited more by the use of PLM as an aid to conventional method of study than with the conventional method alone as indicated by means of 66.83 and 65.20 under these two conditions. They were least benefited by its use for self study as there is a very poor mean of 47.00 as it is on the delayed retention test.

Conclusions

1. The delayed retention test scores of the sample under study varied significantly on the basis of methods of study indicating that methods of study

FIG. 12 SUITABILITY OF METHODS ACCORDING TO PREPARATION

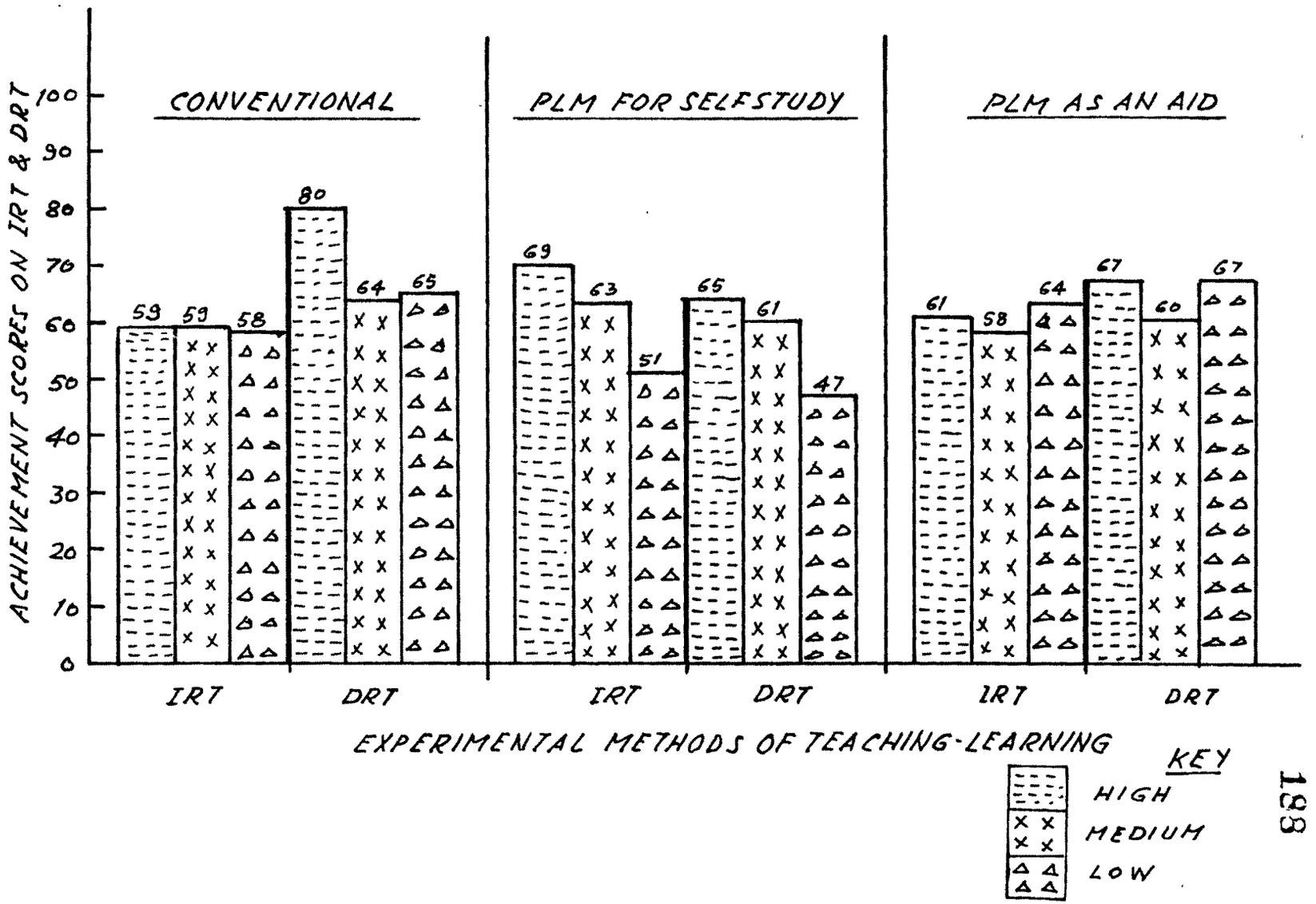
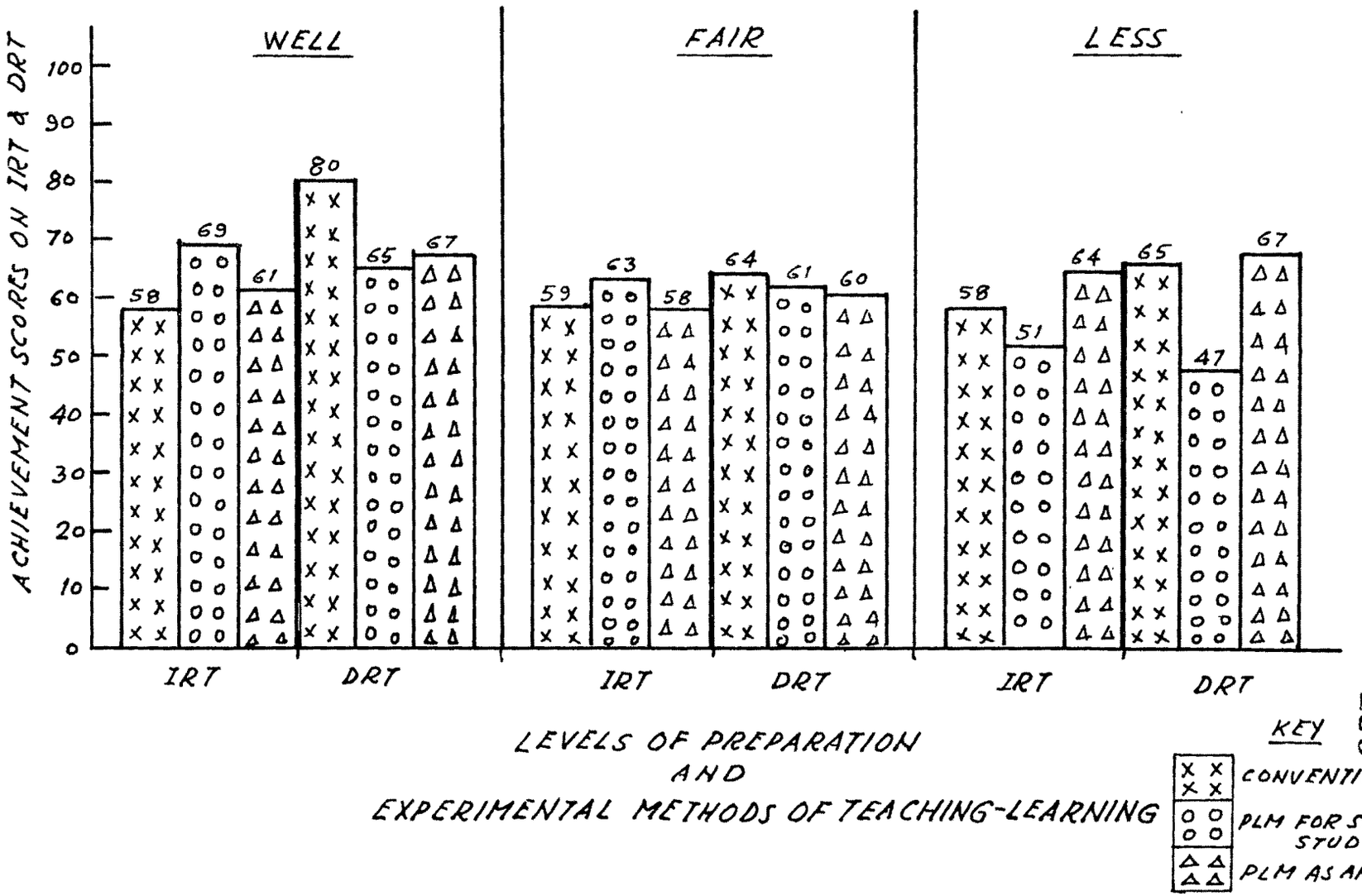


FIG. 13 EFFECT OF PREPARATION ON IRT AND DRT



independently affected these variations. The extent of preparation alone as well as when combined with the methods did not significantly affect these variations.

2. There was a positive relation between the extent of preparation and achievement on DRT. The scores on DRT increased as the level of preparation increased.

3. The influence of methods of study was found to be in reverse order when compared to its effect on IRT. In that the scores increased as conventional method was used with combination or independently.

4. The combined effect revealed that well prepared students were benefited by use of conventional method whereas less prepared were benefited by use of PLM as an aid to conventional method of study as far as delayed retention was concerned.

PART III

Effect of Socio-economic Status as well as adjustment to School on the IRT and DRT Scores in General

5.7 Effect of Socio-economic Status and Methods of Study on the IRT and DRT

Socio-economic status is considered an important factor which brings about variation in various types of achievements as it influences the individual in many ways. Higher socio-economic status may avail a student of many

opportunities, on the other hand lower socio-economic standard may limit it. Socio-economic status may expose a student or restrict his experience even in terms of use of various tools of teaching like books, maps, self learning aid etc.

In the present investigation the sample represented mainly the middle socio-income group. However whatever little variations among this group were found are treated to identify variations in the scores on the basis of experimental conditions combined with socio-economic status as well as independently.

3.7.1 Effect of SES and Methods of Study in the IRT Scores

It was hypothesized that there will be no significant difference in the IRT scores on account of differences in SES and methods of study independently as well as when combined.

Table 33 : Showing Results of Analysis of Variance on IRT Scores as influenced by SES and Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
SES	2	19.6309	9.6309	-	-
Method	2	157.0119	78.5059	-	-
SES X Method of study	4	190.3008	47.5952	-	-
Within	126	10469.4375	83.0908	-	-
Total	134	10836.0117	-	-	-

As per table 33, it was evident that socio-economic status and methods of study did not significantly affect the variations in the immediate retention test scores independently as well as when combined.

Further examination of the data to find out whether any group of students under study scored higher mean due to their SES and methods of study independently as well as when combined revealed as per the following.

Table 34 : Distribution of Mean Scores of IRT according to SES under the Three Methods of Study

	Three Methods of Study			Row Mean
	Conven-tional	PLM for Self Study	PLM as an aid	
High	59.00	64.44	57.38	60.27
Medium	59.82	60.29	58.29	59.46
Low	87.95	60.60	61.00	59.87
Column Mean	58.92	61.74	58.59	-

As indicated in Table 34 above when the data were examined on the basis of SES, it revealed that high middle SE group achieved the highest mean of 60.27 whereas the medium and low middle SE group achieved almost equal average mean of 59.46 and 59.87 respectively.

As for the effect of methods of study independently the data indicated that use of PLM for self study resulted in

achieving highest mean of 61.74 leading to conclude that it was the most effective method of study. The students treated with conventional method independently as well as when combined with PLM, as an aid achieved almost equally as indicated by the average mean of 58.92 and 58.59 respectively.

The examination of data in terms of combined effect of SES and methods of study revealed that use of PLM for self study was most suitable for the high and the medium socio-economic group of students as they scored a mean of 66.44 and 60.29 respectively under this method. The higher socio-economic group achieved better as compared to the medium socio-economic group. Both of these groups were almost equally benefited by use of conventional method of study in which the mean score for these two groups were 59.00 and 59.82 respectively. As for use of PLM as an aid the medium socio-economic group scored a higher mean of 58.29 than the high socio-economic group who scored a mean of 57.38 only. The low socio-economic group were benefited more by use of conventional method of study as they achieved a higher mean of 87.95 under it. Among the two methods where PLM was used the use of PLM as an aid was found to be more beneficial than its use for self study as indicated by the means of 61.00 and 60.60 as far as immediate retention test scores were concerned for this SES group.

Conclusions

1. The findings lead to conclude that SES and method of study did not affect the variations in the immediate retention test scores independently as well as when combined.

2. As for the effect of SES alone those with high socio-economic status achieved better average mean compared to those in medium and low socio-economic status.

3. As for the methods of study independently the use of PLM for self study was found to be more suitable. The other two methods were found to be equally suitable to the sample under study as far as immediate retention was concerned.

4. The combined effect of the methods of study with the SE status indicated that the students of high and medium socio-income group achieved better when they used PLM for self study. Whereas the students from low middle socio-income group achieved highest score on immediate retention test under conventional method of study.

5. Use of PLM as an aid was found to be more suitable when compared to its use for self study for the lower middle SE group of students.

5.7.2 Effect of SES and Methods of Study on the DRT Scores

It was hypothesized that there will be no significant difference in the DRT scores on account of differences in SES and methods of study independently as well as when combined.

Table 35 : Showing the Results of Analysis of Variance on DRT as influenced by SES as well as Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
SES	2	19.000	000.15000	-	-
Methods	2	1290.3125	645.1563	2.7080	-
SES and Methods of Study	4	587.3750	146.8437	-	-
Within	126	30017.8125	238.2300	-	-
Total	134	31914.5000	-	-	-

As indicated in Table 35 above the calculated F value of 2.7080 for methods of study independently was not found to be significant. The analysis indicated that the socio-economic status and methods of study independently as well as when combined did not affect the variations in delayed retention test scores.

However further examination of the data to find out which group of students on the basis of their mean score according to SES and methods of study alone as well as when combined varied in their DRT scores revealed as per the following table :

Table 36 : Distribution of Mean Scores on DRT according to SES under the Three Methods of Study

	Three Methods of Study			Row Mean
	Conven-tional	PLM for Self Study	PLM as an aid	
High	58.25	63.38	63.38	61.69
Medium	66.45	56.00	62.76	61.79
Low	66.79	58.67	60.88	62.11
Column Mean	63.83	59.35	62.34	

The examination of means according to SES as indicated in Table 36 above revealed that as the SES decreased the average mean increased. The low middle socio-economic group of students achieved the highest average mean of 62.11 followed by the medium and the high middle socio-income group students having a mean of 61.79 and 61.69 respectively.

The effect of methods of study revealed that students treated under conventional method of study achieved highest average mean of 63.83. Among those treated with PLM those using it as an aid scored higher mean of 62.34 than those using it for self study scoring 59.35 as an average mean.

The combined effect of SES and methods of study revealed that the high middle socio-income group of students were highly equally benefited by use of PLM for self study as well

as an aid as far as delayed retention was concerned as indicated by their mean score of 63.38 compared to that of 58.25 under conventional method.

The medium and low middle socio-income group of students were highly and almost equally benefited by use of conventional method of study as indicated by their means of 66.45 and 66.74 respectively. As for use of PLM they were benefited more by its use as an aid than for self study. In that the middle middle socio-income group achieved better mean of 62.70 compared to the low middle socio-income group of students. On the other hand its use for self study was found to be beneficial to the low middle socio-income group students having a mean of 58.67 as against the other group of students having a mean of fifty six only.

Conclusions

1. The socio-economic status and methods of study independently as well as when combined did not affect the variation in the delayed retention test scores.
2. As for the effect of SES it indicated that as the SES decreased the average mean score increased.
3. In case of the methods of study the score decreased with use of PLM as an aid to conventional method than for self study alone. Those under conventional method of study scored the highest average mean.

FIG. 14 SUITABILITY OF METHODS ACCORDING TO SES

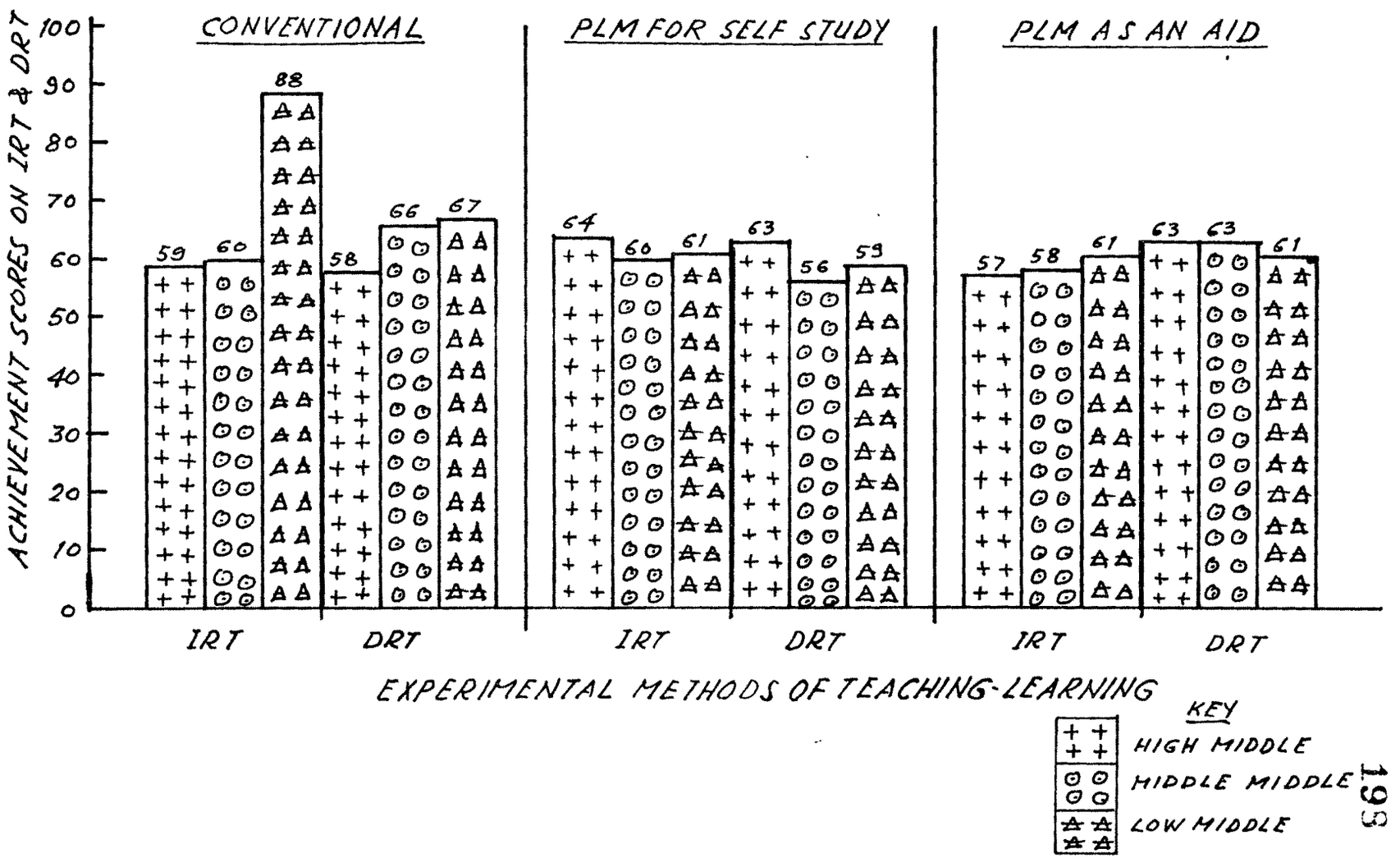
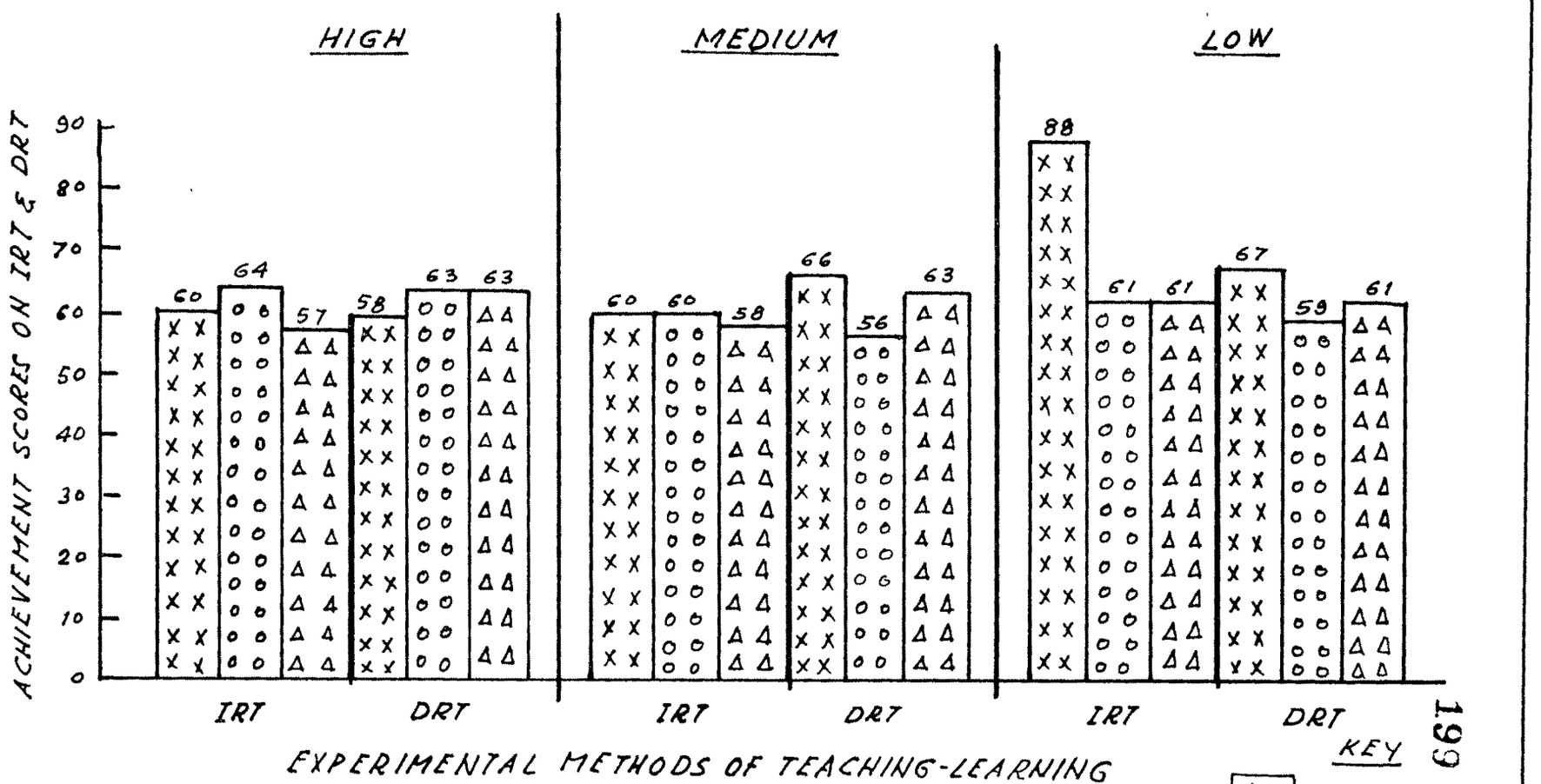


FIG. 15 EFFECT OF SES ON IRT AND DRT



200

4. The combined effect revealed that the high middle income group of students were highly equally benefited by use of PLM for self study as well as an aid.

5. The middle and low middle socio-income group students were highly equally benefited by use of conventional method of study.

6. As for use of PLM, its use as an aid was found to be more beneficial to the medium as well as low middle income group students as compared to its use for self study. In this, the former achieved higher average mean than the later. It was reverse in case of use of PLM for self study.

5.8 Effect of Adjustment to School and Methods of Study

Adjustment to the School in Life of a Student is one of the important factors which may affect the performance of students under various conditions. It may also affect the immediate as well as delayed performance. In the present investigation the school adjustment of the students was thought of as one indicated by number of years spent in the school.

The school in which the investigation was undertaken had students belonging to two main categories. There were students who were in the school from 5th standard that is those who spent about four years in the school when this experiment was conducted. There were also some students who

were enrolled in this school in Vth standard that is they had spent only a year in this school. It was assumed that those who spent over four years in the school were well adjusted to the school and its environment - both social as well as physical. Those who spent only a year were considered as those who were less adjusted to it.

As no special tool was prepared or a standardized tool was used to study the level of adjustment, the findings and their interpretations in this section are restricted only to the conditions mentioned above.

The effect of school adjustment was studied only in terms of the two experimental conditions in which PLM was used namely PLM for self study and PLM as an aid.

5.8.1 Effect of Adjustment to School and Methods of Study on IRT Scores

It was hypothesized that the immediate retention scores of the sample under study will not vary as a function of their adjustment to school and the two experimental methods of study independently as well as when combined.

Table 37 : Showing the Results of Analysis of Variance on IRT Scores as influenced by Adjustment to School as well as the Three Methods of Study

Source	df	SS	MSS	F-Value	Level of Confidence
Adjustment	1	585.1855	585.1855	8.2678	.01
Methods of Study	1	144.6230	144.6230	2.0433	-
Adjustment X Methods of Study	1	1185.6895	1185.6895	16.7520	.01
Within	86	6087.000	70.7791	-	-
Total	69	8002.4961	-	-	-

The calculated F value of 8.2675 for adjustment to school was found to be highly significant, indicating that IRT scores of the sample under study varied significantly due to other adjustment in school independently.

The calculated F value of 2.0433 was not found to be significant indicating that the IRT scores of the sample under study did not vary on account of their methods of study.

However the combined effect of adjustment to school and methods of study was found to be very highly significant as indicated by the calculated F value of 16.7520 which was much higher than the table F value at the given degrees

of freedom. This indicated that students under study varied significantly in their IRT scores due to their level of adjustment to school under the two methods of study.

Thus, the hypothesis that the immediate retention test scores of students under study will not vary as a function of their adjustment to school independently as well as when combined with their methods of study was rejected.

In order to find out which group of students on the basis of their adjustment to the school and methods of study independently as well as combined scored higher average mean, When data were examined, it revealed as per the following :

Table 38 : Distribution of Mean Scores on IRT according to the School Adjustment under the Two Methods of Study

Adjustment	Two Methods of Study		Row Mean
	PLM for Self Study	PLM as an aid	
Well adjusted	67.17	57.84	62.50
Adjusted	54.82	60.05	57.43
Column Mean	60.99	58.94	-

As per the Table 38 above the well adjusted students scored higher average mean of 62.50 than the less adjusted students having an average mean of 57.43 only when the same was compared on the basis of school adjustment.

As per the methods of study those who used PLM for self study scored a higher mean of 60.99 as compared to the mean of 58.94 scored by those using it as an aid.

The combined effect of school adjustment and methods of study revealed that well adjusted students were benefited by use of PLM for self study as they scored a much higher mean of 67.17 under this method than the mean of 57.84 scored under the other method where PLM was used as an aid.

On the other hand the less adjusted were benefited more by use of PLM as an aid as they scored a higher mean of 60.05 under this method than the mean score of 54.82 scored under the other method.

Conclusions

scores

1. The immediate retention test of the sample under study was significantly affected by their level of school adjustment independently as well as when combined with their methods of study. However, methods of study independently did not influence the variations in their IRT scores.
2. The well adjusted students scored better than the less adjusted students, and
3. The students using PLM for self study scored better than those using it as an aid as far as IRT scores were concerned.

4. However, the combined effect indicated that the well adjusted students found use of PLM for self study more suitable than its use as an aid. The reverse was true for the less adjusted students.

5.8.2 Effect of Adjustment to School and Methods of Study on DRT Scores

It was hypothesized the DRT scores of the sample under study will not vary as a function of school adjustment and methods of study independently as well as when combined.

Table 39 : Showing the Results of Analysis of Variance on DRT Scores as influenced by Adjustment to School as well as Methods of study

Source	df	SS	MSS	F-value	Level of Confidence
Adjustment	1	933.2883	933.2883	3.9862	.05
Methods of Study	1	230.1638	230.1638	-	
Methods X Adjustment	1	751.0862	751.0862	3.2080	
Within	86	20134.9375	234.1272		
Total	89	22049.4727	-	-	

As indicated in Table 39 the calculated F value of 3.9862 for the school adjustment was found to be significant, indicating that the DRT scores of the sample under study

varied significantly due to their school adjustment independently.

The effect of methods of study alone as well as when combined with their school adjustment was not found to be significant as indicated by the calculated F value of 1.072 and 3.2080 respectively. This indicated that the methods of study independently as well as when combined with the school adjustment did not influence variations on DRT scores of the sample under study.

The null hypothesis that the DRT scores of the sample under study will vary due to their school adjustment was rejected. This indicated that school adjustment independently influenced the variations in DRT scores.

When data were further examined to find out which of the group of students under study varied in their DRT scores as indicated by mean due to methods of study and school adjustment independently as well when combined, it indicated the following :

Table 40 : Distribution of Mean Scores on DRT according to School Adjustment and the Two Methods of Study

Adjustment	Two Methods of Study		Row Mean
	PLM for Self Study	PLM as an aid	
Well adjusted	64.09	61.88	62.98
Less adjusted	51.86	61.25	56.65
Column Mean	57.97	61.56	-

The above table indicated that the well adjusted students scored higher average mean of 62.98 when compared to the mean of 56.65 scored by the less adjusted students.

The students under study scored a higher average mean of 61.56 when PLM was used as an aid than the mean of 57.97 which was scored under the methods where PLM was used for self study. This indicated that in general the use of PLM as an aid was more suitable than its use for self study.

The combined effect of school adjustment and methods of study indicated that the well adjusted students were benefited by use of PLM for self study (64.09) than its use as an aid (61.88). However the less adjusted students scored a higher mean of 61.25 when PLM was used as an aid than the mean of 51.86 when it was used for self study. The well adjusted and less adjusted students scored almost equal mean when PLM was used as an aid.

Conclusions

1. The delayed retention test scores varied significantly due to the school adjustment independently. The methods of study alone as well as when combined with their level of adjustment to school did not influence variations on DRT Scores.
2. The well adjusted students achieved better than the less adjusted.
3. The students found use of PLM as an aid more suitable than its use for self study.

FIG. 16 SUITABILITY OF METHODS ACCORDING TO ADJUSTMENT

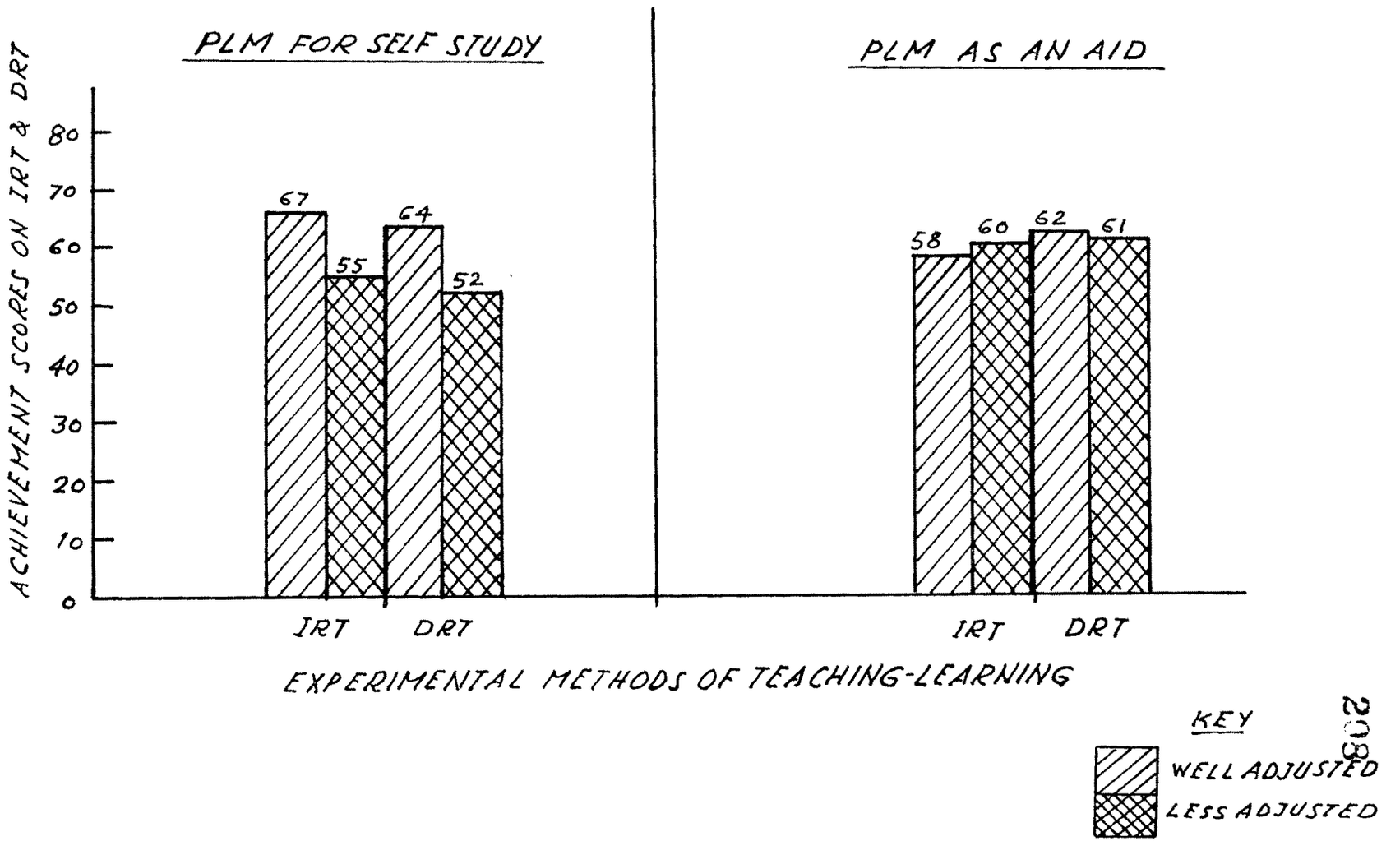
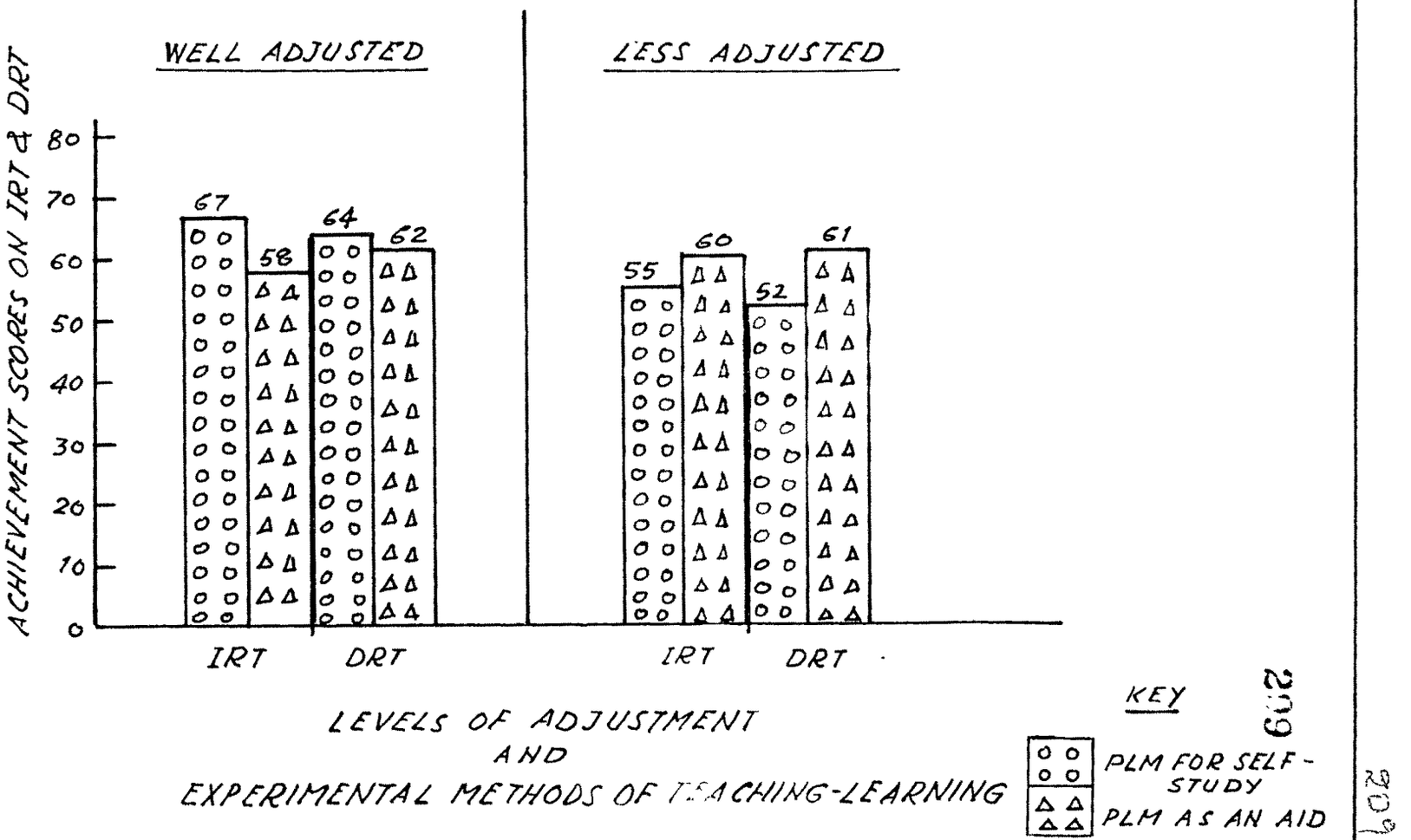


FIG. 17 EFFECT OF ADJUSTMENT ON IRT AND DRT



210

4. The combined effect of school adjustment and methods of study indicated that use of PLM for self study was most suitable for well adjusted students. The less adjusted students were benefited by its use as an aid. They achieved almost equally under this method as indicated by their means as far as delayed retention was concerned.

PART IV

5.9 Time Taken as Factor Affecting Variations in the Achievement Scores of IRT and DRT in General as well as Those on Subjective and Objective Items as Particular

Time taken to go through PLM and its effect on the achievement score are considered important aspects of studies in the area of programmed learning. One of the important characteristics of PLM stressed by those who advocate its value in teaching-learning situations is that it reduces considerably the time taken by students to master the desired content as compared to other methods of study. They further indicated that it allows students with varying capacities not only to study at their own speed but such a study may lead to increase in their achievement score on the retention test.

In the present investigation the time taken to study the selected content by students under conventional method of

study was kept constant. The variations in time taken to study were noted only in case of the two experimental conditions in which PLM was used for self study as well as an aid to conventional method of study.

The variations in the immediate as well as delayed retention test scores in general as well as specifically in terms of subjective and objective items of IRT and DRT are discussed in relation to the two experimental conditions only on the following pages.

5.9.1 Effect of Time Taken and Methods of Study on the Variations of Scores on IRT

It was hypothesized that the immediate retention test scores will not vary as a function of time taken and methods of study independently as well as when combined. The two way analysis of variances on the basis of time taken and methods of study revealed as per the table presented below :

Table 41 : Showing the Results of ANOVA for IRT Scores on Account of Time Taken and Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Time taken	1	766.09	766.09	9.36	.01
Methods	1	31.21	31.21	-	
Methods & Time taken	1	81.72	81.72	1.001	
Within	86	7040.03	81.89		
Total	89	8018.00	-	-	

As per the data presented above the calculated F value of 9.36 for time taken was found to be highly significant when compared to the table F value at .01 level of confidence. However, the calculated F value of 1.001 for interaction was not found to be significant. The data thus indicated that as far as immediate retention was concerned time taken by students to study the content was mainly responsible for the variations of the scores on immediate retention test. Methods of study independently as well as when combined with the time taken did not significantly affect the variation of scores on IRT.

The null hypothesis that the immediate retention test scores of the students under study will not vary as a function of time taken was therefore rejected.

Further analysis, to check which of the group of students on the basis of time taken as well as methods of study scored higher mean scores, revealed as per the following :

Table 42 : Distribution of Mean Scores on IRT according to Time taken under the Two Methods of Study

Time taken	Two Methods of Study		Row Mean
	PLM for Self Study	PLM as an aid	
More time taken	64.07	61.10	62.59
Less time taken	56.06	57.00	56.53
Column Mean	60.06	59.05	-

The data presented in the above table indicate that the students who took more time to go through the content of study achieved average mean score of 62.59 than those who took less time and achieved an average mean of 56.53 only. As for the methods of study the table revealed that students using PLM for self study scored a little higher average mean (60.06) than those using it as an aid (59.05) as far as the immediate retention test scores were concerned.

The combined effect of time taken and the methods of study revealed that students taking more time achieved better mean scores under both the experimental conditions. In this, those treated with PLM for self study scored higher mean of 64.09 than those who used it as an aid having a mean score of 61.10 only.

The data presented for those who took less time indicated that those who were treated with PLM as an aid scored a mean of 57.00 which was higher than the mean of 56.06 scored by those who were treated with PLM for self study. The data thus indicated that use of PLM as an aid takes less time to study the content and results in better achievement as far as immediate test was concerned. Whereas use of PLM requires more time but results in much higher achievement when compared to those taking higher time and using it as an aid. It has indicated the suitability of PLM as a self

study method as well as an aid for those who require more time to go through it in order to achieve better scores on IRT. However, the results indicated that its use as an aid resulted in better achievement through lesser consumption of time as far as IRT was concerned.

Conclusions

1. The IRT scores of the sample under study varied significantly due to time taken independently. The methods of study alone as well as when combined with time taken did not affect these variations.

2. Those students who took more time scored better than those who took less time.

3. The use of PLM for self study was found to be more suitable than its use as an aid as far as immediate retention was concerned.

4. As for the combined effect of time as well as methods of study that students taking more time were more benefited by use of PLM for self study as well as an aid than those who took less time.

5. Those taking less time were benefited more when PLM was used as an aid.

5.9.1.1 Effect of Time Taken and Methods of Study on Subjective Items of IRT

Time spent on learning the content presented was considered as an important factor. The scores on subjective

items on IRT required construction of answer by oneself. Time taken to study the content presented was thus thought as an important element which may affect understanding of a given content and constructing an answer for subjective items.

It was hypothesized that the immediate retention test scores on subjective items of IRT will not vary as a function of time taken and methods of study independently as well as when combined.

Table 43 : Showing the Results of ANOVA for Scores obtained on Subjective Items on IRT as influenced by Time Taken and the Two Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Time Taken	1	1090.50	1090.50	6.27	.05
Method	1	71.81	71.81	-	
Time taken and Method	1	5.07	5.87	-	
Within	86	14953.38	173.88	-	
Total	89	16052.94	-	-	

As shown in the Table 43 above the calculated F value of 6.27 for time taken was found to be significant at .05 level of confidence when compared to the table F value. This

led to conclude that the variations in scores on subjective items of IRT were mainly due to time taken alone. The calculated F values for methods of study independently as well as when combined with time taken were not found to be significant. This indicated that methods of study independently as well as combined with time taken did not affect the variations of scores on subjective items of IRT.

The null hypothesis that the immediate retention scores of subjective items of the test will not vary on account of time taken for study was rejected.

Further analysis to check which group of students on the basis of time taken and methods of study scored highest average mean revealed as per the following table.

Table 44 : Distribution of Mean Scores on Subjective Items of IRT according to Time Taken under Two Methods of Study

Time Taken	Two Methods of Study		Row Mean
	PLM for Self Study	PLM as an aid	
More time taken	41.93	43.20	42.56
Less time taken	34.19	36.40	35.29
Column Mean	38.06	39.80	

Examination of the data presented above indicated that students taking more time scored higher average mean

score of 42.56 as compared to the average mean of 35.29 scored by those taking less time. The students who used PLM as an aid scored little higher (39.80) than those who used it for self study (38.06) when data were checked for the independent effect of methods study on the subjective items of IRT.

The combined effect of time taken and methods of study revealed that students use of PLM as an aid resulted in scoring higher means of 43.20 and 36.40 in case of those taking more time as well as less time in going through the content as far as subjective items on IRT were concerned. In general those taking more time to go through the content scored higher mean of 41.93 and 43.20 under both the experimental methods, namely use of PLM for self study and its use as an aid, respectively. This led to conclude that use of PLM both for self study and as an aid is more suitable for scoring high on subjective items when more time is available. However, its use as an aid results in higher achievement even when less time is spent on learning the content.

Conclusions

1. The IRT scores on subjective items were found to be varying significantly due to time taken, indicating that time factor was responsible for these variations independently. The methods of study alone as well as when combined with time taken did not influence these variations.

2. The students taking more time scored higher mean on subjective items than those taking less time.

3. Use of PLM as an aid was found to be more beneficial than its use for self study.

4. The combined effect of time taken and methods of study revealed that students taking more time found PLM as well as for self study as an aid more suitable than those taking less time as far as an aid more suitable than those taking less time as far as they scores on subjective items of IRT were concerned.

5.9.1.2 Effect of Time Taken and Methods of Study on Objective Items of IRT

Response on objective items call for recall and recognition of facts presented in textual body. In the linear form of programme usually the criterion frames call for responses on objective items. In the present investigation too, the criterion frames of the programmes called for response to the objective items. The investigator was interested in examining the effect of time taken to go through the content on the IRT as well as DRT scores of the objective items of these tests.

It was hypothesized that the immediate retention scores on objective items of the test will not vary as a function of time taken and methods of study.

Table 45 : Showing Results of ANOVA for Scores obtained on Objective Items of IRT as influenced by the Time taken and Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Time taken	1	50.34	50.34	-	-
Methods	1	787.84	789.84	5.33	.05
Methods and Time taken	1	9.03	9.03	-	-
Within	86	798.93	147.58		
Total	89	13491.56			

As per the Table 45 above the calculated F value of 5.33 according to the methods of study was found to be significant at .05 level of confidence. However no significant difference in the IRT scores was indicated due to the time taken alone as well as when combined with the methods of study. The data, therefore, led to conclude that methods of study independently affected the variation on objective items of IRT. The time taken alone as well as when combined with methods of study had absolutely no effect on these variations.

The null hypothesis that the immediate retention scores on the objective items by the test will not vary due to methods of study was thus rejected.

Further analysis of data to study the differences in average mean scored achieved an objective items of IRT on the

220

basis of time taken and methods of study revealed as per the following :

Table 46 : Distribution of Mean Score on Objective Items of IRT on the Basis of Time Taken and Two Methods of Study

Time Taken	Two Methods of Study		Row Mean
	PLM for Self Study	PLM as an aid	
More time taken	59.21	65.85	52.53
Less time taken	58.38	63.68	61.03
Column Mean	58.79	64.74	

Interestingly enough the data presented in the above Table 46 indicated that students taking less time scored highest average mean of 61.03 on the objective items of IRT when compared to the average mean of 52.53 scored by these taking more time. When the effect of methods of study on the average mean was studied it was found that students using PLM as an aid achieved much higher average mean (64.74) than those who used PLM for self study (58.79), indicating suitability of PLM as an aid for better scores on objective items of IRT.

The combined effect of methods of study and time taken revealed that students taking more time as well as less time scored high means when PLM was used as an aid. It further indicated that those taking more time under this method scored

higher mean of 65.85 as compared to those taking less time scoring a mean of 63.68. In case of those using it for self study very little difference in the means of those taking more time (59.21) and less time (58.38) was indicated.

Conclusions

1. The IRT scores on objective items were found to be significantly varying due to the methods of study, indicating that methods of study independently affected the variations in the scores obtained on the objective items of IRT. Time taken independently as well as when combined with the methods of study did not affect these variations.

2. Interestingly enough the data revealed that the students taking less time achieved better on objective items of IRT when compared to the achievement of those taking more time.

3. Use of PLM as an aid was found to be more suitable and its use for self study as far as the scores of objective items of IRT were concerned.

4. The use of PLM as an aid was found to be more suitable to the students taking more time as well as less time. In that those taking more time achieved better than those taking less time as far as scores on objective items of IRT were concerned.

5.9.2 Effect of Time Taken and Methods of Study on Variations of DRT Scores

When data were analysed to study the effect of time taken and methods of study on the delayed retention test scores, it revealed as per the following.

It was hypothesized that the delayed retention test scores will not vary as a function of time taken and methods of study independently as well as when combined.

Table 47 : Showing Analysis of Variance for DRT Scores as influenced by Time Taken and Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Time taken	1	445.88	445.88	1.81	-
Methods of Study	1	417.94	417.94	1.70	-
Methods X Time taken	1	188.43	188.43	-	-
Within	86	908.23	246.34	-	-
Total	89	22093.25	-	-	-

As indicated in Table 47 above the calculated F value of 1.81 and 1.70 for time taken and methods of study were not found to be significant. This indicated that the time taken as well as methods of study independently as well as

when combined together do not affect the variations in DRT scores of the sample of study.

When data were further examined to check whether the group under study varies according to mean on the basis of time taken and methods of study independently as well as when combined it indicated as per the following :

Table 48 : Distribution of Mean Scores on DRT according to time taken under the Two Methods of Study

Time taken	Two Methods of Study		Row Mean
	PLM for Self Study	PLM as an aid	
More time	60.83	62.55	61.69
Less time	53.19	60.84	57.01
Column Mean	57.01	61.69	-

The Table 48 indicates that those taking more time scored a higher mean of 61.69 as compared to a mean of 57.01 scored by those taking less time. Among the methods of study using PLM, the one where PLM was used as an aid was found to be more beneficial than the one where it was used for self study as evidenced by the average mean of 61.69 and 57.01 respectively.

The combined effect of time taken and methods of study on DRT scores revealed that those who took more time scored

a higher mean of 62.55 when compared to the mean of 60.83 under the method where PLM was used for self study.

Those taking less time also found its use as an aid more beneficial as indicated by a mean of 60.84 over a mean of 53.19 when PLM was used for self study. The means of those taking more time while using PLM for self study and those taking less time and using PLM as an aid were almost equal leading to conclude that in less time the students could achieve the same score achieved by those taking more time when PLM was used as an aid.

Conclusions

1. The DRT scores of sample under study did not vary on account of time taken and methods of study independently as well as when combined.

2. Those taking more time achieved better than those taking less time.

3. Use of PLM as an aid was more suitable in general as well as specially for both the groups. It helped those taking less time achieve a mean almost equal to that achieved by those taking more time under the method where PLM was used for self study.

5.9.2.1 Effect of Time taken and Methods of Study on the Subjective Items of DRT

It was hypothesized that the scores on subjective items of DRT will not vary as a function of time taken and

methods of study independently as well as when combined.

Table 49 : Showing Analysis of Variance for the Scores on Subjective Items of DRT as influenced by Time Taken and Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Time taken	1	271.34	271.34	-	-
Methods of study	1	720.64	720.64	2.42	-
Methods X Time taken	1	0.09	0.09	-	-
Within	86	29520	343.26	-	-
Total	89	16025.94	-	-	-

As indicated in Table above when the calculated value of 2.42 for methods of study was compared to the table F value at the given degrees of freedom, it was not found to be significant indicating that the DRT scores on subjective items did not vary as a function of methods of study.

Further examination of data to check which group of students according to time taken and methods of study independently as well as when combined scored, better mean, it revealed as per the following :

Table 50 : Distribution of Mean Score on Subjective Items of DRT according to Time Taken under Two Methods of Study

Time Taken	Two Methods of Study		Row Mean
	PLM for Self Study	PLM as an aid	
More time	38.14	32.40	35.27
Less time	34.63	28.80	31.72
Column Mean	36.38	30.60	

In general the achievement scores on the subjective items of DRT were found to be very low. However examination of the above table reveals that students taking more time could score at least a passing mean of 35.27. On the other hand those taking less time scored an average mean of 31.72 which was less than the one required for passing.

As for the method used of PLM for self study was found to be more suitable as far as scores on subjective items of DRT were concerned. Those using PLM for self study scored a higher mean of 36.38 as against those using it as an aid having scored on 30.60.

When the combined effect of time taken and methods of study was checked, the data revealed those who took more time scored highest mean of 38.14 under the method

where PLM was used for self study and those taking less time too scored a higher mean of 34.63 when compared to a mean of 28.80 scored by those using it as an aid. In this those taking more time scored a higher mean of 32.40 than those taking less time.

Conclusions

1. The sample under study did not vary significantly in their scores on subjective items on delayed retention test due to time taken and methods of study independently as well as when combined.

2. Those taking more time scored a higher average mean than those taking less time as far as subjective items on DRT were concerned.

3. Of the two experimental methods, use of PLM for self study was found to be more suitable than its use as an aid in case of scores on subjective items of DRT.

4. As to the combined effect its use for self study was found to be more beneficial to both taking more time as well as less time. Its use as an aid was beneficial to those taking more time when compared to those taking less time.

5.9.2.2 Effect of Time Taken and Methods of Study on Objective Items of DRT

It was hypothesized that the DRT scores on the objective items achieved by the sample under study will not

vary as a function of time taken and methods of study independently as well as when combined.

Table 51 : Showing Results of Analysis of Variance for DRT Scores on Objective Items as influenced by Time Taken and Methods of Study

Source	df	SS	MSS	F-value	Level of Confidence
Time taken	1	402.84	402.84	1.96	
Methods of Study	1	484.47	484.47	2.36	
Methods X Time taken	1	20.66	20.66	-	
Within	86	17688.75	205.68	-	
Total	89	18448.69	-	-	

As evidenced in the above Table 51 the calculated F values of 1.96 and 2.36 for time taken and methods of study was not found to be significant as far as DRT scores on objective items were concerned. This lead to conclude that the DRT scores of the sample under study on the objective items did not vary as a function of time taken and methods of study independently as well as when combined.

Further examination of data to check whether any group of students on the basis of their mean achieved better on objective items of DRT due to time taken and methods of

study independently as well as when combined, the data revealed as per the following :

Table 52 : Distribution of Mean Scores on Objective Items for DRT according to Time Taken and Methods of Study

Time Taken	Two methods of Study		Row Mean
	PLM for Self Study	PLM as an aid	
More time	62.62	66.45	64.53
Less time	57.25	63.08	60.16
Column Mean	59.93	64.76	

overall
The [illegible] achievement on the objective items on DRT was good. As evidenced in Table 52 above those taking more time achieved a higher average mean of 64.53 as against a mean of 60.16 achieved by those taking less time.

As for the methods of study, those using PLM as an aid achieved a higher average mean of 64.76 as against a mean of 59.93 achieved by those using it for self study.

The combined effect revealed that those taking more time scored highest average mean of 66.45 when they used PLM as an aid. They scored a mean of 62.62 when they used it for self study. Students taking less time too scored a higher mean of 63.08 when they used PLM as an aid than the mean of 57.25 achieved when PLM was used for self

FIG. 18 SUITABILITY OF METHODS ACCORDING TO TIME TAKEN

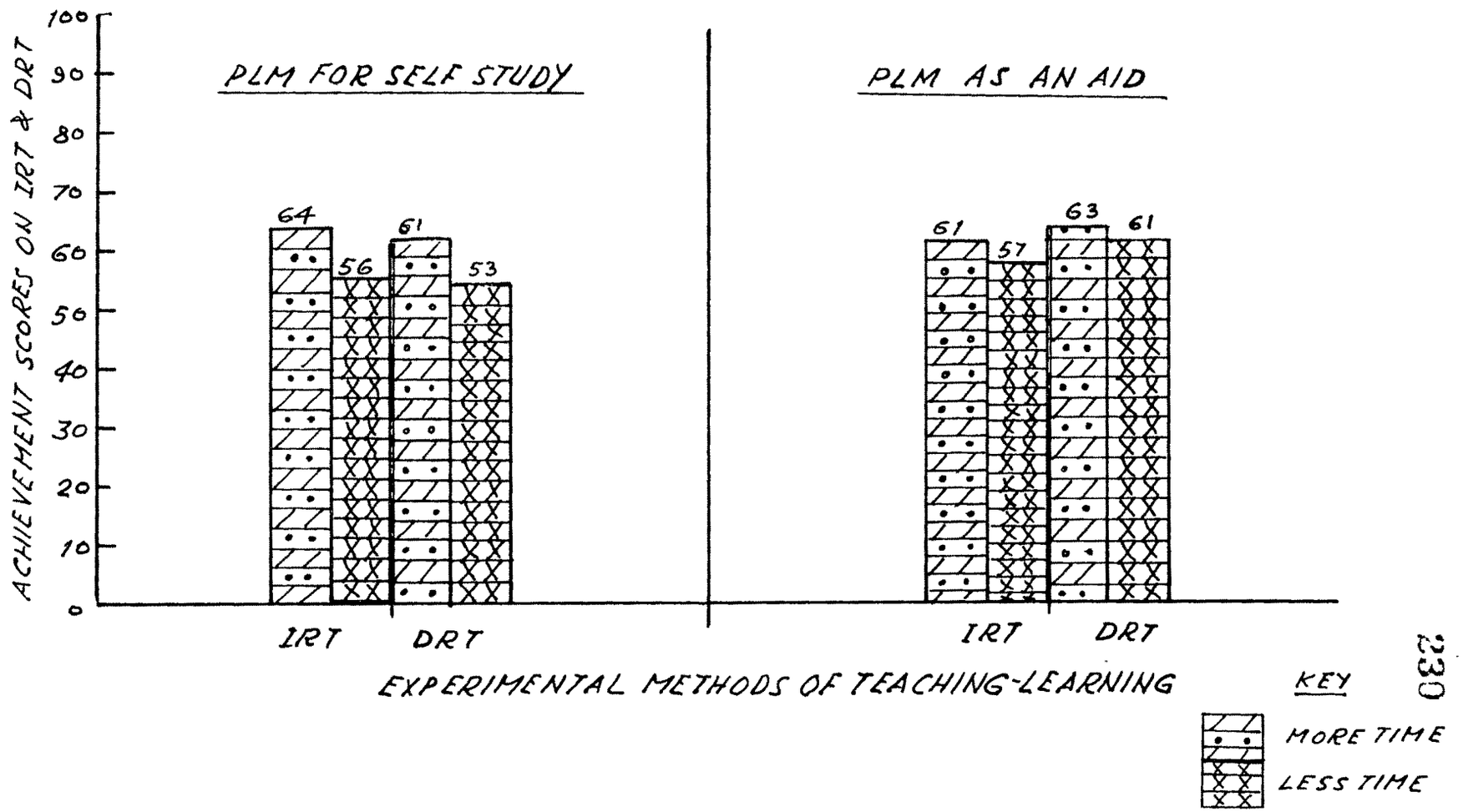
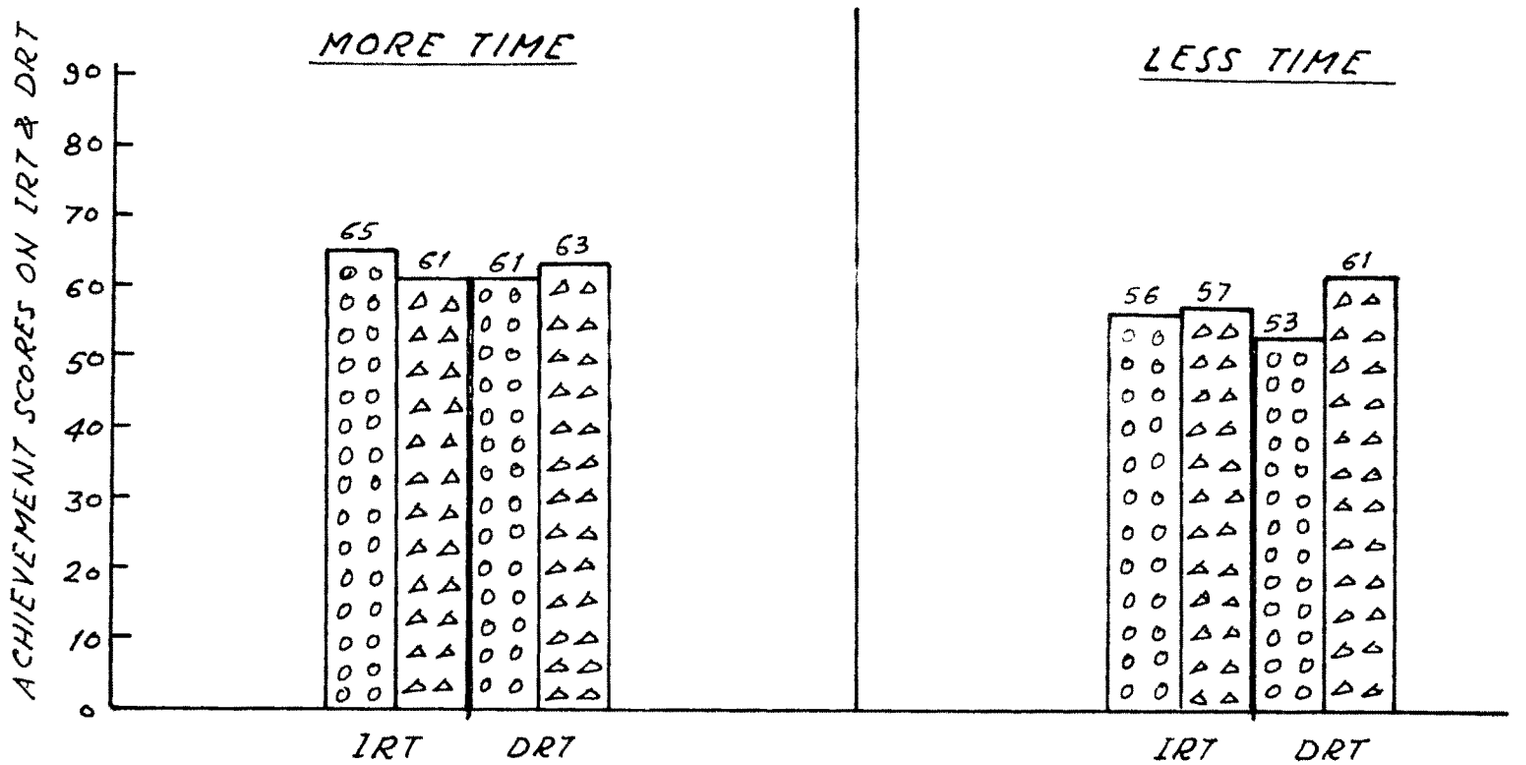


FIG. 19 EFFECT OF TIME TAKEN ON IRT AND DRT



EXTENT OF TIME SPENT
AND
EXPERIMENTAL METHODS OF TEACHING-LEARNING

KEY

PLM FOR SELF-STUDY

PLM AS AN AID

FIG.20 SUITABILITY OF METHODS ACCORDING TO TIME TAKEN ON SUBJECTIVE AND OBJECTIVE ITEM SCORES OF IRT

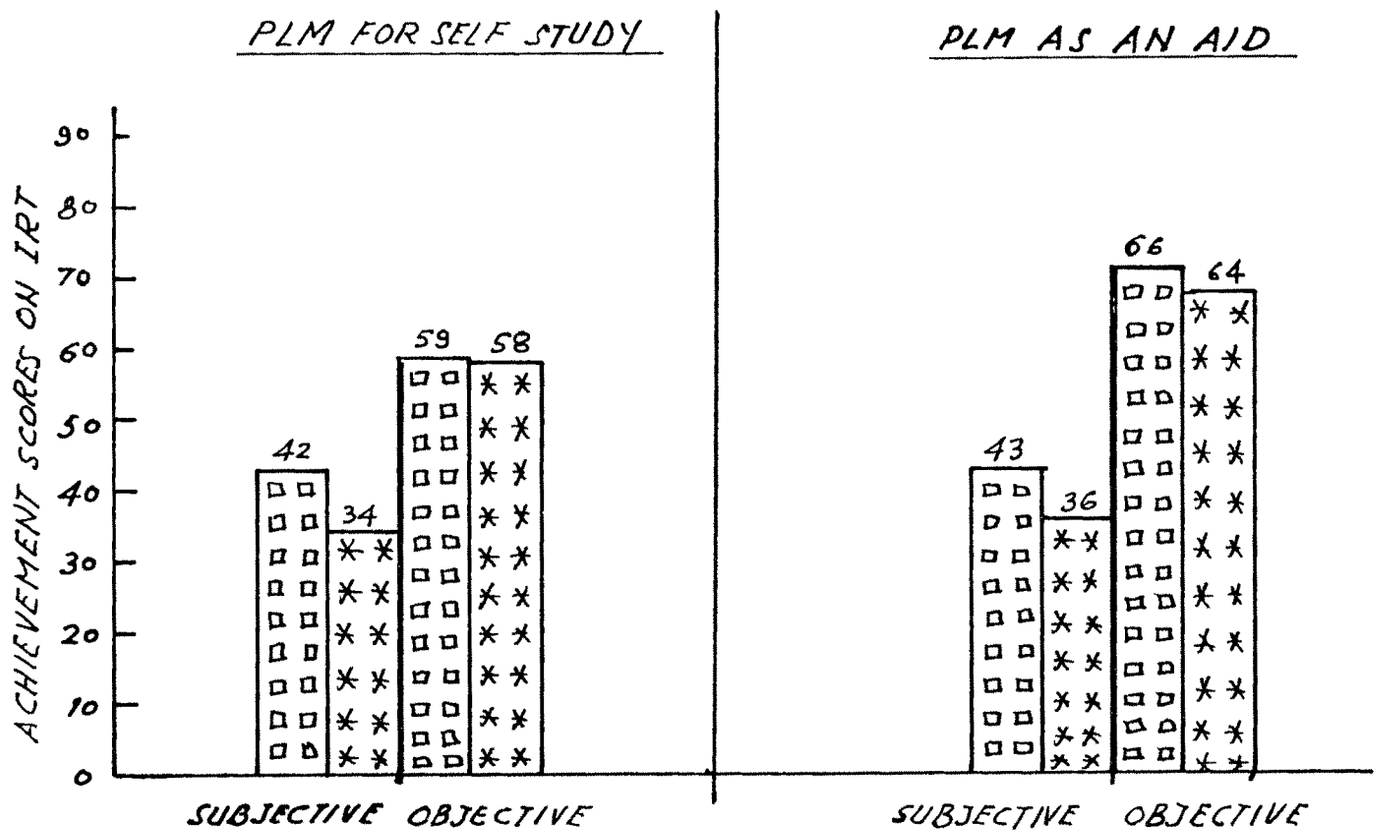
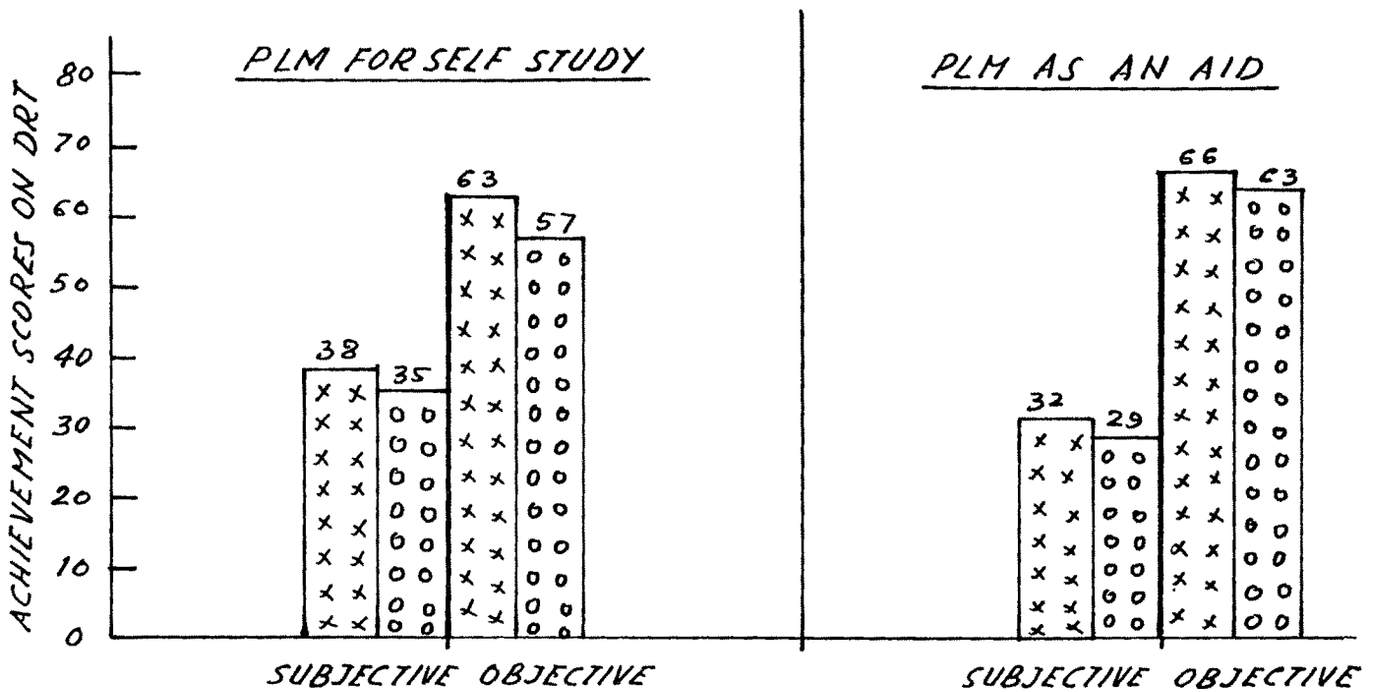


FIG. 21 SUITABILITY OF METHODS ACCORDING TO TIME TAKEN ON SUBJECTIVE AND OBJECTIVE ITEMS OF DRT



study. However this group achieved a little higher mean of 63.08 when they used PLM as an aid than those taking more time under the method where PLM was used for self study.

Conclusions

1. The DRT scores on objective items did not vary as a function of time taken and methods of study alone or when combined.

2. Those taking more time scored higher average mean than those taking less time.

3. In general use of PLM as an aid was found to be more suitable than its use for self study.

4. Those taking less time as well as more time found the use of PLM as an aid better than its use for self study, in that those taking less time achieved a higher mean when compared to a mean of those taking more time and using it for self study.

Overall Conclusions

On the basis of the findings, one can conclude that PLM is suitable for promoting Home Science Education for adolescent girls. In general, it is suitable as a self study method. In particular its use as an aid to conventional method of study is suitable for immediate retention whereas its use for self study is helpful in achieving more on

delayed retention test. As established by the findings of the present investigation use of PLM for self study as well as an aid was found to be more suitable as compared to the use of selected conventional method of study namely Lecture-cum-Discussion. Its use as an aid to conventional method of study was found to be superior to the conventional method of study alone, as far as immediate retention was concerned. Its use for self study was more suitable than conventional method of study as far as delayed retention was concerned.

Suitability of PLM for Self Study in Relation to Personality Variables

As revealed by the mean scores on immediate retention test use of PLM for self study was found to be most suitable for :

* Above average students as far as intelligence is concerned.

* The high achievers in terms of overall class achievement. The medium and low achievers too found its use for self study more suitable than conventional method or as an aid.

* The high and the medium achievers in relation to their achievement in Home Science

* The well prepared students
* The students belonging to high and middle cl SES.
* The well adjusted students.
* The students who took more time to go through it.

As revealed by the mean scores on delayed retention test, its use for self study was found to be suitable for

* The high achievers as far as overall achievement was concerned.
* The high achievers in case of achievement in Home Science.
* The students from low middle SES
* The well adjusted students
* Those taking less time to go through.

As per levels of intelligence, its use for self study was not found suitable as far as delayed retention was concerned.

Suitability of PLM as an Aid in Relation to Personality Variable

As revealed by the mean scores on immediate retention test use of PLM as an aid was found to be most suitable for

* The average students according to intelligence. Its use as an aid brought their achievement scores equal to those of the above average level using PLM for self study.

* As for the medium and low achievers according to achievement in Home Science, it was equally suitable for them when compared to the conventional method of study.

* The least prepared students.

* The students from middle middle and low middle SES.

* The less adjusted students.

* These taking less time to go through PLM.

Its use as an aid was not found to be suitable for any level of students as far as overall class achievement was concerned.

As revealed by the mean scores on delayed retention tests use of PLM as an aid was found to be suitable for :

* The above average and average students benefiting more to the average students.

* The low achievers as far as overall class achievement is concerned.

* The medium and low achievers according to achievement in Home Science.

* The least as well as well prepared students in that the later found it were suitable that its use for self study.

* The students from middle middle SES.

* The less adjusted students.

* Those taking more as well as less time

Suitability of PLM for Self Study and as an Aid according Intelligence and Time Taken as per IRT and DRT Scores on Subjective as well as Objective Items in General

As for the scores on subjective items of IRT and DRT the study revealed that use of PLM both for self study as well as

* According to intelligence use of PLM both for self study as well as an aid for scoring on subjective items of IRT was found to be more suitable when compared to the Conventional method of study. Whereas its use as an aid for the same items was found to be most suitable as far as DRT scores were concerned.

* As for DRT scores its use as an aid was found to be more suitable almost equal to that of Conventional on which the students scored highest scores.

* According to time taken use of PLM as an aid was found to be more suitable than its use for self study as far as IRT as well as DRT were concerned.

Suitability of PLM for Self Study as well as an Aid as per the IRT and DRT Scores on Subjective Items according to Intelligence and Time Taken

(A) * Extra-ordinary students found use of PLM for self study more suitable as far as IRT was concerned. For above average and average students its use as an aid was more suitable.

* As for delayed retention use of PLM as an aid was found to be more suitable for average students. The other two groups found conventional method more suitable.

239

(B) * Students taking more time found use of PLM for self study as well as an aid suitable than the conventional method of study. Those taking less time found its use as an aid more suitable as far as subjective items on IRT was concerned.

* As for DR scores students taking less time as well as more time found use of PLM for self study more suitable than its use as an aid.

Suitability of PLM for Self Study as well as an Aid as per the IRT and DRT Scores on Objective Items according to Intelligence and Time Taken

(A) * Use of PLM as an aid was most suitable for average students as it helped them score even higher than the extra ordinary students as far as objective items on IRT was concerned.

* Use of PLM as an aid was found to be most suitable for average students when they scored at par with extraordinary students under conventional method of study as far as DRT scores on objective items were concerned.

(B) * Use of PLM as an aid was found to be more suitable for both the types of students according to time taken namely those taking more time as well as those taking less time. In this those taking more time achieved better than those taking less time as far as scores on objective items of IRT were concerned.

* As for objective items on DRT students belonging to both the categories of time taken found its use as an aid more suitable. In that those taking less time achieved better mean on objective items than those taking more time.