FINDINGS

CHAPTER 4

FINDINGS

The present study was undertaken with a major objective of developing and studying the effectiveness of instructional materials used for teching children's clothing to the second year home science students. The instructional materials were prepared seperately for theory and practical sections so that both the aspects could be studied.

The sample consisted of thirtyone second year students of the Faculty of Home Science, Assam Agricultural University, Jorhat, who had registered in the year 1989. Those students who could complete the course were included in the analysis of the data and those who cculd not complete had to be omitted. Final sample consisted of 30 students.

The age of the students ranged from 18 years 11 months to 22 yrs 5 months. Almost half of the students, i.e., 14 (46.66 per cent) belonged to the age group of 20 years. The next biggest number of 10 (33.33 per cent) belonged to the age group of 21 years. Among the remaining six students, 5 (16.66 per cent) belonged to the age group of 22 years and one (3.33 per cent) to the age group of 19 years. The table below shows the distribution of students in the two groups according to age. The modal age of the sample was 20 years.

Table 4 : Distribution of sample according to age.

Age	Gr.A		Gr. B		Total	
	f	%	f	%	f	%
19 yrs.	0	0	1	3.33	1	3.33
20 yrs.	7	23.33	7	23.33	14	46.67
21 yrs.	6	20.00	4	13.33	10	33.33
22 yrs.	2	6.67	3	10.00	5	16.67
Total	15	50.00	15	50.00	30	100.00

A set of instructional material was prepared by the investigator and its effectiveness was studied by conducting experiments in the class, where one group taught by the instructional material was compared with the other taught by the conventional method. To assign the treatment to the groups, lotttery method was adopted according to which group 'A' was taught by the conventional method and group 'B' by the instructional material.

The findings of the study have been discussed in this chapter under the following major sections.

4.1 Distribution of the students according to the variables.

4.2 Overall effectiveness of the instructional material.

4.3 Effectiveness of the instructional material in relation to the selected variables.

4.4 Reaction of students towards self instructional materials.

4.5 Major findings and discussion.

4.1 Distribution of the sample according to the variables.

Thirty students were divided into two groups of fifteen students each. The two groups were comparable in intelligence with respect to the mean and standard deviation. To determine the difference in the means of the two groups 't' test was used for which the value of 't' obtained was 0.4618 which was very much lower than the tabulated value at 28 d.f. showing that the difference of 1.07 in the two means was not significant. As a result the two groups were treated as equal (table 5).

Table 5 : Mean intelligence test scores of the two groups.

	Gr.A	Gr.B	't'value	df
Mean Intelligence	51.6	50.53	0.4618	28

$t_{0.05} = 2.05$

$t_{0.01} = 2.76$

To study the effectiveness of instructional materials, the students were also divided into two categories of high and low according to their intelligence, their scores in English course in the previous semester, and their scores in Clothing and Textiles course in the previous semester. Table

6 shows the variable wise frequency and per cent distribution of the sample in different categories.

Raven's Standard Progressive Matrices which were used for measuring intelligence have categorized the scores into five grades of intellictually superior, definitely above the average in intellectual capacity, intellectually average, definitely below average in intellectual capacity and intellectually imparied. Since there were no students in the last grade of intellectually impaired the other four grades were clubed into two categories of make the high and low with two grades in each.

High category	Intellectually superior
	Above average in intellectual capacity
Low category	Intellectually average
	Below average in intellectual capacity

In the case of scores in English and in Clothing, The students obtaining average and above were categorized as high and those obtaining below average were categorized as low to facilitate the making of the two categories of high and low.

Table 6 : Distribution of the sample according to the variables.

Sr.No	Variable	Catagories	f(N)	%
1.	Intelligence	High	19	63.33
		Low	11	36.67
2.	English	High	19	63.33
		low	11	36.67
3.	Clothing & Textiles	High	17	56.67
		low	13	43.33

The distribution of the students in the high and low categories according to intelligence and English was exactly the same, i.e., 63.33 per cent in the high category and 36.67 per cent in the low category. When distributed according to Clothing and Textiles, the high category had 56.67 per cent and the low category had 43.33 per cent.

4.2 Overall effectiveness of the instructional Material

To study the overall effectiveness of the instructional material, pre test, immediate retention test (IRT) and delayed retention test (DRT) were conducted at different stages of the experiment.

Pre test was conducted just before starting the experimental teaching. Analysis of the data revealed that the pre-test scores of the class ranged from 10 to 25 with a mean score of 15.9 (26.5%) and a standard deviation of 4.58. The mean score of group 'A' was 16.7 (27.83 per cent) and that

for group 'B' was 15.1 (25.17 per cent) with a standard deviation of 4.5 and 4.75 respectively. The total obtainable score was 60 (table 7).

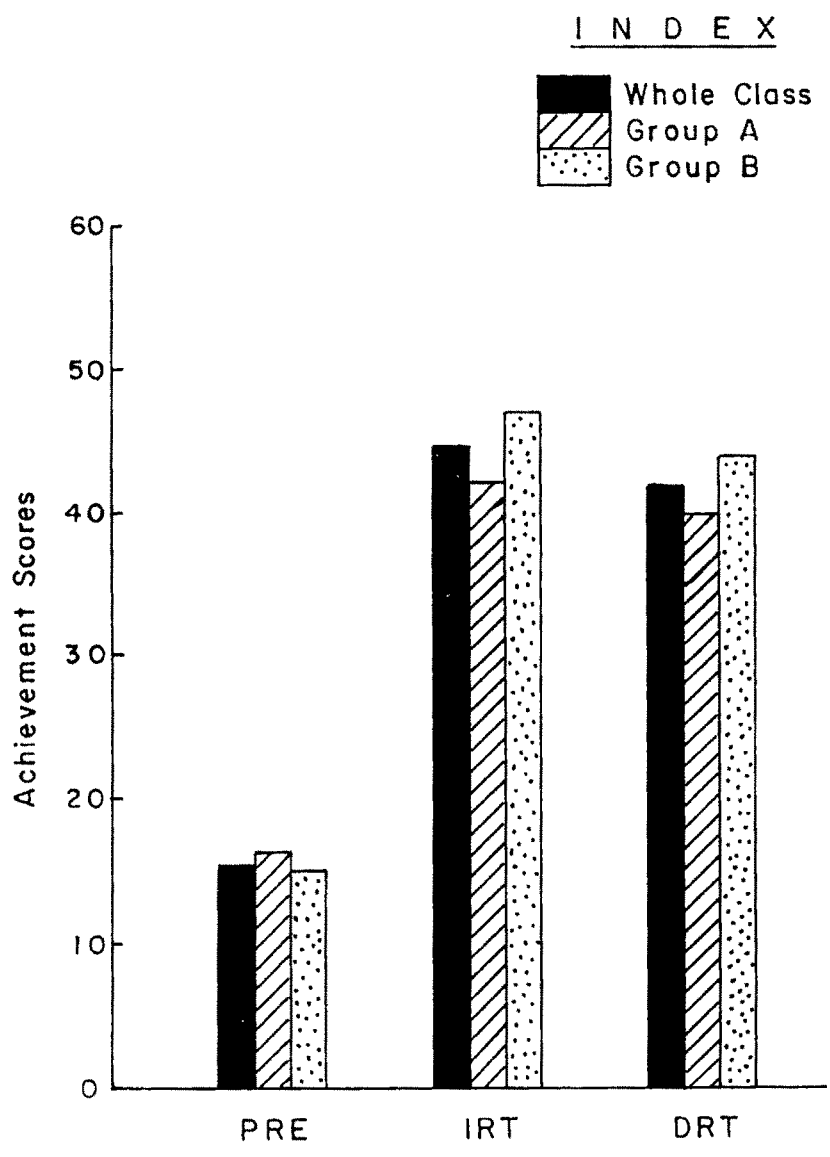
The IRT was conducted just after the experimental teaching was over. The scores for this test ranged from 27 to 55.5 with a mean score of 44.83 (74.72 per cent) and a standard deviation of 7.76. The mean score of group 'A' was 42.17 (70.28 per cent) and that for group 'B' was 47.5 (79.17 per cent) with a standard deviation of 6.91 and 7.65 respectively. The variability was more in the case of group 'B' so both the highest and lowest scores belonged to this group.

The scores of the DRT which was conducted one month after the IRT ranged from 24 to 56 with a mean of 42.15 (70.25 per cent) and a standard deviation of 7.23. The mean score for group 'A' was 40 (66.67 per cent) and that for group 'B' was 44.30 (73.83 per cent) with a standard deviation of 5.42 and 8.13 respectively. The variability was very much higher for group 'B', both the highest and lowest scores belonging to this group. The mean scores of students taught by instructional material, i.e., group 'B', was higher than the mean scores of the students taught by the conventional method, i.e., group 'A', both in the IRT and DRT which shows that instructional materials were an effective method of teaching.

Table 7 : Pre test, IRT and DRT Scores of the Two Groups.

Variable	Group	Lowest Score %	Highest Score %	Range	Mean	Percent	Sd.
Pre test	Whole class	10	25	16	15.90	26.50	4.58
	Group A	13	25	13	16.70	27.83	4.5
	Group B	10	24.5	15.5	15.10	25.17	4.75
IRT	Whole class	27	55.5	29.5	44.83	74.72	7.76
	Group A	29	54	26	42.17	70.28	6.91
	Group B	27	55.5	29.5	47.50	79.17	7.65
DRT	Whole class	24	56	33	42.15	70.25	7.23
	Group A	32.5	49.5	18	40.00	66.67	5.42
	Group B	24	56	32	44.30	73.83	8.13

FIG.4 MEAN ACHIEVEMENT OF THE TWO GROUPS ON PRE TEST, IRT AND DRT



When the students were distributed according to scores obtained in the IRT and DRT, it was seen that in the IRT, 60 per cent students from group 'A' scored 70 per cent and above marks. Twenty per cent students scored less than 60 per cent and 20 per cent scored between 60 and 69 per cent (table 8).

Group 'B' had 86.67 per cent students scoring 70 per cent and above marks, and 13.33 per cent students scoring below 60 percent. There were no students in the category of 60 to 69 per cent.

In the DRT, 33.33 per cent students from group 'A' scored 70 per cent and above marks, whereas 46.67 per cent students scored between 60 to 69 per cent. Twenty per cent students scored less than 60 per cent.

Among group 'B', 73.33 per cent students scored 70 per cent and above marks. Only 6.67 per cent students scored between 60 and 67 per cent and 20 per cent students scored below 60 per cent marks.

This shows that more students from group 'B' could score a higher percentage both in the IRT and DRT. This could be attributed to the fact that they learnt on their own and so could remember better at the time of the test.

Table 8 : Percentage distribution of students according to scores obtained in IRT and DRT.

Test	Group	Below 60%	From 60 to 69%	70% and above
IRT	A	20%	20%	60%
	B	13.33%	-	86.67%
DRT	A	20%	46.67%	33.33%
	B	20%	6.67%	73.33%

The difference in the mean achievement of the two groups on the IRT was tested using the 't' test. The obtained value of 't' was 2.342 which was higher than the tabulated value of 2.05 at 0.05 level and 27 degrees of freedom, showing that the difference in the mean achievement of the two groups on the IRT was significant, group 'B' taught by instructional materials achieving higher (table 9).

Table 9 : Comparison of the mean scores of group 'A' and group 'B' on the IRT.

	Gr.A	Gr.B	df	't'value
IRT	42.17	47.5	27	2.342
IRT-Pretest	25.47	32.40	28	2.86

$t_{0.05} = 2.05$

The actual gain of the students in the IRT was measured by subtracting the pre-test scores from the IRT scores. The

mean gain by group 'A' was 25.47 (42.43 per cent) and that by group 'B' was 32.40 (53.33 per cent). The difference in the mean gain of the two groups was tested by using the 't' test. The value obtained for 't' was 2.86 which was very much higher than the tabulated value of 2.05 at 0.05 level and 28 degrees of freedom, signifying that the difference in the means of the two groups was significant, group 'B' taught by instructional materials achieving higher, indicating that instructional materials were an effective method for teaching Clothing and Textiles.

For the theory section, the null hypothesis stating that there will be no significant difference in the achievement of the two groups in the IRT was therefore rejected.

The delayed retention test was administered to students one month after the completion of the programme. This was a sudden, unannounced test which gave no time to the students for preparation for the test. It was the same test used earlier for the immediate retention test. Since the students were not aware of the test and did not come prepared for it, the scores obtained on it would reflect their retention ability.

In case of DRT, the mean scores of 40 and 44.3 of group 'A' and group 'B' respectively, revealed that the students of both the groups had retained the content taught to a great extent, indicating that both the methods were

effective. The difference in the mean scores of the two groups was studied using the 't' test. The value obtained for 't' was 2.53 which was higher than the tabulated value of 2.05 at 0.05 level and 27 degrees of freedom signifing that the difference in the mean scores of the two groups was significant, group 'B' taught by instructional materials achieving higher, indicating that the instructional materials were also very effective for delayed retention.

Table 10 : Mean IRT and DRT scores of the two groups.

Group	IRT	DRT	Row mean
Group A	42.17	40.0	41.08
Group B	47.5	44.3	45.9
't' value	2.342	2.53	

d.f. 27, $'t'_{0.05}$ = 2.05

The high scores of group 'B' in the IRT and DRT shows the effectiveness of the instructional material in comparision to the conventional method of teaching. The calculated values of 't' have proved the differences to be significant and in favour of IM. The high row mean obtained by group 'B' (table 10) also supports the effectiveness of the IM.

The null hypothesis stating that there will be no significant difference in the mean DRT scores of the two groups was therefore rejected.

The first garment included in the study was a baby frock for which the paper pattern was provided. It had a yoke, round neckline and was open through the front for self-help. The fasteners were buttons and buttonholes. The sleeves were butterfly sleeves made by attaching a frill and finishing the underarms by a bias facing. The neckline was finished by bias binding. Attempt was made to incorporate different construction techniques in one garment. The fabric used was a white cambric with small pin dots in green. A small band of smocking was done on both the front pieces just below the yoke. This frock was stitched by the students of group 'A' taking guidance from the teacher at every step. The second group, i.e., group 'B', had to follow the instructional material and stitch on their own. Help was given to them only when they asked for it. It was seen that students of group 'B' needed help to start smocking and also to turn back after completion of one row.

For the second garment, the paper pattern was provided, which was the same as that for the first garment. In this case students of both the groups had to work on their own on the basis of what they remembered from the stitching of the first garment. Since the second garment did not have smocking, the total obtainable score on it was less than that on the first garment.

Scoring was done as per the evaluation sheet prepared by the investigator so that all the details of the garment may be included. Evaluation was done by three experts from Clothing and Textiles department who scrutinized each garment and gave the scores on the evaluation sheets provided to them. For both the sets of garments, the scores obtained from the experts were treated to obtain the means scores which were used as the scores obtained by each student. For the purpose of analysis, the scores of both the garments were converted into percentages. The analysis of the obtained scores revealed the following results.

The scores of the whole class for the first garment ranged from 70.25 per cent to 89.97 per cent with a mean score of 81.58 and a standard deviation of 5.51 (table 11). The range for group 'A' was the same as that for the whole class, with a mean of 82.27 per cent and a standard deviation of 5.60. The scores for group 'B' ranged from 70.25 per cent to 88.89 per cent, with a mean of 80.88 per cent and a standard deviation of 5.34.

Table 11 : First garment and second garment scores of the two groups.

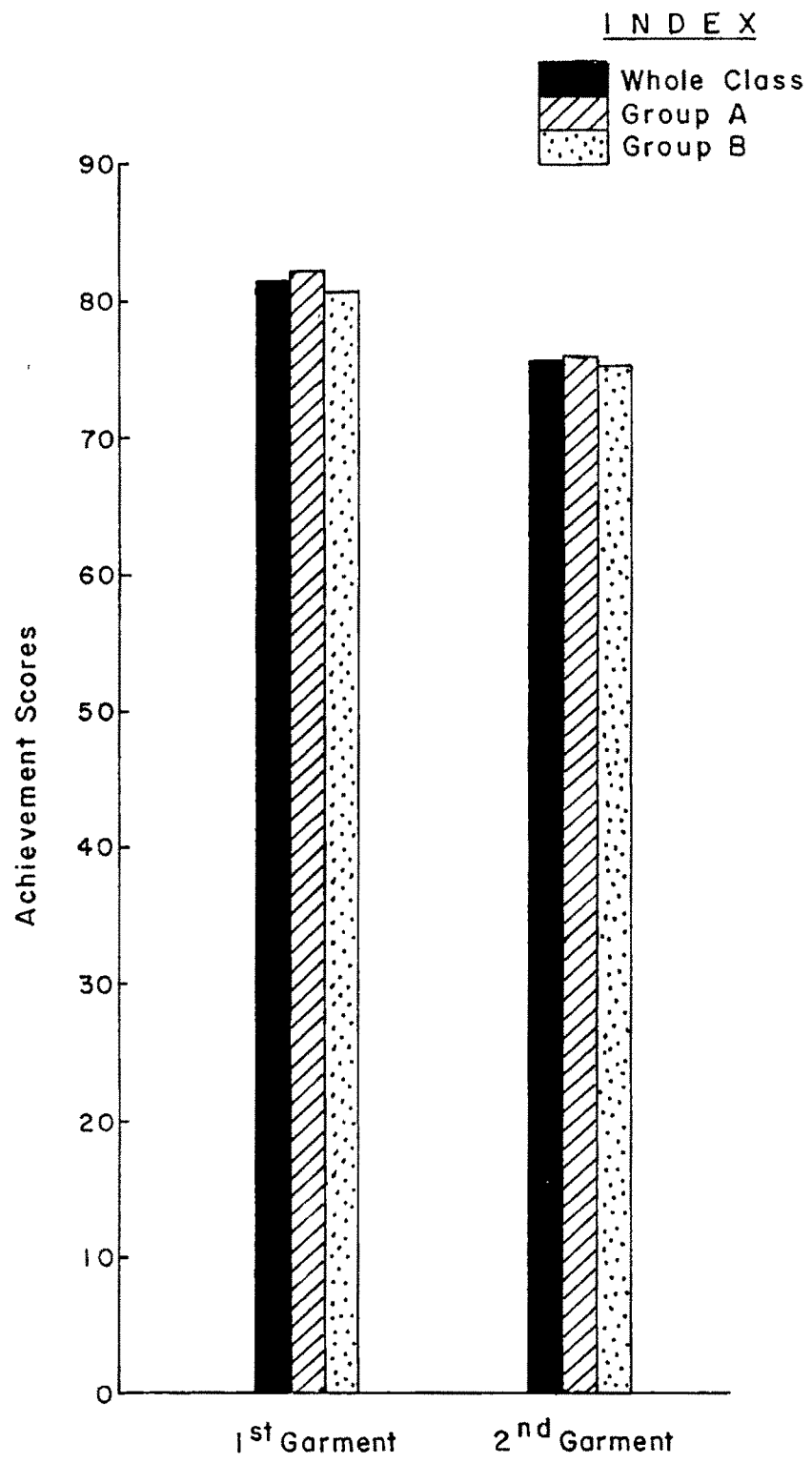
Variable	Group	Lowest Score %	Highest Score %	Range	Percent Mean	Sd.
1st Garment	Whole class	70.25	89.97	20.72	81.58	5.51
	Group A	70.25	89.97	20.72	82.27	5.60
	Group B	70.25	88.89	19.64	80.88	4.34
2nd Garment	Whole class	60.71	92.46	32.75	75.87	9.92
	Group A	61.11	92.06	31.95	76.06	11.13
	Group B	60.71	92.46	32.75	75.69	8.55

For the second garment, the scores of the whole class ranged from 60.71 per cent to 92.46 per cent, with a mean of 75.87 per cent and a standard deviation of 9.92. The scores of group 'A' ranged from 61.11 per cent to 92.06 per cent, having a mean of 76.06 per cent and a standard deviation of 11.13. The range for group 'B' was the same as that for the whole class, with a mean of 75.69 per cent and a standard deviation of 8.55.

Table 12 shows the per cent distribution of the students according to scores obtained in the two garments. In the first garment, the whole class, both group 'A' and group 'B', obtained more than 70 per cent marks.

In the second garment, 33.33 per cent students from group 'A' obtained between 60 to 69 percent marks, and 66.67

FIG.5 MEAN SCORES OF THE TWO GROUPS ON 1st AND 2nd GARMENTS



percent students got 70 percent and above marks. From group 'B' only 26.67 per cent students obtained between 60 and 69 per cent marks where as the other 73.33 per cent got 70 per cent and above marks.

Table 12 : Percentage distribution of students according to scores obtained in the 1st and 2nd Garment.

Garment	Group	Below 60%	From 60 to 69%	70% and above
1st Garment	A	-	-	100%
	B	-	-	100%
2nd Garment	A	-	33.33%	66.67%
	B	-	26.76%	73.33%

This shows that the students of both the groups could not perform as well in the second garment but they had performed fairly well as this was the garment where they got no help from the teacher while doing the work, and they achieved solely on their own capabilities.

The difference in the mean scores of the two groups in the first garment were compared using the 't' test (table 13). The value obtained for 't' was 0.673 which was very much below the tabulated value of 2.05 at 0.05 level and 28 degrees of freedom, indicating that the difference in the means of the two group was not at all significant.

The difference in the mean scores of the two groups in the second garment was also tested using the 't' test. Here again the calculated 't' value was too small showing that the difference in the two means was not significant (table 13). It could be said that the differences in the means of the two groups in the first and second garment could just be due to chance, and that, students of both the groups had learnt equally well to stitch a child's frock.

Table 13 : Difference in the means of the two groups in the two garments.

Groups	1st garment	2nd garment	't'value
Group A	82.27	76.06	1.865
Group B	80.88	75.69	1.929
't' value	0.673	0.099	

d.f. 28 $t_{0.05}$ = 2.05

For stitching of the second garment, no instructions were given to the studens of both the groups. They had to do the work on the basis of what they had retined from stitching of the first garment. When comparing the scores of the first and second garment it was seen that a difference of 6.21 and 5.19 existed for group 'A' and group 'B' respectively, but on calculating the 't' values it was found that the values of 1.865 and 1.929 for group 'A' and B respectively were much below the tabulated value of 2.05 at 0.05 level and 28

degrees of freedom, indicating that the differences were not significant.

The null hypothesis stating that there will be no significant difference in the achievement of the two groups was accepted for the practical.

4.3 Effectiveness of the IM in relation to the selected variables

When studying the variable wise achievement of the students of the two groups in the IRT, it was seen from table (14) that when students were grouped into two categories of high and low according to their intelligence, the highest mean achievement of 49 (81.67 per cent) was obtained by the high intelligence group taught by the IM (group 'B') in comparison to the mean score of 42.5 (70.83 percent) obtained by the high intelligene group taught by the conventional method (group 'A'). To study the difference in the means of the two groups 't' test was used for which the value obtained was 1.79 which was much below the tabulated value of 2.11 at 0.05 level and 17 d.f. Among the low intelligence group also, it was students taught by IM who scored higher mean of 44.5 (74.17 percent) in comparison to 41.67 (69.45 percent) scored by the students taught by conventional method. The calculated value of 't' for the difference in the two means was 0.65 which was not significant at 9 d.f.(table 17).

Table 14 : Mean IRT scores of the two groups according to intelligence

Group	High	Low	Row mean
Group A	42.5	41.67	42.08
Group B	49.0	44.5	46.75
Column mean	45.75	43.08	44.42

When the students were categorized according to their grades in English course, it was seen from table 15 that among the students who were in the higher category, the students taught by IM achieved the higher mean of 49.25 (82.08 per cent) in the IRT in comparison to 41.54 (69.23 per cent) achieved by the students taught by the conventinal method. The calculated value of 't' for the difference in the means of the two groups was 2.32 which was higher than the tabulated value of 2.11 at 0.05 level and 17 degrees of freedom indicating that the difference in the means of the two groups was significant. Among the students lower in English, both the groups achieved almost the same mean score in the IRT (table 15).

Table 15 : Mean IRT scores of the two groups according to English

Group	High	Low	Row mean
Group A	41.54	46.25	43.89
Group B	49.25	46.33	47.79
Column mean	45.39	46.29	45.84

Table 16 shows the mean scores of students in IRT when categorized according to their scores in Clothing and Textiles in the previous semester. Here again, in the higher category, it was students taught by IMs (group 'B') who achieved the higher mean score of 50.28 (83.8 percent) in comparison to 43.13 (71.88 per cent) scored by the students of the conventional method (group 'A'). The calculated value of 't' was 2.509 which was higher than the tabulated value of 2.13 at 0.05 level and 15 degrees of freedom indicating that the difference in the means of the two groups was significant.

Table 16 : Mean IRT scores of the two groups according to clothing and textiles

Group	High	Low	Row mean
Group A	43.13	41.07	42.1
Group B	50.28	43.33	46.80
Column mean	46.70	42.2	44.45

Table 17 : Difference in the means of the different groups in the pretest, IRT and DRT.

Group		Pre test				IRT				DRT			
		Mean	Per cent	't'	d.f.	Mean	Per cent	't'	d.f.	Mean	Per cent	't'	d.f.
High IQ	Gr.A	17.22	28.7	0.416	17	42.5	70.83	1.791	17	42.55	70.92	0.672	17
	Gr.B	16.15	26.92			49.0	81.67			44.8	74.67		
Low IQ	Gr.A	15.91	26.52	2.366*	9	41.67	69.45	0.652	9	36.16	60.27	1.835	9
	Gr.B	13.00	21.67			44.5	74.17			43.3	72.17		
High Eng.	Gr.A	16.92	28.2	0.42	17	41.54	69.23	2.322*	17	40.61	67.68	1.393	17
	Gr.B	17.92	29.87			49.25	82.08			44.58	74.3		
Low Eng.	Gr.A	15.25	25.42	0.758	9	46.25	77.08	0.011	9	36.00	60.00	1.081	9
	Gr.B	13.22	22.03			46.33	77.22			44.11	73.52		
High C.T.	Gr.A	18.87	31.45	0.854	15	43.13	71.88	2.589*	15	41.94	69.9	2.539*	15
	Gr.B	17.11	28.52			50.28	83.8			48.77	81.28		
Low C.T.	Gr.A	14.21	23.68	0.977	11	41.07	68.45	0.452	11	37.78	62.97	0.055	11
	Gr.B	12.08	20.13			43.33	72.22			37.58	62.63		

d.f. 9, $t_{0.05} = 2.262$, $t_{0.01} = 3.250$
d.f. 11, $t_{0.05} = 2.201$, $t_{0.01} = 3.106$
d.f. 15, $t_{0.05} = 2.131$, $t_{0.01} = 2.947$
d.f. 17, $t_{0.05} = 2.110$, $t_{0.01} = 2.898$

* Significant at 0.05 level

FIG.6 MEAN ACHIEVEMENT OF THE TWO GROUPS ON PRE TEST ACCORDING TO IQ, ENG., AND C.T.

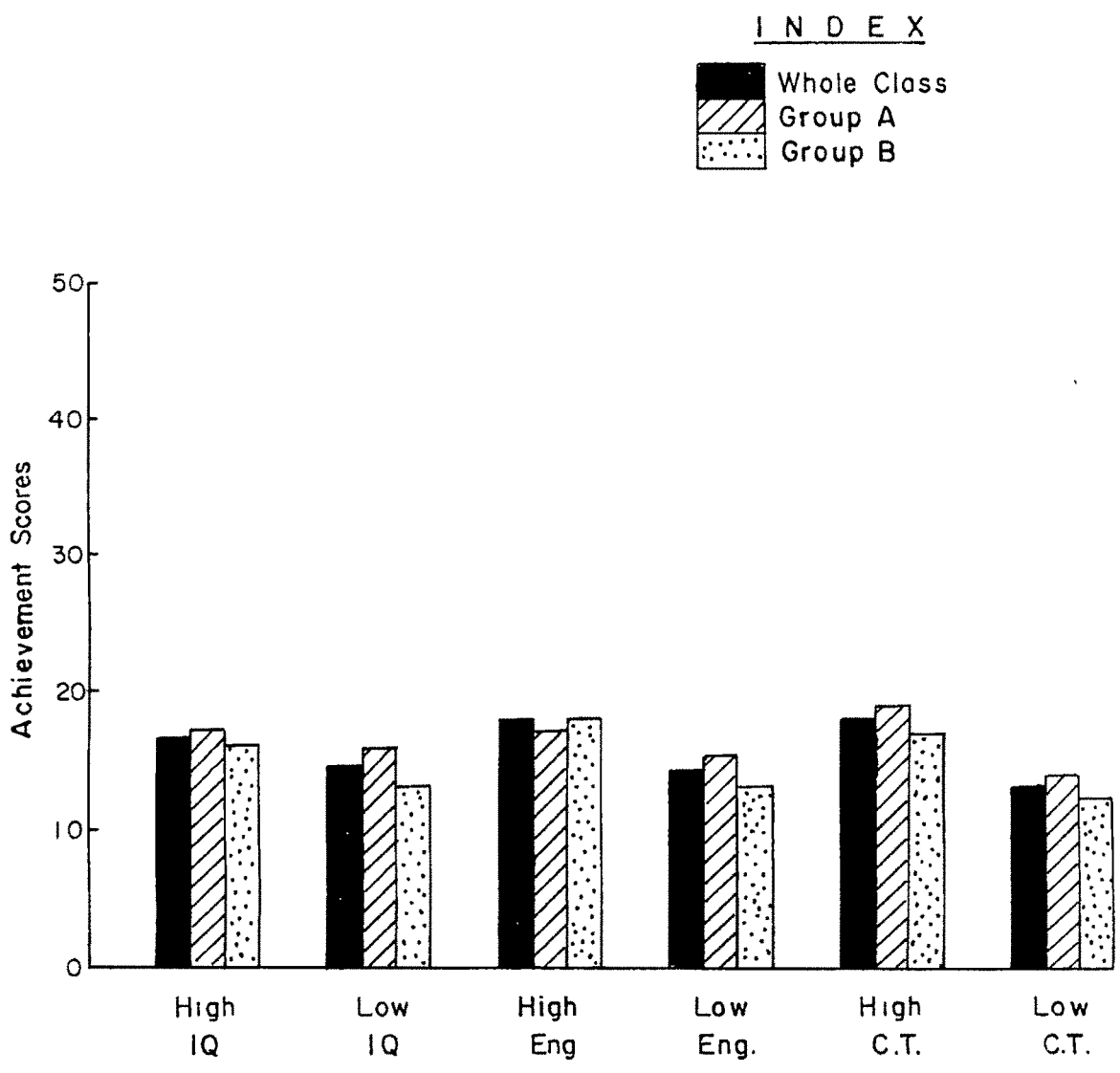


FIG. 7 MEAN ACHIEVEMENT OF THE TWO GROUPS ON THE IRT ACCORDING TO IQ , ENG., AND C. T.

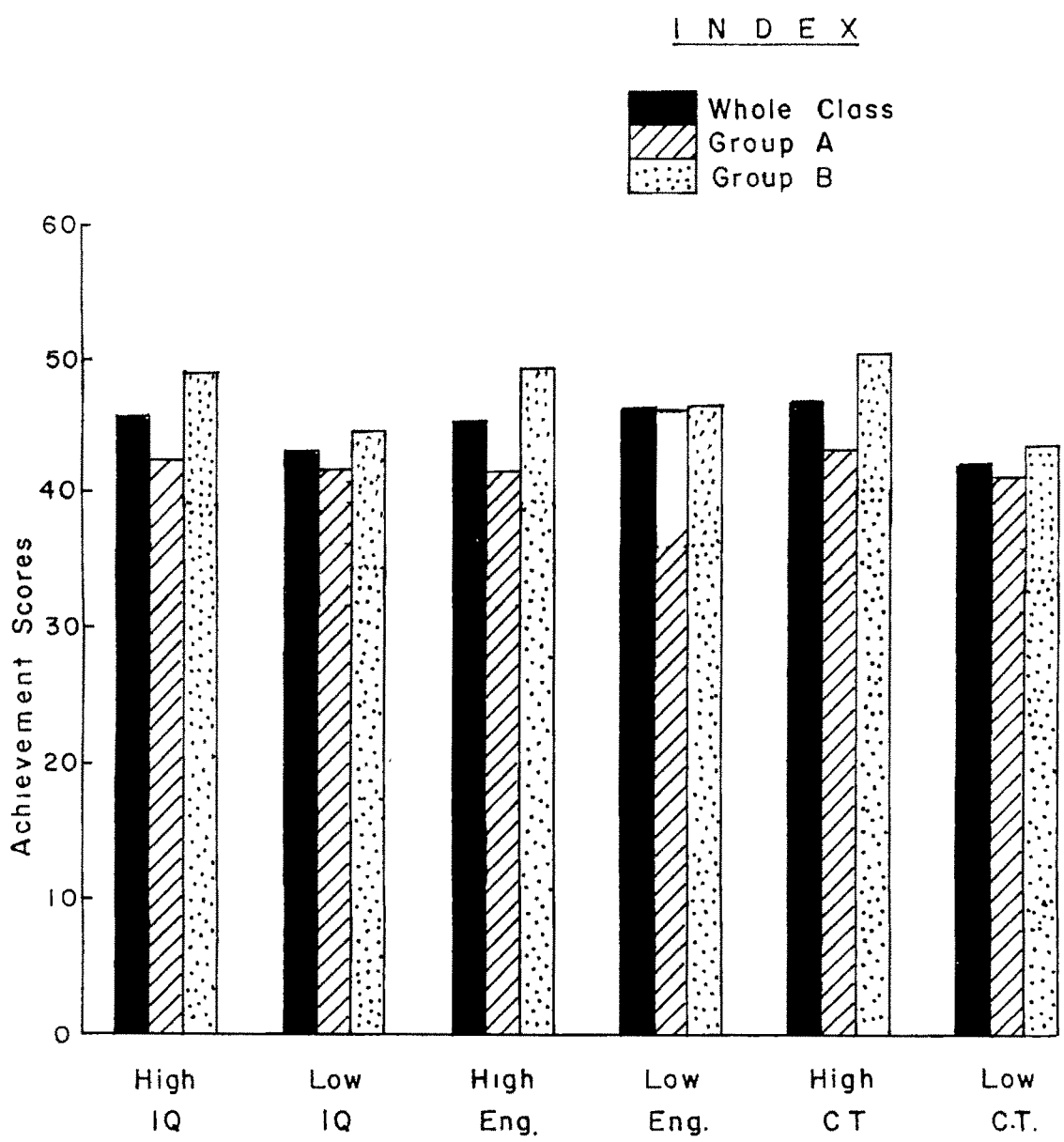
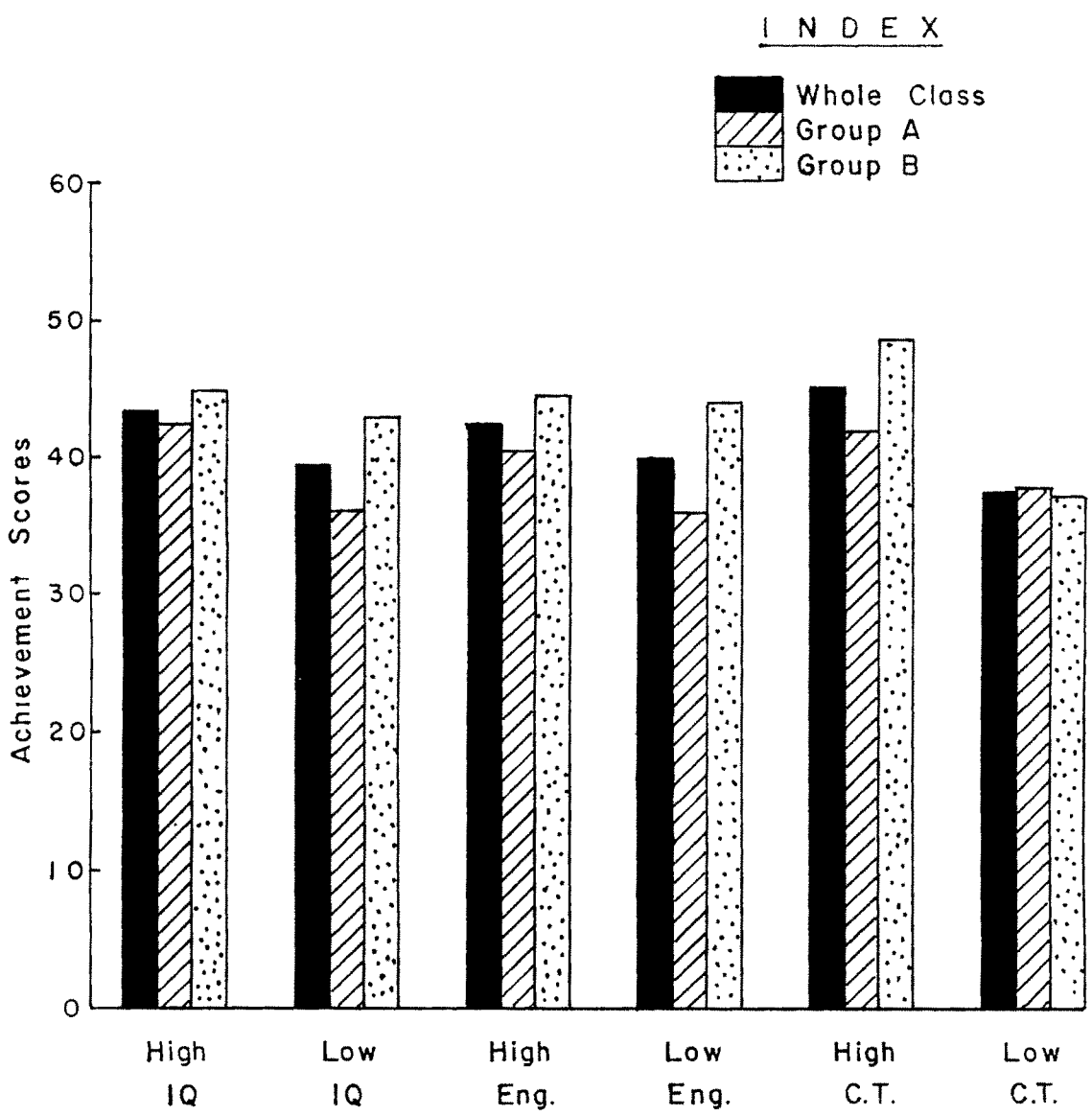


FIG.8 MEAN ACHIEVEMENT OF THE TWO GROUPS ON DRT ACCORDING TO IQ, ENG., AND C.T.



In the category of students having lower grades in Clothing and Textiles, the students taught by the IM, i.e., group 'B' scored higher in the IRT than students taught by the conventional method, i.e., group A, though the difference in the means was not very much. The value of 't' obtained was 0.45 which was very much below the tabulated value at 11 degrees of freedom (table 17).

The scores of both the groups in the DRT were also categorized into high and low according to the variables as in the case of IRT. When the scores were categorized according to intelligence, it was seen from table 18 that among the high intelligence group, the students taught by IM (group 'B') had a higher mean score of 44.8 (74.67 per cent) in comparison to 42.55 (70.92 per cent) obtained by group A. The value calculated for 't' was 0.67 which was very much below the tabulated value of 2.11 at 0.05 level and 17 d.f. (table 17).

Table 18 : Mean DRT scores of the two groups according to intelligence

Group	High	Low	Row mean
Group A	42.55	36.16	39.35
Group B	44.8	43.3	44.05
Column mean	43.67	39.73	41.70

Among the students who were low in intelligence, the higher mean score of 43.3 (72.17 per cent) was achieved by the students taught by the IM in comaraison to 36.16 (60.27 per cent) achieved by the students taught by the conventional method. The calculated value of 't' for the difference in the means of the two groups was 1.84 which was lower than the tabulated value of 2.262 at 0.05 level and 9 degrees of freedom.

When the DRT scores were categorized according to high and low scores in English, (table 19) students of group 'B' taught by 1M achieved the higher score of 44.58 (74.3 per cent) and 44.11 (73.52 percent) in the high and low categories respectively.

Table 19 : Mean DRT scores of the two groups according to English

Group	High	Low	Row mean
Group A	40.61	36.00	38.30
Group B	44.58	44.11	44.34
Column mean	42.59	40.05	41.32

When the DRT scores were categorized according to the scores in the Clothing and Textiles course in the previous semester, it was seen from table 20 that students who had higher grades in Clothing and Textiles and who had been taught by IM had a higher mean score of 48.77 (81.28 per

cent) in comparison to 41.94 (69.9 per cent) of students who had higher scores in Clothing and Textiles but were taught by the conventional method. Students having lower grades in Clothing and Textiles and taught by different methods had an almost equal mean score in the DRT.

Table 20 : Mean DRT scores of the two groups according to Clothing and Textiles

Group	High	Low	Row mean
Group A	41.94	37.78	39.86
Group B	48.77	37.58	43.17
Column mean	45.35	37.68	41.52

The difference in the mean scores of the two groups in the IRT and DRT is shown in table 21. When categorized according to intelligence it was seen that in the IRT the higher category had a difference of 2.83 (4.72 per cent) in favour of instrutional materials. In the DRT the difference in the high and low categories was 2.25 (3.75 per cent) and 7.14 (11.9 per cent) respectively in favour of instructional materials.

Table 21 : Difference in the mean achievement of the two groups in the IRT and DRT.

Variables	Difference in IRT	%	Difference in DRT	%
High IQ	6.5	10.8	2.25	3.75
Low IQ	2.83	4.72	7.14	11.9
High in Eng.	7.71	12.85	3.97	6.62
Low in Eng.	0.08	0.13	8.11	13.52
High in C.T.	7.15	11.92	6.83	11.38
Low in C.T.	2.26	3.77	0.20*	0.33

* in favour of conventional method

When categorized according to scores in English in the previous semester, the difference in the IRT was 7.71 (12.85 per cent) and 0.08 (0.13 per cent) in the high and low categories respectively. In the DRT, the difference in the means of the high and low categories was 3.97 (6.62per cent) and 8.11 (13.52 per cent) respectively in favour of instructional materials. Students having lower grades in English seem to have retained better when taught through instructional materials.

The difference in the mean scores in the IRT when categorized into high and low according to the scores in Clothing and Textiles was 7.15 (11.92 per cent) and 2.26 (3.77 per cent) respectively. The difference in the mean DRT scores of the high and low categories was 6.83 (11.38 per

cent) and 0.20 (0.33 per cent) respectively (table 21).

As seen in the previous tables, the mean scores of group 'B' were always higher than the mean scores of group 'A'. In the IRT, the difference in the mean scores of the students in the high and low categories was maximum in the catagory of higher scores in English (Table 21). Next was the category of high scores in Clothing and Textiles and then was high intelligence. This indicates that students in all the higher categories can achieve better in the IRT when taught through instructional materials. The difference in the mean scores of the two groups who were low in English was very negligible showing that both the methods were equally effective for this category in English.

In the DRT, the maximum difference in the means was seen in the category of low scores in English. Next was the difference in the means of the low intelligence category. This indicates that students who were low in intelligence and were having low grades in English, when taught by instructional materials can achieve better than those taught by the conventional method.

The category of students who scored higher in Clothing and Textiles achieved higher in both IRT and DRT. This may be due to the fact that those who are interested in the subject can score better and also retain well.

When studying the variable-wise achievement of the two groups in the first garment, it was seen from table 22 that when the students were grouped into two categories of high and low according to their intelligence, the highest mean score of 83.04 per cent was obtained by the low category of the conventional method in comparison to 78.92 per cent obtained by the low catagory of students taught by instructional materials. The next higher score was obtained by the high category of students taught by instructional materials in comparison to 81.76 per cent obtained by the high category of students taught by conventional method. The 't' values calculated for the difference in the scores obtained by the two groups of the high and low categories in the 1st garment were much less than the tabulated value indicating that the differences were not significant (table 25).

Table 22 : Mean of 1st garment scores according to high and low catagories in Intelligence.

Group	High	Low	Row mean
Group A	81.76	83.04	82.4
Group B	81.86	78.92	80.39
Column mean	81.81	80.98	

Table 23 shows the mean scores of the two groups in the first garment when categorized according to the scores in English in the previous semester. The highest mean score of

82.52 per cent was obtained by the high category of students taught by the conventional method in comparison to 80.70 per cent obtained by high category of students taught by instructional material. In the low catagory, the students taught by the instructional materials scored higher than students taught by the conventional method, though the difference was very small. The 't' values obtained for the two groups were below the tabulated value indicating that the difference was not significant (table 25).

Table 23 : Mean of 1st garment scores according to high and low catagories in English.

Group	High	Low	Row mean
Group A	82.52	80.65	81.58
Group B	80.70	81.00	80.85
Column mean	81.61	80.83	

Table 24 shows the mean scores of the two groups in the first garment when categorized according to the scores in Clothing and Textiles course in the previous semester. The highest mean score of 82.66 per cent was obtained by the students of the high catagory taught by the conventional method in comparison to 81.00 per cent obtained by the students taught by instructional materials. In the low category, it was students taught by conventional method who scored a higher mean of 81.82 per cent in comparison to 80.70

per cent of the students taught by instructional material. The differences in the high and low categories of the conventional and instructional method were 0.84 and 0.3 respectively showing that the low category in Clothing and Textiles had performed equally well as the high category in both the methods. The difference in the mean scores of the conventional and instructional method was 1.66 for the high category and 1.12 for the low category in Clothing and Textiles for which the 't' values calculated were 0.507 and 0.452 respectively, which were much below the tabulated values, indicating that the difference in the means were not significant (table 25).

Table 24 : Mean of 1st garment scores according to high and low catagories in Clothing and Textiles.

Group	High	Low	Row mean
Group A	82.66	81.82	82.24
Group B	81.00	80.70	80.85
Column mean	81.83	80.26	

FIG. 9 MEAN SCORES OF TWO GROUPS ON 1st. GARMENT ACCORDING TO IQ, ENG., AND C.T.

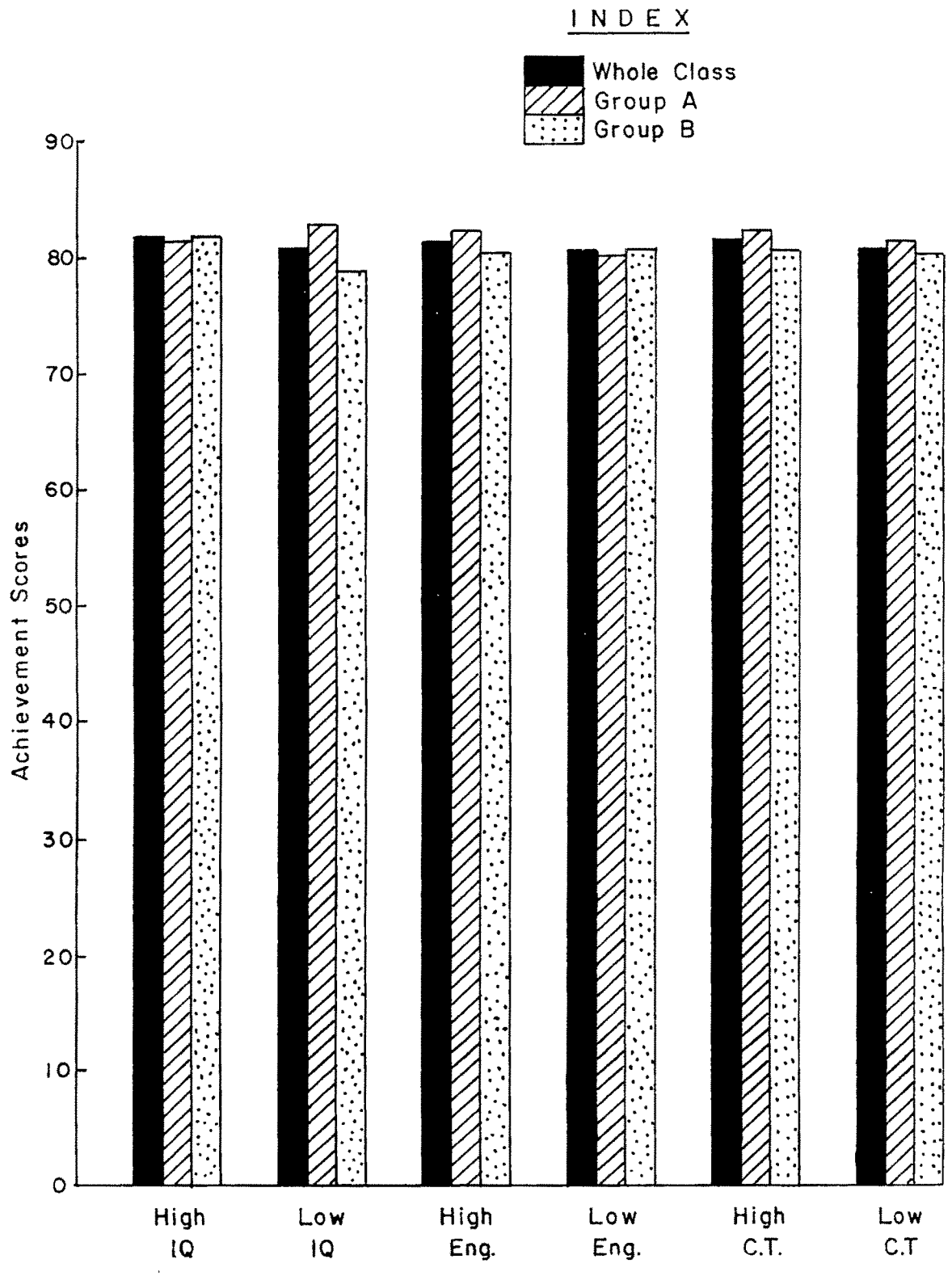


FIG.10 MEAN SCORES OF TWO GROUP ON 2nd GARMENT ACCORDING TO IQ, ENG., AND C.T.

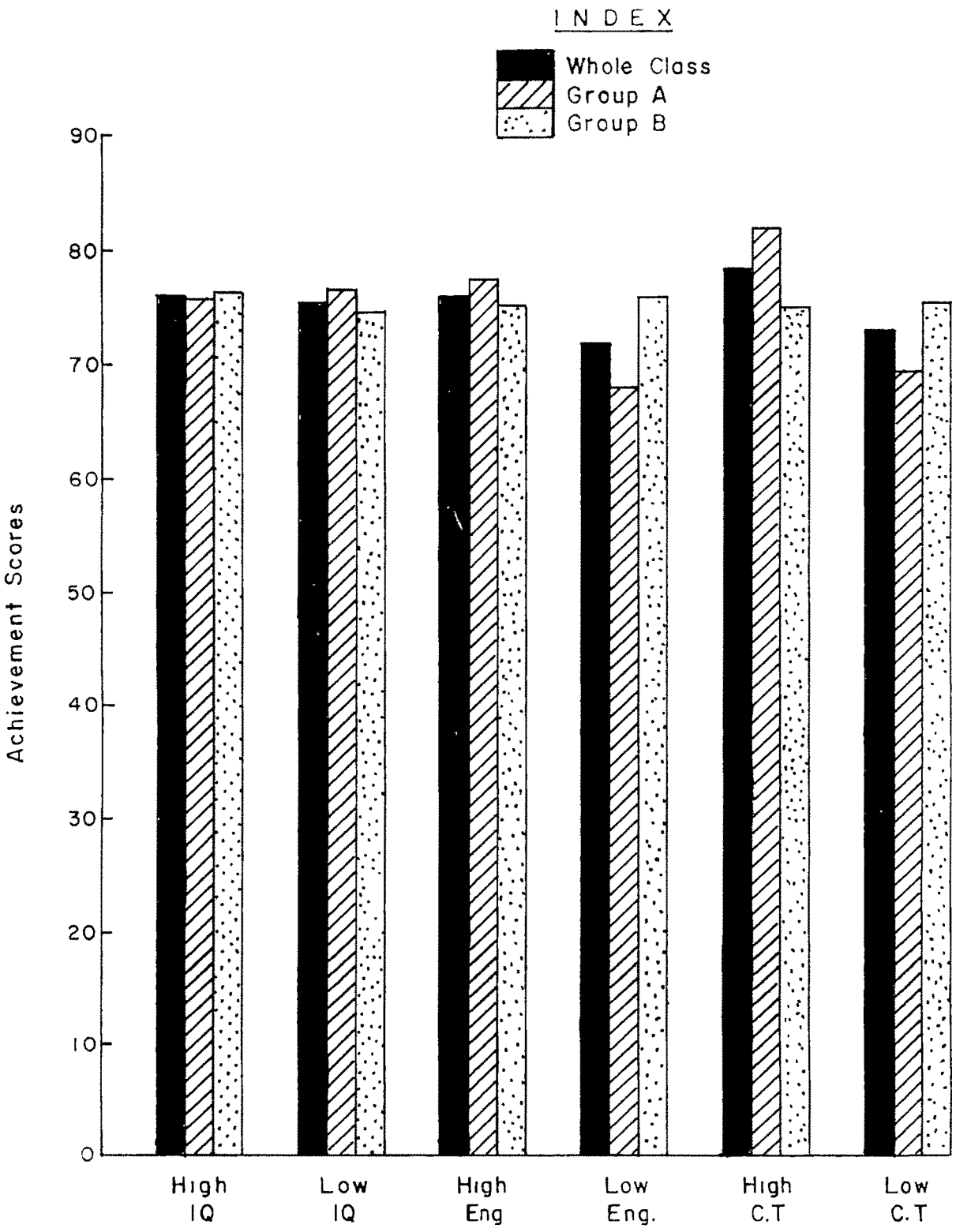


Table 25 : Difference in the means of the two groups in the two garments according to the different categories.

Groups		1st garment			2nd garment		
		% mean	't'value	d.f.	% mean	't'value	d.f.
High IQ	Gr.A	81.76	0.034	17	75.84	0.093	17
	Gr.B	81.86			76.35		
Low IQ	Gr.A	83.04	1.514	9	76.39	0.44	9
	Gr.B	78.92			74.37		
High English	Gr.A	82.52	0.598	17	77.32	0.423	17
	Gr.B	80.70			75.00		
Low English	Gr.A	80.65	0.085	9	67.86	1.21	9
	Gr.B	81.00			76.15		
High C.T.	Gr.A	82.66	0.507	15	81.75	1.794	15
	Gr.B	81.00			75.22		
Low C.T.	Gr.A	81.82	0.452	11	69.56	1.342	11
	Gr.B	80.70			76.39		

d.f. = 9, $t_{0.05}$ = 2.26, $t_{0.01}$ = 3.25
d.f. = 11, $t_{0.05}$ = 2.20, $t_{0.01}$ = 3.11
d.f. = 15, $t_{0.05}$ = 2.13, $t_{0.01}$ = 2.95
d.f. = 17, $t_{0.05}$ = 2.11, $t_{0.01}$ = 2.90

When the scores of the 2nd garment were divided into two categories of high and low according to their intelligence, (table 26) it was seen that the highest mean score 76.39 percent was obtained by the students of low category in intelligence taught by the conventional method in comparison to 74.37 obtained by the students of same category

taught by the instructional meterial. In the high category the higher mean score of 76.35 percent was obtained by the students taught by the instructional material in comparison to 75.84 percent obtained by the students taught by the conventional method. The difference in the two methods of the high and low catagories was 0.51 and 2.02 respectively for which 't' values calculated were 0.093 and 0.44. These values were very much below the tabulated values at 0.05 level indicating that the differences were not significant (table 25).

Table 26 : Mean of 2nd garment scores according to high and low catagories in Intelligence.

Group	High	Low	Row mean
Group A	75.84	76.39	76.12
Group B	76.35	74.37	75.36
Column mean	76.10	75.38	

Table 27 shows the mean scores of the two groups in the 2nd garment when categorized according to the scores in the English course in the previous semester. In the high category, it was students taught by conventional method i.e., group 'A', who scored the highest mean score of 77.32 percent in comparison to 75.00 percent obtained by the students of the instructional method i.e., group 'B'. In the low category, it was students taught by instructional material who obtained 76.15 percent in comparison to 67.86 percent

obtained by the students of the other group. The difference in the high and low categories of the two groups was 9.46 and 1.15 respectively. The difference in the mean scores of the two methods in the high and low catagories was 2.32 and 8.29 respectively for which the calculated value of 't' was 0.423 and 1.21 respectively. These values were very much below the tabulated values at 0.05 level showing that the differences in the means of the two groups were not significant (table 25).

Table 27 : Mean of 2nd garment scores according to high and low catagories in English.

Group	High	Low	Row mean
Group A	77.32	67.86	72.59
Group B	75.00	76.15	75.58
Column mean	76.16	72.01	

When the scores of the 2nd garment were categorized according to the scores in Clothing and Textile in the previous semester, it was seen from table 28 that the highest mean score of 81.00 percent was obtained by the high category of the students taught by the conventional method. In the low catagory it was students taught by instructional material who scored a higher mean of 76.39 percent. The difference in the two methods in the high and low catagories was 6.53 and 6.83 respectively for which the calculated values of 't' were 1.794 and 1.342 respectively, which were lower than the

tabulated value at 0.05 level showing that the difference were not significant (table 25).

Table 28 : Mean of 2nd garment scores according to high and low catagories in Clothing and Textiles.

Group	High	Low	Row mean
Group A	81.75	69.56	75.66
Group B	75.22	76.39	75.81
Column mean	78.49	72.98	

The relationship between the different variables were calculated by the product-moment method of correlation and represented in tables 29,30,31.

Table 29 shows the simple correlation between the different variables for the whole class. The correlations which were significant at 0.01 level were between IRT and DRT, between Intelligence and Clothing and Textiles, between Eng and Clothing and Textiles, between Clothing and Textiles and DRT and between the 1st and 2nd garment. Among the correlation significant at 0.05 level only were those between intelligence and English., and between DRT and the second garment.

Table 30 shows the simple correlation between the different variables for group 'A' only. Here, the correlation between English and Clothing and Textiles was significant at 0.01 level. Among those significant at 0.05

level were those between IRT and DRT, between IQ and Clothing and Textiles, between English and DRT, between English and 2nd garment, between Clothing and Textiles and 2nd garment, and between Clothing and Textiles and DRT.

Table 31 shows the simple correlation between the different variables for group 'B'. High correlations significant at 0.01 level were seen between IRT and DRT and between 1st garment and 2nd garment both being significant at 0.01 level. The correlations significant at 0.05 level were between IRT and 2nd garment, and between Clothing and Textiles and DRT.

Reich et al (91) suggest that students be graded on their recognition of quality of workmanship rather than on workmanship alone. They are of the opinion that if students are able to recognize their mistakes and whether or not they measure up to the standard, they have come a long way. Recognition of their own mistakes helps them to overcome those mistakes and improve their workmanship in future.

Keeping this suggestion in mind, the students were asked to evaluate their first garment according to the evaluation sheet provided to them. This was the same evaluation sheet that was provided to the experts. The scores obtained were converted into percentages for analysis.

The scores for the whole class on self evaluation ranged from 64.52 per cent to 89.25 per cent with a mean of

Table 29 : Correlation between the different variables for the whole class. N=30

	IRT	IQ	Eng.	C.T.	DRT	1^{st}G	2^{nd}G
IRT	x	0.1412	0.0862	0.3385	0.7365**	0.1443	0.3362
Intelligence		x	0.3552*	0.4522**	0.2970	0.1756	0.1557
English			x	0.5764**	0.2008	0.0460	0.2482
C.T.				x	0.5058**	0.1443	0.3377
DRT					x	0.2381	0.3550*
1^{st} garment						x	0.5868**
2^{nd} garment							x

Tab r 0.05 = 0.349 * Significant at 0.05 level
0.01 = 0.449 ** Significant at 0.01 level
at 28 d.f.

Table 30 : Correlation between the different variables for group 'A'. N=15

	IRT	IQ	Eng.	C.T.	DRT	1^{st}G	2^{nd}G
IRT	x	0.0577	0.1141	0.3475	0.5414*	-0.0364	0.2293
Intelligence		x	0.3789	0.5191*	0.4931	0.0327	0.1555
English			x	0.7402**	0.5363*	0.0043	0.6246*
C.T.				x	0.6287*	0.1265	0.6285*
DRT					x	0.3618	0.4709
1^{st} garment						x	0.4704
2^{nd} garment							x

Tab r 0.05 = 0.514 * Significant at 0.05 level
0.01 = 0.641 ** Significant at 0.01 level
at 13 d.f.

Table 31 : Correlation between the different variables for group 'B'. N=15

	IRT	IQ	Eng.	C.T.	DRT	1^{st}G	2^{nd}G
IRT	x	0.2577	0.3631	0.4256	0.8173**	0.4204	0.5253*
Intelligence		x	0.2647	0.3765	0.2636	0.2709	0.1666
English			x	0.4240	0.2963	-0.0025	-0.1153
C.T.				x	0.5678*	0.1307	-0.1098
DRT					x	0.2571	0.3335
1^{st} garment						x	0.7411**
2^{nd} garment							x

Tab r 0.05 = 0.514 * Significant at 0.05 level
0.01 = 0.641 ** Significant at 0.01 level
at 13 d.f.

77.78 per cent and a standard deviation of 7.895 (table 32).

For group 'A', the scores for self evaluation ranged from 64.52 percent to 88.17 per cent with a mean of 79.07 per cent and a standard deviation of 7.42. However, for group 'B', the range was the same as that for the whole class but with a mean of 76.49 per cent and a standard deviation of 8.14.

Table 32 : Expert evaluated and self evaluated scores of the two groups.

	Group	Lowest score(%)	Highest score(%)	Range	Per cent mean	S.D.
Expert evaluated	Whole class	70.25	89.97	20.72	81.58	5.51
	Group A	70.25	89.97	20.72	82.27	5.60
	Group B	70.25	88.89	19.64	80.88	5.34
Self evaluated	Whole class	64.52	89.25	25.73	77.78	7.89
	Group A	64.52	88.17	24.65	79.07	7.42
	Group B	64.52	89.25	25.73	76.49	8.14

The scores of self-evaluation by the students were compared with the scores given by the judges on the same garment to study the difference between the two and see whether the students had judged themselves properly realising their own mistakes.

For group 'A', the mean of scores given by the experts was 82.27 per cent and the mean of the scores by self evaluation was 79.07 per cent. The difference of 3.2 was statistically judged to be not significant as the value of 1.29 obtained for 't' was very much below the tabulated value of 2.05 at 0.05 level and at 28 degrees of freedom (table 33).

For group 'B', the mean of the scores given by judges was 80.88 per cent and that of the scores by self-evaluation was 76.49 per cent. The difference of 4.39 was again statistically judged to be not significant as the value of 1.688 calculated for 't' was very much below the tabulated value of 2.05 at 0.05 level and 28 degrees of freedom (table 33).

Table 33 : Difference in the expert evaluated and self-evaluated scores.

	Group A	Group B	't'value
Expert Evaluated	82.27	80.88	0.673
Self evaluated	79.07	76.49	0.877
't' value	1.29	1.688	

d.f. 28
$t_{0.05}$ = 2.05

Here we could say that the difference seen in the mean of the scores by experts and that by self-evaluation may be because workmanship is qualitative and so the opinion of the

two people may differ slightly on that. Since the difference was not significant it could be said that the students could evaluate their garments correctly and realise their own mistakes so they could do better in future.

Table 34 : Percent distribution of students in self evaluation when compared to expert evaluation.

Scores in Self evaluation	group A	group 'B'
Scored more than that given by experts	40%	26.67%
Scored same as that given by experts	6.67%	-
Scored less than that given by experts	53.33%	73.33%
Total	100%	100%

However it was seen from table 34 that 40 percent students from group 'A' and 26.67 percent students from group 'B' had given themselves score that were higher than those given by the experts. Among students who gave themseleves scores which were less than those given by experts were 53.33 percent from group 'A' and 73.33 per cent from group 'B'. Only one student from group 'A' (6.67%) gave herself the same score as that given by experts.

4.4 Reaction of the students

The reaction of the students towards self instructional materials was taken on a reaction scale in which the lowest

possible score was 28 and the maximum obtainable score was 140, the neutral point being 84. The reliability obtained on the scale by the split half technique was 0.848.

The scores obtained on the reaction scale ranged from 90 to 120 with a mean of 105.4 and standard deviation of 7.53. This shows that all the students who had used the programme had a favourable or positive reaction towards self instructional material.

Since all the students had a favourable or positive reaction and the variability was great (7.53), it was decided to group them in catagories of high, medium and low and see the distribution of respondents in each. The categories were formed as shown below.

Low achievers were those who scored less than (mean-Sd) i.e. less than (105.4-7.53), i.e., less than 97.87 and the number of students in this category was only one (6.67 per cent).

Medium achievers were those who scored between (mean-sd) and (mean + sd), i.e., between (105.4-7.53) and (105.4+7.53), i.e., between 97.87 and 112.93. The number of students in this category were twelve (80 per cent).

High achievers were those who scored more than (mean +sd), i.e., more than 112.93. The number of students in this category were two (13.33 per cent).

Table 35 : Distribution of respondents into different categories according to their reactions.

Category	Range	Frequency	Per cent
Low	Less than 97.87	1	6.67
Medium	Between 97.87 to 112.93	12	80
High	More than 112.93	2	13.33

To study the reaction of the students according to their achievement in the IRT, the IRT scores were divided into high and low categories. Students achieving the mean or above score in the IRT were in the high category and those achieving less than mean were in the low category. Accordingly the reaction scores of the high and low achievers in IRT were grouped and compared by using the 't' test. The value calculated for 't' was 1.589 which was below the tabulated value at 13 degrees of freedom, indicating that the difference in the means of the two groups was not significant. This shows that all the students who had used the programme had a positive reaction towards self-instructional materials irrespective of whether they have achieved more or less in the IRT.

The correlation between IRT and reaction scores was found to be 0.3812 which was also not significant.

The null hypothesis stating that there will be no significant difference in the reaction of the students in

relation to their achievement in the IRT scores was therefore accepted.

4.5 Major findings and discussion.

This study was an attempt to develop self-instructional material for selected aspects of children's clothing course, and to study its effectiveness by experimenting in the classroom for the development of the programme suitable media was essential, which was selected with the help of media selection charts presented by Andersons (4). These charts suggested the use of PLM along with illustrated instructions and sample pieces for the theory and practical sections.

Many researchers have used PLM very successfully. Some have used the linear style, others have experimented with the branching style, and still others have used different combinations in the form of multi-media strategies.

In this present study, linear style of PLM was used for the theory section and illustrated instructions in the printed form along with sample pieces were used for the practical section. Group 'B' taught by instructional material was compared with group 'A' which was taught by the conventional method. The effectiveness of the programme was to be judged on the basis of achievement of the students on a test for immediate retention and the same test administered after one month for delayed retention.

For the practical section, evaluation sheets were prepared and the garments stitched by the students were evaluated by experts as well as by the students themselves. Reaction of the students towards self-instructional materials were taken on a five point reaction scale developed by the investigator.

The mean achievement of the two groups in the IRT and DRT as seen in table 10 has been graphically represented by bar graph in fig.4, both of which indicate very clearly that group 'B' has achieved significantly higher than group 'A' both in the IRT and the DRT. The significant 't' values are given in table 10. The higher scores obtained by group 'B' both in the IRT and DRT prove that the programme was effective for teaching the theory section of Children's Clothing to the second year B.Sc (Home Science) students. Everette (26), Murphy (75), Johnson, Clowson and Shoffner (51), Sharma (103) and Banowich (7) have also found programmed learning to be better than the conventional method. Iyer (48), Shah and Krishnamurthy (100), Anderson (2), David (19), Gupta (35) Stout (108), Parlikar (81), Kapadia (54), Wissink (121), Guzelian (36), Govinda (34), Menon (70), Jayalakshimi (50) and Kim (58) have found Programmed Learning to be as good as the traditional or conventional method of teaching and have suggested that Programmed Learning can be used effectively as a teaching method.

When the scores in the IRT were categorized according to high and low categories in intelligence, English and Clothing and Textiles (fig. 7), it was seen that group 'B' had always achieved higher than group 'A' though the difference was significant only in the category of high in English and high in Clothing and Textiles. The difference in the mean achievement of the two groups was absolutely negligible in the category of low in English. The low achievers in intelligence and in Clothing and Textiles have also achieved well (around 70 per cent in both categories), indicating that both high as well as low achievers could learn effectively by instructional material for immediate retention. This could mean that the programme prepared was so simple and easily understandable that the effect of the language was nullified. The high achievement of those high in Clothing and Textiles could be due to the fact that they may be good in clothing construction and interested to do the work. McKeachie (68) says that student learning is closely tied to motivation. Students usually learn what they want to learn, but they often have great difficulty learning materials which does not interest them. Not all students are deeply interested in what we want to teach them. In this study also, all the students may not be equally interested to learn about children's clothing. Schank (95) White (120) and Bickford (11) have also found that motivational principles are necessary to make teaching-learning more effective.

The correlation of IRT with intelligence, English and Clothing and Textiles was samll and therefore not significant indicating that the IRT scores obtained were not affected by their scores in intelligence, English and Clothing and Textiles. This may be due to the fact that the programme prepared was easy to understand irrespective of whether the students were high graders or low graders. Here the gain was more for the low graders as the high graders mostly tend to do well. It is the low graders who always face the problems. Padhan (77) had also emphasized that programmed learning is effective both for high as well as low achievers.

When categorizing the DRT scores according to high and low categories in intelligence, English and Clothing and Textile (fig. 8), it was seen that in the higher categories though group 'B' had scored higher in all the three catagories, it was the high in Clothing and Textile category in which the difference was actually significant at 0.05 level. Again, this may be due to the fact that those who are genuinely interested to learn can also retain better. In the lower category group 'B' scored higher in categories of low in intelligence and low in English. In the third category of low in Clothing and Textile, it was group 'A' who scored higher than group 'B' though the difference was highly negligible. This indicates that instructional materials have been proved effective even in the case of delayed retention, as has been proved by Parlikar (81) and Anderson (2). The DRT scores were found to have a high correlation with the IRT

scores, significant at 0.01 level for the whole class and for group 'B', and significant at 0.05 level for group 'A'. This may be due to the fact that the DRT, was the same test used for IRT but administered only after an interval of one month. The DRT scores were also found to have a significant correlation with Clothing and Textiles. The reason for this could be that those who are good in Clothing and Textiles are able to do better in DRT as they can easily recollect what they knew.

The mean scores of the two groups on the 1st and 2nd garment as seen in table 13 have been graphically represented in figure 5. Garment one was constructed with the teachers guidance by group 'A' and with the use of instructional material by group 'B', but the second garment was stitched as a test, entirely on their own. Though the achievement in the second garment is lower than that in the first, the pattern is uniform for the whole class as well as group 'A' and group 'B'. This is also evident from the correlation matrix which shows that the scores in 1st garment and 2nd garment are highly correlated. The difference in the mean scores of the two groups on the 1st garment and second garment was not significant. At the same time the difference in the means of the 1st and 2nd garments for two methods was also not significant indicating that both the methods had been equally effective in teaching the skill of clothing construction and that the students have mastered the skill to a great extent as is seen from the mean of scores obtained (above 80 per

cent in first garment and above 75 per cent in 2nd garment). Berman and Reich (91) had also suggested that clothing and textiles, especially clothing constructions seems well suited to a self-instructional programme. Taylor (112) found programmed learning to be effective as an improved teaching tool and Fletcher (28) came to the conclusion that students working on instructional materials at their own pace had high levels of mastery. Murphy (74), Schank (95), White (120), Wissink (121), Johnson, Clawson and Shoffner (51) have all found programmed learning an effective method for teaching clothing construction. The mean scores of the two groups on the 1st garment when categorized according to intelligence, English and Clothing and Textile have been shown graphically in fig.9. The two groups did not have a difference that was statistically significant. In the lower intelligence category, the difference is obvious but is not large enough to be statistically significant. This indicates that intelligence, English and Clothing and Textile do not seem to have any effect on the 1st garment, which can be supported by the correlation matrix given in tables 29,30 and 31 showing that the 1st garment does not have any significant correlation with intelligence, English and Clothing and Textile.

The mean scores of the two groups on the 2nd garment have been represented graphically in fig. 10. The difference in the mean achievement of the two groups does not seem to be obvious from the figure except in the category of low in

English and high in Clothing and Textile. In both these cases the difference though obvious are not statistically significant, indicating that intelligence, English and Clothing and Textile do not seem to have any effect on the scores of the 2nd garment. However, the correlation matrix for group 'A' does show a relation between the 2nd garment with English and C.T scores significant at 0.05 level. The scores on the second garment for whole class were related to DRT scores, significant at 0.05 level. The reason for this may be that both DRT and the 2nd garment were based on their retention ability. The second garment was again correlated with the first garment for the whole class and for group 'B', significant at 0.01 level, which may be due to the fact that the second garment was a repetition of the first, and students of group 'B' had worked on their own to stitch the first garment and so they performed well on the second also. In group 'A' this correlation was not significant may be because while construction of the first garment they followed the instructions given by the teacher and did not have to think on their own and do the work.

As suggested by Reich et al, that it was decided self-evaluation would be a good means of making students realise their mistakes and the quality of their workmanship so that they can improve in future. It was seen that the mean of the self-evaluation scores did not differ significantly from the mean of the expert evaluated scores for both the groups, which shows that the students could realise their mistakes

and judge the quality of their work.

Any new programme or development, however effective or good it may be, can not be put into practice if the target population does not have a favourable attitude or reaction towards it. It is therefore necessary to know the views of the students before we can conclude that the programme is effective and can be used for teaching. Schank (95), White (120), Govinda (34), Fletcher (28), and Kim (58) found that students had favourable attitude towards instructional materials. Menon (70) and Joshi (52) found favourable attitude toward multi-media strategies also. However findings of the study conducted by Murphy (74) showed that students did agree that programmed teaching was good, but they also found it monotonous and boring.

In this study, the reactions of the students were found to be positive, i.e., in favour of self-instructional materials. They felt that it was easier to learn through self-instructional material as ideas were presented in small steps, and it made them more confident to study on their own.

Since the students had learnt effectively from the programme, both for theory and for practical, and at the same time they had shown a positive reaction towards self-instrutional materials, it can be concluded that the programme was effective for teaching children's clothing to the second year B.Sc. (Home Science) students.

In a practical class, where the number of students exceed 20, it becomes difficult for a single teacher to attend to the needs of all the students at a time. In such cases, self-instructional materials would be of great help in a way that students can work on their own and the teacher can serve as a guide, councellor and a catalytic agent to help the students learn effectively. Through immediate correction, errors would not lead to complications in the learning process. The slow but intelligent learner would not be at a disadvantage of keeping up with the class. The fast learners could save time and utilize it for more useful educational experiances. Instructional materials in Clothing and Textiles would also be very useful for home learning or distance education.