CHAPTER V

THE INSTRUCTIONAL STRATEGY - EXPERIMENT AND EVALUATION

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5.2.1 Evaluation of the Instructional Strategy as a Whole

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5.1 Conduct of the Experiment

As mentioned in chapter IV under caption 4.5, to study the effectiveness of instructional material for each component, it was tried out on B.Ed. students in their regular classroom situation during the year 1978-79. The tryout material was then modified on the basis of students' performance and suggestion, and made ready to study the effectiveness of instructional strategy as an integrated whole as well as of its components. For this purpose the final experiment was conducted during the year 1979-80. The sample consisted of 30 B.Ed. students of Mahila Mahavidyalaya, Baroda, affiliated to S.N.D.T. Women's University. The detailed schedule for the full period of experimentation was given to them. It was of the pattern as produced on the next page as 'Scheme of Experiment'.

All the students were oriented in the procedure to be followed while studying the course, and also about its objective (to reach to the mastery level attainment) to provide an effective instructional process in terms of their performance.

SCHEME OF EXPERIMENT

Stage 1

Administration of Intelligence Test, G.R.C.T., and JIM Motivation Scale

Stage 2

Unit	PLM (No.of Periods)	Lib.Reading (No. of sessions)	Discussion (No. of Periods)	Practical Work	Criterion Test (Marks)	Feedback Sessions (No.of Periods)
I	5	5	1	(To be submitted after discussion session)	50	1
II	3	2	1	"	50	1
III	3	3	1	"	50	1
		Writing reactions towards the approach				
IV	4	4	1	"	50	1
V	2	2	1	"	25	1
VI	3	2	1	"	50	1

Stage 3

Administration of Reaction Scale

Comprehensive Test	Administration of Comprehensive Test of 100 Marks	No time limit

At the first stage, the instruments selected to obtain the score on students' characteristics were administered, prior to the actual learning process.

During the second stage, according to the schedule, the investigator provided the programmed learning material to each student. Before they started reading the PLM, the brief introduction about the unit was given at the request of the students. After the introduction students started reading the programme and noting down the time when they started and when they stopped during that period of regular teaching. Those who could not finish within the scheduled time, were given extra time to finish the programme. So, opportunity was provided to every student to learn according to her speed and ability. The students learnt the unit through PLM which was followed by library reading.

For the library reading the list of reference books was provided along with PLM at the end of every unit. The instruction was given that they should read library references after they complete the PLM, not before reading PLM or in between. The number of library sessions required were planned in advance depending upon the length and nature of the content of each unit.

After students completed PLM and library reading they attended the discussion session. The discussion was considered as reviewing the material learnt, clarifying the doubts and seeing the relationship among different concepts. It was conducted on the basis of students' responses on PLM and

points of discussion given in advance. Though it was a planned discussion session, opportunity was given to the students to clarify any issue or doubt they had regarding contents, language of frames etc. To make the discussion fruitful, scope for maximum interaction was provided. Attempts were made to see that points identified were covered at the end of discussion session. Whenever the investigator felt that certain points were not covered, she instructed the students on those points during the discussion.

The practical work was assigned after they completed the unit through PLM and before they came for discussion. The consideration was that, if they have any difficulty about the practical work assigned to them they could clarify at the discussion session. So, no separate session for the practical work was arranged. Students had to submit their practical work done after the discussion session. Following the sequence in this fashion the learning process of the whole unit was completed.

Administration of the Criterion Test :

After the completion of the unit, the criterion test was given to measure the extent of the achievement of instructional objectives. At this stage the results on criterion test were analysed. The results revealed the specific

points of difficulty, where the students failed to answer correctly, specific points of learning that they had not grasped and needed more time to do so.

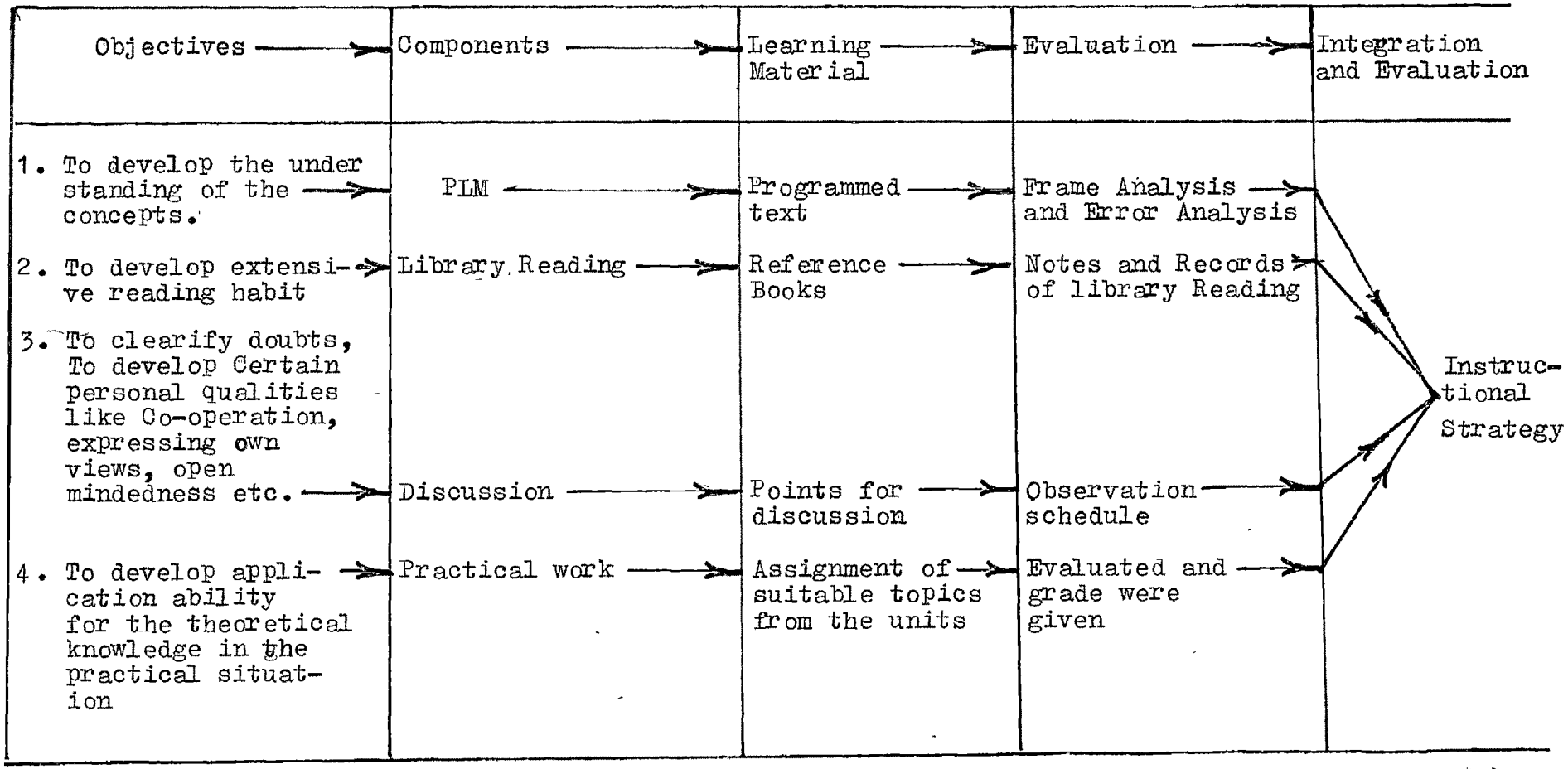
Organising Feedback Session :

After analysing the results feedback session was organized to discussion the performance of students. The purpose was to help the students to get clarity about their mistakes and to concentrate on their weak points before they start the next unit. During this session, students expressed their views regarding the suitability of questions included in the test and the coverage of the content. Thus, it served as the feedback to the investigator too, to modify the criterion test and to identify the points in instruction which needed modification.

Following the same order, all units were completed. At the end of all units, the comprehensive test was given to measure the overall performance of the students and effectiveness of the instructional strategy.

The whole procedure formed one sequence and hence resulted in the integration of components which can be named as the instructional strategy. In chapter I the model of the process of the development of strategy was proposed. From the following paradigm, it can be seen that the model has worked in the actual development of the strategy within the same framework.

PARADIGM OF DEVELOPED INSTRUCTIONAL STRATEGY



Affective aspect was studied by finding outpercentage of students' reactions to various components on four points scale as well as recording the verbal expression of students in terms of reactions to various components.

Cognitive aspect was studied by students' performance on each component, through rating by teachers on participation in group discussion, by evaluating their library notes and practical work done for each unit. while, performance on PLM was evaluated through frame-analysis and error-analysis.

5.2.1 Evaluation of the Instructional Strategy as a Whole

Table :5.1 : Mean, SD, Skewness, Percentiles of all Criterion Tests and Comprehensive Test

Percentiles	Units						Comprehensive test
	I	II	III	IV	V	VI	
90	43.80	47.83	48.55	48.42	48.66	47.62	89.50
80	41.15	46.16	47.60	47.35	47.83	45.75	88.00
70	39.50	44.50	46.55	46.28	47.00	44.16	86.50
60	38.50	41.50	46.50	45.20	46.16	43.16	84.00
50	36.50	38.87	44.80	44.00	45.33	42.16	82.50
40	35.00	37.00	43.50	42.50	44.50	41.16	79.50
30	32.50	35.12	42.00	41.00	42.35	40.16	75.50
20	24.50	32.00	40.50	39.50	40.20	35.25	72.50
10	27.00	27.00	37.80	34.50	36.10	34.50	69.50
Mean	36.50	39.00	44.36	42.93	42.44	42.5	80.60
S.D	5.67	7.08	3.90	4.66	5.01	4.85	7.82
SK	- 1.1	- 1.45	-1.62	- 2.54	- 2.95	- 1.1	- 3

* Maximum score for each unit was 50
* Maximum score for comprehensive test was 100.

It can be seen from the Table 5.1 that the performance of top 10 percent of students in all units was above 87 percent which is considered as performance with distinction. Further, the performance of bottom 10 percent of students was not less than 54 percent in all units. In case of Unit III, the performance of this group of students was 75 percent which is also considered as performance with distinction.

The performance of below 50 percent of students ranged from 54 percent to 90 percent. Similarly, the performance of above 50 percent of students ranged from 73 percent to 97 percent. Further, it can be seen that 70 percent of students had achieved above 70 percent of objectives stated for all the units except for Unit I.

The mean performance of the students on criterion tests in Units III, IV, V, VI and on comprehensive test was above 80 percent which can be considered very high. For the remaining two units viz. I and II also, the mean performance was 73 percent and 78 percent respectively.

Looking to the various percentiles, it can be said that instructional process through developing the strategy has positively influenced the achievement of students.

The standard criterion to decide the effectiveness of strategy is to reach the mastery level, where 100 percent of objectives are achieved by 100 percent of students. In the

present study, though the mastery level has not been achieved, the distribution of scores tends towards the higher side of the scale. This becomes clear by looking at coefficient of skewness. For the present distribution, the coefficient of skewness ranges from - 1.1 to - 3 for all the six units and comprehensive test. This means that scores are massed at the higher end of the scale and distribution of the scores is negatively skewed. Thus, the hypothesis that, since the strategy is based on particular logical sequence, it will have a favourable impact on the students' performance measured in terms of criterion tests and comprehensive test is not rejected. The findings of Yadava and Govinda (1977) and Sansanwal (1978) are in line with the present study. Both the studies have found that the introduction of components like library work, discussion, practical work, seminar along with PLM has brought the enrichment to the instructional process.

The results obtained through the instructional strategy get the support from different views presented here.

According to Schwazer (1973), 'A sign of successful teaching would therefore be a strong distribution to the right hand peak of the successful learning data'.

Davies*(1972) considers that the indicator of effective instruction is, 'The deliberate destruction of the normal curve of distribution in achievement scores'.

*Op.Cit., Davies P. 248.

Bloom* considers pedagogic endeavours ineffective if efficiency in learning can be represented in the form of normal curve.

It may, therefore, be stated that the breakdown of normal curve suggests the success of teaching - learning process. Thus, the negative skewness in the present study confirmed that the majority of students have learnt effectively through the instructional strategy and also shows a ray of hope for reaching mastery level.

Another criterion of studying the effectiveness of strategy was in terms of achievement of objectives at three levels, viz., knowledge, comprehension and application. The Table 5.2 presents the objectivewise (Knowledge, Comprehension and Application) analysis of scores, achieved on each of the six units and comprehensive test.

The mean achievement of marks obtained by students on Unit I were 20 out of 27 on knowledge objective, 13 out of 17 on comprehension objective and 4 out of 6 on application objective. Thus, the achievement of students on knowledge objective was 74.0 percent, on comprehension objective 76.47 percent and on application objective 66.6 percent. The achievement on knowledge and comprehension objective was more than the achievement on application objective. The total percentage of objectives achieved on Unit I was 73 percent. Usually the 60 percent performance is considered good and at that level the instructional process can be said to be effective. Looking to the percentage of performance at three

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Op.Cit., Bloom,P. 249.

Table :5.2: Objective Wise Analysis of the Achievement Scores

Units	Objectives									Total percentage of Objectives achieved
	KNOWLEDGE			COMPREHENSION			APPLICATION			
	Marks allotted	Mean marks obtained	Percentage of Obj.achieved	Marks allotted	Mean marks obtained	Percentage of Obj. achieved	Marks allotted	Mean marks obtained	Percentage of Obj.achieved	
I	27	20	74.0	17	13	76.47	6	4	66.6	73 %
II	30	24.25	80	12	10	83.33	8	5.26	70	78 %
III	21	18	85.7	29	26.36	89.6	-	-	-	88 %
IV	27	23.4	85	17	15.13	88.20	6	5	83.33	86 %
V	28	21	75	22	21	95.4	-	-	-	85 %
VI	25	22.5	91	25	20	80	-	-	-	85 %
Comprehension test	38	32.43	82	42	34	80	20	16	80	81 %

* Maximum score for each unit was 50

** Maximum score for comprehensive test was 100

different levels of objectives, the strategy can be said to be effective for Unit I.

For Unit II, the percentage of achievement of students on different objectives achieved can be read as 80 percent, 83.33 percent and 70 percent respectively. In comparison to Unit I, all the objectives got higher percentage of achievement in this unit.

For these three objectives, percentage varied from 70 percent to 83 percent. So, the achievement could be considered high which speaks of the effectiveness of strategy for learning Unit II.

The assessment of Unit III comprised of two levels of objectives; viz., knowledge and comprehension. The extent to which the students achieved on knowledge objective was 85.7 percent and on comprehension objective 89.6 percent. It is very apparent that percentage of achievement was very high and tended towards the mastery level. Therefore, for learning Unit III, the strategy had been proved very effective.

For Unit IV, the percentages of the achievement of students on different objectives were 85 percent, 88.20 percent and 83.33 percent respectively. The total percent of the achievement of objectives was 86 percent. It can be read from the Table 5.2, that the achievement of students on application objective could be raised from 66.6 percent to 83.33 percent. It can, therefore,

be claimed that the majority of the students achieved most of the objectives. This means that students learnt the Unit IV very effectively through the developed strategy.

In Unit V, the achievement of students on knowledge objective was 75 percent, while on comprehension objective it was 95.4 percent.

In Unit VI, the achievement of students on knowledge objective was 91 percent and on comprehension objective it was 80 percent. As discussed for the previous 4 units, percentage of achievement of students on criterion tests for Unit V and VI also can be considered very high and strategy could be taken as an effective strategy for learning the Units V and VI.

The comprehensive test for the course on Educational Evaluation was constructed to measure the overall performance of students, learning through the developed strategy. The test includes the major objectives of all the six units. The extent of the achievement of students on comprehensive test was 82 percent on knowledge objective, 80 percent on comprehension and 80 percent on application objective. The extent of the achievement of the total objectives was 81 percent.

The performance on comprehensive test was in line with the performance of various units. The total percentage of achievement at various units did not vary much except in Unit I. In Units II to VI and in comprehensive test, these percentages ranged between

78 percent to 88 percent only. This ascertained the consistency of the attainment of objectives at different criterion tests and on comprehensive test, as well as at various levels of objectives.

Thus, from the results of comprehensive test it can be observed that the achievement of objectives at three levels was above 80 percent, where the knowledge objective got the highest that is 82 percent, and comprehension and application objectives got the same that is 80 percent. Therefore, the hypothesis that, the impact of the strategy will be quite favourable on the achievement of students at three levels of objectives viz., knowledge, comprehension and application is not rejected.

It was mentioned in the beginning that the effectiveness of strategy can be judged by the extent to which the objectives are achieved. Looking to the performance in terms of various objectives the developed instructional strategy can be said to be effective at 80 percent attainment level. Thus, the strategy has facilitated the learning. It is, therefore, concluded that the developed strategy can be evaluated as an effective instructional strategy for the course in Educational Evaluation.

The objective-wise analysis of performance revealed that there is a consistency in the level of achievement on different criterion tests and comprehensive test. But this does not

represent the picture to judge whether the same students who have performed good or bad at criterion tests were able to perform good or bad at comprehensive test. To find out such internal consistency, coefficient of correlation was calculated between each unit test with comprehensive test, and among all units.

Table :5.3: Internal Correlation Between each Unit Test including Comprehensive Test (N = 30)

Units	Units						Compre-hensive test	Total Percentage of Achievement
	I	II	III	IV	V	VI		
I		.24	.56**	.59**	.41*	.38*	.60**	73 %
II	.24		.39*	.43*	.16	.40*	.15	78 %
III	.56**	.39*		.62**	.28	.54**	.35	88
IV	.59**	.43*	.62**		.32	.51**	.66**	86
V	.41*	.16	.28	.32		.38*	.40*	85
VI	.38*	.40*	.54**	.51**	.38*		.60**	85
Compre-hensive test								81

** at .01 significant level

* at .05 significant level

Looking to the values of correlation coefficient among different units and with comprehensive test, it is evident that in most of the cases the relationship is significant either at .01 level or at .05 level. (Table 5.3)

In comparison to significant relationship the cases of non-significant relationship are very few and their values are positive. To present such cases, Unit I is not related with Unit II and Unit II is not related with I and V. Similarly Units III and IV are not related with Unit V, and Unit V is not related with Unit II, III and IV, whereas Unit VI is related significantly with all the units.

From the results it can be observed that Unit V has non-significant relationship with highest number of units, while Unit VI has significant relationship with highest number of units.

On the whole, the results show the internal consistency among different units for the achievement. Therefore, to study the content of various units of the course the same strategy can be said to be effective.

This can be made more explicit by studying the correlation between each unit and comprehensive test,which is also given in the same table.

All the values were positive and varied from .15 to .66. The coefficient of correlation between the performance of Unit I, IV and VI with comprehensive test were .60, .66 and .60 respectively, which were positive and significant at .01 level, while in Unit V, it was .40 and found significant at .05 level. This shows that there was a remarkable internal consistency

between the results of Unit I, IV and VI with the results of comprehensive test. It means that those students who have benefited more in learning the content of these units through the developed strategy were also able to perform well on comprehensive test and vice versa.

One important point to note here is that, the less achievement is not in the sense of poor performance, but it is in the context of comparative performance of group.

The coefficient of correlation between Unit II and comprehensive test was .15 which is lowest amongst all units. It can be said that the performance of students in Unit II and comprehensive test was not consistent. The higher achiever at one test may not get same high score at another test and vice - versa. But, the total percentage of achievement in Unit II and comprehensive test were 78 percent and 81 percent respectively which can be considered consistent at the satisfactory level. Such consistency in total performance is sufficient enough to prove the effectiveness of strategy.

The coefficient of correlation of Unit III with comprehensive test was .35. This means that internal consistency between the performance in the two tests was not remarkable. Certain lower or middle students at one test, may

get higher performance at another test and vice versa. The results do not show much internal consistency but do show high performance in this unit i.e. 88 percent. At this level of performance, low or high internal consistency does not affect students' achievement in any of the two tests. It can be interpreted that majority of students were able to learn the Unit III effectively through the strategy. Thus, the less internal consistency at high level of performance of students did not affect the effectiveness of the strategy.

From the analysis of the results, it can be said that though the different components are distinct in their nature and operation, they have functioned in a co-ordinated manner and contributed to the achievement of the common goal. When this is the result, it is interesting as well as logical to ascertain the effectiveness of all its individual components separately.

5.2.2 Evaluation of the Individual Components

To study the effectiveness of each of the individual components, the evaluation of each component viz., PLM, library reading, discussion and practical work has been presented here separately.

First of all the cognitive aspect has been presented.

(i) Evaluation of PLM :

The PLM was included as the major component of the strategy. This means that PLM should be very effective. It was, therefore, essential to evaluate the effectiveness of PLM. The usual measures to evaluate the effectiveness of PLM are :

(a) Test scores

(b) Number of errors

(c) Time taken

(d) Students' attitude.

(a) Test Scores : In the present study, it was not possible to isolate the students' achievement obtained through PLM alone, as it was the combined result of all the four components. The effectiveness of PLM as a component, therefore, was studied in terms of number of errors made on different frames, time taken to complete the PLM, and students' attitude towards the PLM.

(b) Number of Errors : Errors that are made on the actual frames provide a second source of indication of a weak programme. For this purpose error-analysis was done.

In the Table 5.4 on the next page, the column, 'Frame No' represents the frames on which 2 or more than 2 students had

Table :5.4: Error-Analysis of PLM for all the Six Units
(N = 30)

UNIT i		UNIT II		UNIT III		UNIT IV		UNIT V		UNIT VI	
Frm. No. (208)	No.of Errors	Frm. No. (169)	No.of Errors	Frm. No. (119)	No.of Errors	Frm. No. (177)	No.of Errors	Frm. No. (90)	No.of Errors	Frm No. (123)	No.of Errors
8	2	19	2	12	2	4	3	-	-	78	6
12	3	20	2	20	2	44	2	-	-	80	2
19	2	40	2	31	2	55	4	-	-	101	2
21	5	43	3	44	2	56	3	-	-	103	2
33	4	96	2	67	2	63	2	-	-	115	3
35	3	97	3			81	4				
36	3					142	2				
59	3					159	2				
61	3										
62	4										
65	2										
71	2										
73	2										
75	3										
76	6										
86	2										
93	3										
94	2										
147	6										
157	4										
160	2										
182	3										
186	2										
198	2										
Total	24		6		5		8	-	-		5

Figures in the breckets ( ) indicate the Total number of Frames

given wrong responses. The column, 'No.of Errors' represents the number of students who had given wrong responses on that frame.

From the error-analysis, it can be seen that in Unit I, out of 208 frames, 24 frames were wrongly responded. In Unit II, out of 169 frames, students were wrong on 6 frames . In Unit III, out of 119 frames, students had given wrong responses for 5 frames. In Unit IV, students were wrong on 8 frames out of 177 frames. In Unit V, out of 90 frames, not a single frame was wrongly responded while in Unit VI, out of 123 frames 5 frames were wrongly responded.

Number of errors on each frame also did not exceed 6, particularly in Unit I and in Unit VI. In Unit II and III, number of errors were limited to 2 or 3 only. In Unit IV the highest number of errors made was 4. Whereas in Unit V all students were right on all frames.

Number of wrongly responded frames and number of errors on each frame can be considered very low. The less number of errors prove that almost all students were able to follow the PLM. This means that students have learnt through PLM, and the objective of PLM that it should provide knowledge of basic concepts seems fulfilled. Thus PLM can be considered effective with reference to errors made.

The usual criterion to decide about the effectiveness of PLM is mean percent of error-rate. But this is not much helpful for the programmer and, indeed, for the learner too, because what the programmer needs to know, is, what each student did on each frame, why he or she did it so, and how long it took him and what she feels about it.

With such aims, the frame-analysis and error-analysis for the present PLM was done. From the error-analysis it was possible to focus on those frames which were wrongly responded and on thost students, who responded wrongly (as group was not big in number). Efforts were made to study the wrong responses. Such frames were discussed with the students at the discussion session to get the feedback to modify them. Discussion became helpful in deciding whether wrong responses were due to their negligence or difficulty in understanding, or ambiguous wording or any weakness in the frame structure. Such interactions between students and the investigator provided the guidelines to know where and what to modify in PLM. On the basis of such guidelines the investigator made the final revision of PLM attempting to make it as effective as possible.

(c) Time Taken : To record the time taken by students to read through the PLM students were instructed to note down the time when they started reading PLM and when they stopped. In this

manner the total time required for each Unit by each of the students was counted. Finally the mean time required to study each unit was calculated, and it is given in Table 5.5 below.

Table :5.5: Maximum Time, Minimum Time, and Mean Time needed for each Unit (in Minutes)

Units	Time in Minutes		Difference in Time	Mean time
	Maximum	Minimum		
I	235	165	70	200 mts.
II	210	150	60	177 mts.
III	120	80	40	97 mts.
IV	215	145	70	148 mts.
V	95	65	30	82 mts.
VI	175	90	85	135 mts.

The mean time taken to read through the PLM in all units varied from 82 minutes to 200 minutes. The PLM was given during the regular classroom periods for all the units, so the variations in mean time can be considered due to the nature of the content and the length of each unit. The difference between the maximum and minimum time needed to read PLM varied from 30 minutes to 85 minutes. It can be well understood from the difference in time to complete the unit that PLM has provided an opportunity to every student to learn according to her own capacity. It is important to note here that though there were

variations in time, number of errors (Table 5.4) in each unit was considerably low.

So, time-factor, as one of the measures of PLM, provided here an important source to prove its effectiveness.

(d) Students' Attitudes : Students' attitudes were studied in terms of their reaction towards PLM. For this purpose reaction scale was constructed. Reaction scale represented the affective aspect more than the cognitive aspect. The details about this have been given in the later section, (under caption 5.3) where the reaction scale for all components is discussed.

The main considerations to study the effective contribution of a particular programme are its 'appropriateness', 'effectiveness' and 'practicability'.

The measures applied here to evaluate the PLM and results presented here provide the answer to all these three considerations, viz., 'appropriateness', 'effectiveness' and 'practicability' of the present PLM.

Appropriateness, Effectiveness, Practicability :

'Appropriateness' refers to the nature of the subject-matter or 'content' that is covered by programme.

In the present study, PLM developed includes the content of the course on Educational Evaluation prescribed by the university for B.Ed. students. Taking into consideration the

B.Ed. students selected for the experiment and the course 'Educational Evaluation' PLM used for the study can be called appropriate.

'Effectiveness' refers to how well the programme does, in fact, how well it attains certain prospective outcomes, how well it teaches whatever it is intended to teach, or in other words, the extent to which stated objectives are achieved.

The error-analysis (in Table 5.4) showed that number of wrongly responded frames and number of errors made on each frame were very less. This could be possible only when students follow the programme and learn the concept included in it. The results suggest that majority of students followed the programme. Thus, the programme was effective enough to facilitate their learning. In this context, the objective of PLM to provide the knowledge of basic concepts can be said to be fulfilled to a great extent. Thus, less number of wrongly responded frames and errors speak of the effectiveness of the programme.

'Practicability' refers to cost, feasibility, acceptance by students and teachers. In the present study, feasibility takes into account the time needed to complete the PLM and scheduling with other programmes of teacher training. With

respect to time, the important thing to consider is whether it is possible to complete the course within the time prescribed for it. The duration for the present course was one academic session. During the experiment, it was possible to complete the course through the programme within the time limit. Moreover, the positive side is that it has provided the scope for each individual student (looking to the variations in time, in Table 5.5) to learn according to her own speed. So, the time factor was quite favourable to make the programme practicable.

The programme was given during the regular period of classroom teaching. It was continued for the whole term without disturbing the schedule of other academic activities. So, it proves the practicability of working of the programme with other scheduled programme.

All these evidences prove that the developed PLM was quite practicable to be adopted for instructional work.

To decide about the acceptance by students, their attitudes were studied through reaction scale. Attitudes of students were quite positive and highly favourable towards PLM (Table 5.8). This suggested that students accepted the programme for their learning.

The investigator herself was the teacher to teach the course in the B.Ed. class in regular period. Hence the question

of acceptance by other teachers did not arise.

(ii) Evaluation of Library Reading :

The objective of library reading as one of the components, was to develop an independent study habit. This could be helpful for extensive reading.

To enhance learning certain references were suggested at the end of each unit of PLM. Students were instructed to complete the PLM and then go for library reading. All the students were also required to maintain records of their library work. The evaluation of the library reading was done on the basis of their library notes. From these records it was found that the response was not very satisfactory. Students were not conscious to make use of library references although some of them maintained the complete record of their reading.

Effectiveness and contribution of library reading can be well understood from their responses on Reaction Scale, which has been discussed (under caption 5.4). At this stage, it can be said that, to make the library reading an effective component, it is necessary to develop the attitude and habit by constant persuasion and by providing sufficient time in the regular time table.

(iii) Evaluation of Discussion :

As mentioned in chapter IV, to evaluate the discussion session observation schedule was prepared. The various items included in it and procedure followed has already been discussed there. The objectives to be achieved through the discussion as one of the components of the instructional strategy were (1) to clarify the doubts (2) to develop ability to express one's own views (3) to develop critical thinking and (4) to develop certain human values like openmindedness, tolerance, and objective attitude.

The evaluation of discussion session containing these objectives has been presented through observation schedule. For the sake of convenience to represent the data obtained, the items of the observation schedule have been divided in two tables (A) and (B).

Table :5.6(A): Number of Points covered, Questions asked and Observations made at Discussion Session

Items	Units					
	I	II	III	IV	V	VI
(i) No. of points covered	8	4	6	10	6	9
(ii) No. of simple questions	5	7	5	10	4	8
(iii) No. of higher level questions	6	6	6	10	10	12
(iv) No. of clarification questions	8	8	14	16	12	18
(v) No. of irrelevant questions	3	2	-	-	-	2
(vi) No. of observations	4	4	6	8	8	9
Total Number of Questions	22	23	25	36	26	40

(i) Number of Points covered : In the Table 5.6 (A), the column 'No. of Points covered' indicates how many points of the units were discussed at the discussion session. It accounts only those points which were pre-decided to make the evaluation clear and simpler and to judge how many points were covered during the discussion. The highest number of points covered were 10 in Unit IV and lowest number of points covered were 4 in Unit II.

To cover points during discussion means to review the material learnt, which can provide the scope to concentrate on those points where students need more clarification, to review some portion of material if necessary, to develop critical thinking, and to see relationship among different points. Such contribution of discussion has all possibilities to enrich the instructional work.

Looking to the number of points covered during the discussion session, it can be claimed that discussion proved helpful to enrich the instructional work at this level for the course 'Educational Evaluation'.

(ii) Types of Questions : The purpose to include different types of questions had been made clear earlier in chapter IV.

From the Table 5.6 (A), it can be seen that in all units different types of questions were raised. Total number of

questions asked by students varied from 22 to 40. Out of all types of questions students have asked more questions for clarifications in all units. Number of such questions varied from 8 to 18 from Unit I to Unit VI. Then comes the higher level questions. Number of such questions varied from 6 to 12. In all units students have asked less number of questions of simple type as compared to clarification questions and higher level questions. About the irrelevant questions, the number was negligible. They were 3, 2, 2, in Unit I, II and VI respectively.

One observation can be made here that in Unit IV and VI, the total number of questions asked by the students were 36 and 40 respectively and out of these questions clarification questions were 16 and 18 respectively. This shows that students have asked more number of questions in these two units in comparison to other units.

The question may arise here as to why were students more active in these two units ?

The above question can be explained in terms of experience the investigator had throughout the discussion session which is interpreted below.

1. Due to persuasion of teacher and experiences provided, students wmight have developed the confidence to ask more questions. This in turn became helpful to clarify their doubts.

2. The students might have developed the insight into the knowledge of basic concepts provided through PLM and therefore might have been curious to have more details about certain things e.g.,

   (a) Standardization of test
   (b) Various types of multiple questions
   (c) Construction of blue-print in various subjects
   (d) Weightage in different subjects.

This suggests that discussion can play a definite role in the improvement of instructional process if conducted with proper care.

Let us analyse how different types of questions contributed to make the discussion successful.

The less number of simple questions asked by students suggest that they had not to ask more about the basic knowledge of different concepts provided through PLM. Such data of discussion session prove that the objective of PLM to provide the knowledge of basic concepts has been achieved. Only few students were not able to understand the basic concepts. To such students discussion became more helpful to understand the basic concepts.

In comparison to simple questions students have asked more of higher level questions. Such questions have scope to raise controversial issues, to express their own views, and thus to maximise the interaction among group members. Students

could raise such questions only if they understood the basic concepts. Discussion of this level again confirmed their clarity about the concepts and provided them scope to develop critical thinking about the concepts.

The presence of more number of clarification questions in the table indicated that whatever the doubts students had, either regarding frames or contents, they got them clarified during the discussion session. This can be further confirmed from what the students had to say about the discussion session (under caption 5.4). It was their feeling that clarification at discussion helped them in three ways :

1. To perform better on criterion test
2. To develop confidence in what they have learnt through PLM and library reading
3. To feel presence of the teacher.

(iii) No. of Observations : Students were asked to express their views freely especially whenever the controversial situations occurred. The objective of such type of participation of students was to develop independent and critical thinking, to develop open-mindedness and objective attitude towards others' views.

During the discussion of first two units number of observations were less. They were only 4 each in Unit I and in

Unit II respectively but in later units, may be due to practice, it was observed that students were able to participate and express their views confidently. So, in Units III, IV, V and VI, observations made by students were 6, 8, 8 and 9 respectively. It shows the gradual increase in participation of students in the discussion.

The investigator herself guiding the discussion observed the manner of their expression and whenever felt necessary directed them to speak confidently and precisely, to be open-minded, and to be objective towards others' views. During the discussion such type of development had been observed and marked simultaneously in the columns representing personal qualities. The details of such observations have been presented in Section II of observation schedule. (Table 5.6(B))

The different observations made by students proved helpful to know their ability to grasp material, their difficulties, and certain personal qualities such as way of speaking, open-mindedness and tolerance. Thus, the analysis of different types of questions and observations from students throw light on the fruitfulness of discussion.

It can be said that during discussion different types of questions asked by students, have contributed to clarify

their doubts, to develop critical thinking and to provide scope to express their own views. This shows that discussion session became successful in achieving its stated objectives.

One of the objectives of discussion session was to develop human values like openmindedness, tolerance. and objective attitude towards others' views. As mentioned earlier in order to know the extent of the presence of such qualities, a four-point rating scale was prepared.

The rating was done on the basis of the items such as speaking confidently, speaking precisely, openness to others' ideas, elaborating ideas put forth and integration of different ideas included in the observation schedule. Simultaneously, rating was done for the number and type of questions asked, observations made by students and their personal qualities.

The maximum possible score for all those personal qualities was 15. To avoid the subjective evaluation, two teachers assigned the scores. So the combined maximum possible score was considered to be 30.

Table :5.6(B): Score of Personal Qualities achieved by Students at Discussion Session

No.	Units					
Marks out of	I 30	II 30	III 30	IV 30	V 30	VI 30
1	17	20	24	24	20	27
2	8	-	6	8	7	8
3	-	6	10	18	14	13
4	-	5	-	6	7	5
5	-	-	0	-	0	-
6	8	7	15	15	14	18
7	8	-	10	9	9	9
8	2	4	15	17	18	17
9	-	2	0	-	1	-
10	2	x	4	6	-	4
11	8	-	6	11	14	17
12	2	4	4	4	3	X
13	2	6	-	-	-	7
14	-	7	8	15	10	9
15	-	-	-	-	0	-
16	9	10	10	19	13	14
17	5	10	9	13	14	15
18	-	X	4	4	6	8
19	-	9	-	9	7	10
20	-	4	-	7	7	-
21	3	4	6	7	10	9
22	X	8	-	-	8	9
23	2	11	9	10	10	8
24	2	X	4	8	6	5
25	-	-	0	X	7	9
26	20	23	23	25	24	28
27	X	8	-	7	6	4
28	3	9	10	14	12	9
29	-	-	X	2	4	4
30	4	5	-	4	5	5

In the above table 0 = represents the absence of quality
- = represents no participation of students
X = represents absence of the student in the class.

The Table 5.6(B) reveals that,in Unit I, out of 30 students, 17 students took part in the discussion, whereas 11 students had not participated in the discussion. The maximum score was 20 and minimum score was 2. From among the students who had taken part in discussion, nearly 50 percent of them had scored 2 or 3. This shows their poor ability of discussion. Two students had scored 17 and 20, which can be considered to be above 50%. The score of remaining students varied from 5 to 9. The evaluation of discussion session for Unit I suggests that it was not at the satisfactory level.

In Unit II, out of 30 students, 7 students had not participated, but all of them were not the same students who had not participated earlier in Unit I. The score ranges from 2 to 23. Out of 20 students who took part in the discussion, 15 students scored below 10, while 3 students scored 10,10 and 11. It can be observed that the two students who scored high in Unit I also scored high in Unit II.

Number of students participated in discussion and some improvement in the score of individual students in Unit II, revealed the positive attitude of students and provided the encouragement to continue discussion for other units.

Before the discussion session of Unit III, the teacher provided some guidance to the students about, how to ask question, how to express their views, how to react. Such guidance

proved helpful to the students which can be seen from the score of Unit III. The score of this unit ranges from 4 to 24. Six students have scored between 10 to 15, whereas 10 students have scored between 4 to 9. This shows some improvement on both higher and lower sides of score.

During the discussion session of Unit IV more students have participated in comparison to first three units. Only 5 students have not taken part in the discussion. The score of 13 students was below 10. The increase in number of students and their score indicated the improvement in students' participation and success of discussion session.

Before getting ready for the discussion session of Unit V, the teacher insisted on speaking to each student at least once. This was the step in the direction of developing the habit and confidence in them to speak. The result was that except two students all tried to participate in the discussion. The student number 15 who was silent throughout all units also tried to speak. Her score was 0, it may be due to her first attempt of this kind. The same was observed in the case of Number 5. Others had participated well. In this unit, 10 students scored between 10 to 18, whereas 14 students scored between 1 to 9. It can be seen that, scores of the majority of the students were on lower side. This is quite obvious that due to the persuasion from teacher most of the students tried

to participate, but have not scored more. Such qualities cannot be developed fully within a short period of time. This can be considered as the beginning for such students. The discussion session was successful in the sense that more number of students were inspired to participate in the discussion.

In Unit VI, again 4 students remained silent. The score ranges from 4 to 28. From the Table 5.6(B), it can be seen that there are ups and downs in the scores of different students and also in number of participating students. Students' development can be well understood on broad range from Unit I to Unit VI that is the difference between their scores in the beginning and at the end of all discussion sessions.

From the scores presented in the table, it can be said that, in case of students numbers 2, 5, 9, 15, and 30, no development had taken place. Moreover, the contribution of students number 5 and 15 can be considered nil throughout all discussion sessions. Except these 7 students, the score of remaining students seems increasing from Unit I to Unit VI. From their improved score, it can be claimed that there was a remarkable development in them. Discussion sessions proved helpful to develop qualities of open-mindedness, objective attitude, tolerance in the majority of the students which

was one of the objectives of discussion session.

(iv) Evaluation of Practical Work :

The practical work in the present study aims at (1) providing practical experience in the construction and using of various tools of evaluation, (2) providing ability to apply theoretical knowledge to practical situations and (3) providing various skills needed by a teacher to carry out educational evaluation in schools.

It may be remembered here that for the evaluation of practical work grades were assigned on nine-points scale and the marks allotted to each grade were from 20 as presented below :

A+	A	A-	,	B+	B	B-	,	C+	C	C-
18	16	14	,	12	10	8	,	7	6	5

Table :5.7: Performance Score on Practical Work Transferred from the Grade

Score	f	cf	Grades
19 - 20	0	30	-
17 - 18	1	30	A +
15 - 16	6	29	A
13 - 14	11	23	A -
11 - 12	6	12	B +
9 - 10	4	6	B
7 - 8	2	2	B- , C+
5 - 6	0	0	C , C-

N=30

The highest possible score for the practical work was 20. From the data presented above, it can be seen that the score 12 can be considered as performance with 60 percent at B+ grade.

Looking to the table, the performance of lower 6 students was below 60 percent out of which 4 students scored 45 percent to 50 percent whereas only two students scored 35 percent to 40 percent. The performance of lowest two students was also not below the level of passing.

The performance of upper 18 students range from 70 percent to 90 percent out of which 11 students scored nearly 70 percent at A- grade, 6 students scored 80 percent at A grade, and 1 student scored nearly 90 percent at A+ grade. The performance at 70 percent and above is considered as performance with distinction. Here the performance of 18 students that is 60 percent students of the total group was at distinction level or above. At the same time not a single student had secured below the level of passing.

The good performance of the majority of the students shows that they had done the practical work effectively. They were able to construct and use various tools of evaluation such as objective test items, rating scale, checklist, blue print etc. Thus, the objective to provide the practical

experiences for the construction and use of various tools seems to be successful.

Another important aspect of the practical work to be evaluated was its contribution in the achievement of comprehensive test. To study the relationship between the performance of practical work and comprehensive test, the rank-correlation technique was employed. The assumption here was that those students who were able to perform well on practical work could equally perform well in the comprehensive test and vice-versa. The coefficient of rank correlation between performance on practical work and on comprehensive test was .71. The value was significant at .01 level. This suggests that performance on practical work and comprehensive test were highly related.

The evaluation of cognitive aspect of each individual component proved that out of four components, PLM, library reading, discussion and practical work, except the library reading, the three components were effective. Library reading needed to be handled in a more structural way followed by continuous persuasion of the students. It may work more effectively with the students having different attitudes.

5.3 Analysis of Students' Reactions Towards the Strategy and Its Components

In order to study the effectiveness of individual components with respect to affective aspect, students' reactions were obtained at two stages, namely : (i) during the experiment, and (ii) at the end of the experiment.

(i) During the Experiment : During the experiment, after the completion of 3 units, students were asked to express their opinion in writing about how different components helped them in learning.

There were two objectives to collect the reactions in the form of verbal expressions as mentioned below :

(a) Students could express what they actually felt. This may help to know the good and weak points of all individual components.

(b) Such verbal expressions may help more to understand the rationale behind their likes and dislikes about particular components, which is not possible through the reaction scale. This is very important for the suitability of the components with reference to the characteristics of the present sample.

All the verbal expressions were analysed by reading the reactions of each student. After reading the various expressions, the list of most common reactions, where more than 25 students that is more than 80 percent students agfeed, was prepared.Thus, the list including the reactions of students is presented hereunder:

(i) Learning from PLM was more clear, and specfic than learning from text book. (Favourable)

(ii) PLM was well planned and pre-planned. (Favourable)

(iii) Revision became boring and took more time.(Unfavourable)

(iv) Revision through variety in frames helped for clearer understanding of concepts and for retention. (Favourable)

(v) After reading PLM it was not necessary to read library references. (Unfavourable)

(vi) Library reading created confusion. (Unfavourable)

(vii) Library references provided guidance for further reading. (Favourable)

(viii) Discussion helped to clarify doubts. (Favourable)

(ix) Discussion helped to perform better at criterion tests. (Favourable)

(x) For students at B.Ed. level evaluation techniques are needed to be put into practice. In this sense practical work proved very useful. (Favourable)

(xi) Practical work is less useful in languages. (Unfavourable)

Although some of the students of this group had, one or two criticisms to offer the general tone of the comments was favourable.

(ii) At the End of the Experiment : At the end of all units reaction scale containing various aspects of four components was given. It was analysed by computing the average percentage

of responses under the four categories as shown below :

(i) Helped very much

(ii) Helped to some extent

(iii) Did not help much

(iv) Did not help at all

The results in percentage with respect to four categories are presented in the Table 5.8 below.

Table :5.8: Percentage of Reactions for Four Components of the Strategy

Components	Helped very much 4	Helped to some extent 3	Didn't help much 2	Didn't help at all 1
1. Reading the written material (PLM)				
(a) Reading written material arranged in a sequence of small steps	83.3	16.6		
(b) Reading the material at your own speed	46.6	53.3		
(c) Writing the answer at each step	53.3	46.6		
(d) Knowing the right answer and comparing it with one's responses	40.0	50.0	10.0	
(e) Teacher's help whenever needed while reading the material	60.0	33.3	6.6	
(f) Reading the review frames at the end of the concept	46.6	33.3	20.0	
(g) Reading the introduction to each unit	66.6	33.3		
Suggestions :				

(Continued...)

(Table 5.8 continued)

	Components	Helped very much 4	Helped to some extent 3	Didn't help much 2	Didn't help at all 1
II	Library Reading :				
	(a) Reading the references suggested at the end of each unit	-	43.33	53.33	3.33
	(b) Studying through the use of the written material and the suggested references	26.6	36.6	23.3	13.3
	Suggestions :				
III	Discussion :				
	(a) Clarify the points of doubt	93.33	6.66		
	(b) Discussion about the main points	33.3	63.3	3.33	
	(c) Getting acquainted with other's views	13.33	63.3	23.3	
	(d) Reacting to other's views	6.6	63.3	20.0	10.0
	(e) Studying through the combined use of written material, library followed by discussion	60.00	23.3	16.6	
	Suggestions :				
IV	Practical Work :				
	(a) Getting clarity about concepts after doing practical work	80.00	16.6	3.3	
	(b) Developing ability to apply the knowledge of evaluation in the school work	73.3	20.0	6.6	
	(c) Studying through the combined use of written material, library reading, discussion, practical work	43.3	53.3		
	Suggestions :				

(I) Reading the Written Material (PLM) :

This component contains seven aspects, (Table 5.8). Hundred percent of students expressed that out of these seven aspects, the following four aspects helped them in learning :

* reading written material arranged in a sequence of small steps
* reading materials at your own speed
* writing the answers at each step
* reading the introduction to each unit

For the aspect regarding 'Knowing the right answer and comparing it with one's responses' 40 percent of students expressed that it helped very much in learning, and 50 percent of students expressed that it helped to some extent. Similarly for the aspect 'Teacher's help whenever needed while reading the material'. 60 percent of students expressed that it helped very much in learning and 33 percent expressed that it helped to some extent.

For the aspect regarding, 'reading the review frames at the end of the concepts', percentage of favourable reaction was 79, which was slightly less in comparison to other six aspects of this component.

On the whole the percentage of reactions towards all aspects of this component was highly favourable.

The learning through PLM is found to be a self sufficient method of learning. It is a new approach because students upto

their graduation level, are accustomed to learn with the help of the teacher. In this context, looking to the percentage of favourable reactions, it can be said that this component proved effective in learning.

Percentagewise, the aspect, 'reading the review frames at the end of concept' has got less favourable percentage in comparison to very high percentage of other aspects. Similar expressions are found in verbal reactions also. They have expressed that,

* revision became boring and took more time (Unfavourable)
* revision helped for clearer understanding and for retention (Favourable).

This directs us to understand the nature of the sample, which can become helpful to prepare the learning material. Here in this case, though the students liked PLM, some of them did not need repetition. This may be due to their maturity (age group 24 - 35). The purpose of revision in learning is usually for retention. In this study, students are mature enough to understand and may not need more repetition to retain. This may be the reason for getting slightly less favourable reactions for this aspect. It can guide the programme writer to make necessary changes in the programme.

(II) Library Reading :

The second component consists of two aspects. Only 43 percent of students expressed that, 'reading the references at the end of each unit' helped them in learning and 62 percent expressed that, 'studying through the use of the written material and suggested references' helped them in learning.

For the first and second aspect about 57 percent and 36 percent of students respectively expressed that they did not help them in learning.

Looking to their verbal expressions, students have mentioned that -

* after reading PLM it was not necessary to read references (Unfavourable)
* library reading created confusion (Unfavourable)
* library reading provided guidance for further reading (favourable).

Regarding the library reading component, there were two almost equal groups of students having favourable and unfavourable reactions. This suggests that contribution of library reading in their learning was comparatively less. This may be because some of the students might not have developed the habit to utilize the library references. While conducting the experiment, investigator also came across certain situations where students expressed unfavourable attitude towards library reading. The

formation of habit needs considerably long period of time, which may not be fully possible during the period of one session of experiment.

Even though with such attitudes, due to timely persuasion from the investigator, students developed the habit, to a certain extent, to utilize the library references. It can be seen from the table 5.8 that 43 percent and 62 percent of the students had favourable reactions for first and second aspect respectively. To this extent, this component can be said to have contributed to the development of strategy and to make it effective.

Here, a remarkable point to note is that, though students did not favour library reading, they were very much satisfied with PLM (100 percent favourable reactions). This shows full acceptance of PLM on this fact, and hence, it could be taken as an effective component.

The following statement strengthens this :

* Learning from PLM was more clear and more specific than learning from text book'.

(III) Discussion :

There are five aspects of discussion component. Discussion was conducted immediately after the library reading. Hundred

percent of students expressed favourable reactions for the first aspect that is 'clarifying the points of doubts' helped them in learning, 93 percent of them expressed that it helped very much, whereas 7 percent of them expressed that it helped to some extent. Above 96 percent of students expressed that 'discussion about main points' helped them in learning. Of these 33 percent expressed that it helped very much, whereas 63 percent expressed that it helped to some extent. Only 3 percent were of the opinion that it did not help them in learning.

With respect to third and fourth aspect,

* getting acquainted with others' views, and

* reactions to others' views, 76 percent and 70 percent students respectively expressed favourable reactions. Whereas, 23 percent and 30 percent students respectively expressed that it did not help them in learning.

From the above, it can be observed that majority of the students expressed favourable reactions to all aspects, and hence 'Discussion' could be taken as an effective component of strategy.

Students were of the opinion that integration of PLM, library reading and discussion helped them in learning. Above 83 percent of students expressed favourable reactions for the aspect,

'studying' through the combined use of the written material, library references and discussion'. Among these, 60 percent expressed that it helped much in learning whereas 23 percent of students expressed that it helped to some extent.

The favourable reactions of the majority of students provide the scope to infer that integration of PLM with library reading and discussion has enriched the instructional process. This shows the effectiveness of combined and integrated use of three components.

(IV) Practical Work :

There are three aspects of the components of practical work. Out of these three aspects, for the first two aspects, 'getting clarity about concepts after doing practical work', and 'developing ability to apply the knowledge of evaluation in the school work' above 93 percent of students expressed their favourable reactions. Of these, 73 to 80 percent expressed that practical work helped them very much in learning whereas 16 to 20 percent of students expressed that it helped them to some extent.

It can be inferred from the favourable reactions of 93 percent of students that the component was very effective in the instructional process.

The following verbal expression also suggests the same:

' For students at B.Ed. class evaluation techniques are needed to put into practice. Practical work became very useful in this sense.'

The third aspect of this component is regarding the combined use of written material, library reading, discussion and practical work in a sequence as presented in the experiment. It was found that above 96 percent of students reacted favourably for studying through the integrated use of all these components.

The positive and highly favourable reactions of students towards the approach represent, on one side the affective aspect of students, and on the other side, prove that instructional strategy was effective and efficient to facilitate learning. But with all these data, it is also true that 100 percent mastery level has not been attained.

It may be assumed that there may be certain factors which could influence the achievement of learners learning through the strategy. There are certain unknown factors like memory, working situation, facilities at home or in the class-room which could influence the achievement, but were difficult to study and could not be accommodated in the study. There were, However, certain students' characteristics which could have been possible effect on achievement and which could be studied scientifically were included in the study.

The results of such factors would be helpful to decide whether the achievement of students had any relationship with students' characteristics or it was influenced by certain intervening unknown factors. For this purpose certain hypotheses regarding the relationship between achievement and students' characteristics viz., Intelligence, Gujarati language reading comprehension and academic motivation have been formulated. Therefore, the results have been viewed in this context.

5.4 Analysis of the Relationship Between Achievement and Students' Characteristics

To study such relationships the techniques of product moment correlation and partial correlation have been employed.

Table :5.9: The Co-efficient of Correlation (r) Between Four Variables (N = 30)

Variables	Intelligence	Language reading Comprehension	Academic Motivation
Achievement	.60**	.42*	.24
Intelligence		.56**	.30
Language reading Comprehension			.24
Academic Motivation			

** .01 Significant level
* .05 Significant level

It may be observed from the Table 5.9 above that the coefficient of correlation between achievement and intelligence

and achievement and Gujarati reading comprehension was .60 and .42 respectively which was positive and significant at .01 level and at .05 level respectively. The coefficient of correlation between achievement and academic motivation was .24. This value was positive but not significant. The value of relationship between intelligence and Gujarati reading comprehension was .56, which was significant at .01 level. Whereas the coefficient of correlation between intelligence and academic motivation was .30, which was positive but not significant. In the same manner, the coefficient of correlation between language and academic motivation was .24. This value was also positive but not significant.

Thus, the achievement of students was significantly related to intelligence and Gujarati reading comprehension, but it was not significantly related to academic motivation. The relationship between other variables though not significant in all cases were positive.

The positive relationships suggest that variables were inter-related to a certain extent. In such situations relationship between any two of these variables would be affected by the other variables. To arrive at the actual relationship between the two variables, it would be necessary to partial out the effect of remaining variables. The actual

relationships between any two variables have thus been studied by using the technique of partial correlation.

Table :5.10: The Partial Correlation Between Achievement and Intelligence, Gujarati Language Reading Comprehension and Academic Motivation

Variables	Achievement	Intelligence	Gujarati Language Comprehension	Academic Motivation
Achievement		.47**	.15	.05
Intelligence			.31	.16
Gujarati Language Comprehension				.09

** .01 Significant level

Achievement and Intelligence : The coefficient of partial correlation between achievement through instructional strategy and intelligence after partialing out the effect of reading comprehension and academic motivation was found to be .47, which was positive and significant at .01 level.

This suggests that, when the effect of other variables was partialled out, the magnitude of correlation between the two was reduced from .60 to .47. But the value .47 was still found to be significant at .01 level. It means that, though the magnitude of relationship has been reduced, intelligence was significantly related to the achievement to the extent of affecting it. Thus, the hypothesis that there is no significant relationship between

achievement of students through instructional strategy and their intelligence is rejected. Intelligence contributes in learning through instructional strategy.

Certain studies show the significant relationship between achievement through PLM and intelligence. These studies are of Alter (1962), Lambert (1962), Goel (1970), Bhusan (1973), Kapadia (1976), Govinda (1976). The result of the present study is also in the line of all these studies, though in this study PLM has not been utilized as a sole technique but as one of the components of the instructional strategy. In the other two studies similar in nature to the present study viz. (1) Sansanwal (1977) and (2) Sheshadri (1978) it was found that there was significant relationship between achievement and intelligence. In this context, it can be said that introduction of other instructional components has not been proved effective to change the relationship between intelligence and achievement. This may lead to infer that selection and operation of components may not prove equally effective to the group of students having different intelligence level.

Therefore, to study which group of students benefited more through the strategy, t-test was employed. The t-values between Higher, Average and Lower group can be studied from the Table 5.11 on the next page.

Table :5.11: The Difference Between Higher, Average and Lower Group in Different Variables (N = 30) 't-value

Variables	Mean Achievement Score	No.of Students in each group	't' values Higher Average	Higher Lower	Average Lower
Higher Intelligence	86.4	8	2.02	4.63**	1.92
Average Intelligence	80.25	16			
Lower Intelligence	73.83	6			
Higher Language Comprehension Ability	84.15	13	1.86	2.36*	.27
Average Language Comprehension Ability	77.55	9			
Lower Language Comprehension Ability	76.5	8			
Higher Academic Motivation	84.0	10	1.18	1.96	.75
Average Academic Motivation	80.3	10			
Lower Academic Motivation	78.0	10			

** Significant at .01 level
* Significant at .05 level

The t-value between high and average intelligence groups was 2.02 which was not found to be significant. The t-value between high and low intelligence groups was 4.63 which was found to be significant at .01 level. The mean achievement

score of students belonging to high intelligence group and average intelligence group did not differ significantly, whereas the mean achievement of students belonging to high and low intelligence group differed significantly. This means that though high and average intelligence groups differed in their intellectual ability they benefited equally in learning through the instructional strategy. The effect of intelligence on the achievement of average group is not said to be significant in this sense.

But the t-value between the average and lower intelligence groups was 1.92, which was not significant. Similarly the t-value between the average and higher intelligence groups was 2.02, which was not significant. It means that mean performance of average group of students did not differ significantly either with mean achievement of higher intelligence group or with that of lower intelligence group.

Achievement and Gujarati Language Reading Comprehension :

The actual relationship between achievement of students through instructional strategy and Gujarati language comprehension was studied by partialing out the effect of intelligence and academic a motivation. From the Table 5.10, it can be seen that the coefficient of partial correlation was .15, which was positive but not significant. The value of coefficient between achievement and Gujarati language reading comprehension changed from .42 which was significant at .05 level, to .15 which was

not significant. From the changed value it can be said that relationships were affected by other variables and the effect of these variables have been partialled out; Thus, the hypothesis that there is no significant relationship between achievement and Gujarati language reading comprehension ability is not rejected. It means that achievement of students has not been affected by their language ability. Language ability has not intervened in the process of instruction.

The t-value between high and average reading comprehension ability groups was 1.86. This value was not found significant. The t-value between high and low reading comprehension ability groups was found 2.36, which was significant at .05 level. The mean achievement of students belonging to high ability group was significantly higher than that of 'low group. Whereas the students of high and average L.R.C. ability did not differ in their mean achievement. Thus, students belonging to high and average reading comprehension ability were likely to learn effectively through the strategy than the students belonging to low reading comprehension ability.

The t-value between average and low reading comprehension was .27, which was also not found to be significant. This shows that mean achievement of students belonging to average and low

reading comprehension did not differ significantly. Since average and low reading comprehension ability groups did not differ significantly the low ability group was likely to learn with the same effectiveness as the average group could learn.

Achievement and Academic Motivation : The actual relationship between achievement and students' academic motivation was studied by partialing out the effect of intelligence and Gujarati language reading comprehension ability. The coefficient of partial correlation was .05. This value was not significant. Therefore, the hypothesis that there is no significant relationship between achievement and academic motivation of students is not rejected. It means students' academic motivation did not seem to intervene in learning through the present instructional strategy. Moreover, the achievement of students on higher side of the scale suggests that students could learn effectively through the strategy irrespective of their academic motivation.

The t-value between high and low academic motivation groups was found to be 1.18, which was not significant. Similarly, the t-values between high and average academic motivation, and average and low academic motivation was 1.96 and .75 respectively. These values were also not found to be significant. This means that the mean achievement of students

belonging to high, average and low academic motivation groups did not differ significantly. Thus, students having different academic motivation benefited equally through the learning of present instructional strategy. Academic motivation of students did not play significant role in learning through the developed instructional strategy.

5.5 Findings

1. (a) The developed strategy was found effective to the extent that 90 percent of students got 70 percent of marks on comprehensive test.

   (b) The developed strategy was found effective to the extent that 70 percent of students got 70 percent of marks on all criterion tests except on I.

   (c) The mean performance of students on comprehensive test and on all criterion tests except Iand II was above 80 percent.

2. The achievement on knowledge objective on comprehensive test was 82 percent which was highest in all. The achievement on comprehension and application objectives on comprehensive test was same that is 80 percent.

3. Out of four components three components PLM, Discussion and Practical Work were found effective in the following terms:

   (a) (i) PLM was found effective in terms of less number of errors on each frame and less number of wrongly responded frames.

(ii) Discussion was found effective in terms of its contribution to clarify doubts, to develop ability to participate in the discussion, to provide scope of interaction within group members, to develop certain personal qualities like open-mindedness, tolerance.

(iii) Practical work was found effective in terms of the performance of students on practical work assignment. It was found effective to the extent that 60 percent of students got above 60 percent of marks reaching upto 90 percent.

(b) The performance on the component library reading was not found satisfactory which was assessed in terms of their records of reference books and library notes.

(c) The percentage of students' reactions were highly favourable for PLM, discussion and practical work. The library reading got less percentage of favourable reactions in comparison to other three components.

4. The different components included in the strategy contributed separately as well as in an integrated fashion to make the developed instructional strategy effective.

5. The strategy proved feasible in respect of the time needed and with the other scheduled B.Ed. programme.

6. (a) Achievement of students through the instructional strategy was found to be significantly related with their intelligence.

(b) Achievement of students through the instructional strategy was not significantly related with their Gujarati-language reading comprehension ability.

(c) Achievement of students through the instructional strategy was not significantly related with their academic motivation.

7.(a) The mean achievement score of students belonging to high intelligence group was significantly higher than that of lower intelligence group. There was no significant difference in the mean achievement score of higher and average intelligence group, and average and lower intelligence groups.

(b) The mean achievement score of students belonging to high language reading comprehension ability group was significantly higher than that of low ability group. There was no significant difference in the mean achievement score of higher-average and average-lower language reading comprehension ability groups.

(c) The mean achievement score of students belonging to higher, average and lower academic motivation group of students did not differ significantly.

8. The strategy proved effective and efficient enough to work without getting affected by language ability and academic motivation, but it was affected by intelligence.

5.6 Discussion of Results

As evident from the results, 90 percent of students got 70 percent of marks on comprehensive test. Though the achievement of students through the instructional strategy can be considered very high, the mastery level was not attained. This might be because of certain intervening factors. The first important

factor may be the sample. In the present study sample consisted of only women students belonging to an age-group of 24 to 35 years. Women students of this age-group have certain family and social responsibilities which may not allow some of them to work in a required fashion. Moreover, learning through this strategy needed quite a different attitude and approach. This group especially is considered to have certain fixed conviction for teaching and learning. It was therefore, difficult to bring complete change in their attitude within a short period of one term.

Such factors might have influenced the performance of students to reach the mastery level. In this respect, effectiveness of the developed strategy may get affected. But when looking to the trend of distribution of scores on higher side, it can be concluded that the strategy as a whole was effective. This confirmed that the enrichment in the instructional process was brought through the combination and integration of different components PLM, library work, discussion and practical work.

Considering the achievement of objectives at three levels, knowledge, comprehension and application, it can be said that for Unit I, II, VI and comprehensive test, the achievement on knowledge objective was more than on comprehension objective. Whereas in Unit III, IV and V the achievement on comprehension objective was more than on knowledge objective. In comparison to knowledge

and comprehension objectives, the achievement on application objective was less. In this respect it can be worth considered that though the application objective was achieved less, its minimum attainment level was 66.6 percent which increased upto 83.33 percent during the instructional process of succeeding units. Therefore, it was less only in comparison to very high attainment of knowledge and comprehension objectives. Moreover, the increasing trend of the achievement that is from 66 percent to 83 percent suggests that such objective needs doing more practical work. As mentioned in chapter IV, for the achievement of this objective separate practical work of each unit was given. By providing experiences of practical work, it was possible to increase the level of achievement from 66 percent to 83 percent. It may be said that, due to the continuous practice of doing practical work, the students have developed the application ability gradually. This can be confirmed from the result on comprehensive test, where comprehension objective and application objective got the same percentage of achievement that is 80 percent. This means, taking into account, the performance in terms of various objectives, the developed instructional strategy can be said to be effective at 80 percent attainment level. Thus, the strategy facilitated the learning. It is, therefore concluded that the developed strategy can be evaluated as an effective instructional strategy to achieve various objectives of the course 'Educational Evaluation'.

The value of correlation coefficient of different units with comprehensive test show variations in results. Out of 6 units, the relationship between the level of performance of each of the four units that is I, IV, V and VI and that of comprehensive test were remarkably consistent. While the level of performance of other 2 units that is II and III with that of comprehensive test did not show any remarkable consistency. In spite of such variations in results, it was found that percentage of total achievement at various units and comprehensive test tend towards the high side and on restricted range of marks. The less consistency at high performance level suggest that no particular student or group of students remained consistent gainer or loser while studying through the strategy. But, majority of students were able to perform comparatively well either on one unit or another. When the learning process result in good performance for majority of students that process can be said an effective process. In this context, it can be concluded that the developed strategy was proved effective.

Regarding the PLM, less number of errors on each frame and less number of wrongly responded frames (Table 5.4) provided the evidences of its effectiveness. Moreover, difference in time taken by students to complete the units suggests that PLM provided the facility to complete the units according to

one's own speed. Thus, difference in time alongwith less number of errors, proved PLM effective in minimizing the individual differences in learning which is the usual limitation of classroom teaching. Considering the various results arrived at, it can be concluded that PLM was appropriate, effective, and practicable to contribute as one of the major components of instructional strategy to make its effective.

The response to library reading was very poor. It was found that students were more dependent on teacher and readymade material and were not habituted to make use of library references. At this stage, it can be said that, to make the library reading an effective component, it is necessary to develop the attitude and habit by constant persuasion and by providing sufficient time in the regular time table.

Looking at the number of points covered, different types of questions asked by students (Table 5.6 A) and development of ability to participate (Table 5.6 B) in the discussion, the contribution of the component discussion was found effective (i) (i) in clarifying doubts, (ii) in developing confidence in what they have learnt, (iii) in developing ability to express their own views and critical thinking, (iv) in providing scope of interaction within group members, and (v) in developing human values such as open-mindedness and tolerance. Considering the various contributions made by discussion as a component, it can

be said that discussion as one of the components occupies very important place in the improvement of instructional process. Therefore, in the process of development of the instructional strategy for the course on 'Educational Evaluation' the contribution of discussion as one of the components can be considered noteworthy towards the achievement of common goal that is to enrich the instructional process.

The rank correlation between performance on practical work and performance on comprehensive testw was found .71. It seems that the experiences provided to do the practical work influenced positively the performance on comprehensive test. The students who were able to do the practical work more successfully, were able to score more than those who were not. Thus, the practical work can contribute to the improvement in performance in the subject of Educational Evaluation. Looking to theøø contribution of practical work as one of the components of the strategy, it can be said that it seems to be an effective component in the process of the improvement of instructional work.

The high percentage of favourable reactions (Refer Table 5.8) towards each component except library reading and towards the integrated approach provided the evidence to consider the effective contribution of each individual component and integrated approach in learning. While, the less favourable reactions of students towards the library reading suggested the need to understar

the behaviours and attitudes of students to bring necessary changes in them during the instructional process, the changes can be brought over a long period of time with successive efforts.

The relationship between achievement through the instructional strategy and intelligence was found significant at .01 level. The t-value between high-average and average-lower intelligence group were not found significant. While the t - value between higher - lower intelligence group was found significant at .01 level. It proved that mean achievement of average intelligence group of students did not differ significantly either with the mean achievement of higher intelligence group or with lower intelligence group. This led to arrive at following conclusions :

(i) Other than intelligence certain unknown factors might have influenced the achievement of the students of the average intelligence group.

(ii) The significant relationship of intelligence with achievement has influenced more the achievement of high and low intelligence group of students. The high intelligence group benefited more while learning through the strategy in comparison to the low intelligence group.

(iii) The result of the average intelligence group can be said inconclusive. They may achieve still more or still less than what they have achieved depending upon the influence of other unknown factors in their learning.

From the results obtained, reading comprehension ability seems to affect the achievement of students having low ability. But the low ability group in the present study constitutes only 26 percent of students of the sample (Table 5.11). It can be said that in case of majority of students that is 74 percent, reading comprehension ability did not intervene in their achievement through the developed instructional strategy.

Regarding the ability of reading comprehension it is obvious that the students at this level should possess good comprehension ability of their mother-tongue and were expected to score very high. The results obtained on Gujarati language reading comprehension test also supported this view, as the minimum score on language ability was not less than 56 percent and the maximum score went upto 96 percent. It can be said from the results obtained that the students possess the ability of reading comprehension at the satisfactory level which provides sufficient scope for learning through the instructional strategy. For such students language ability should not be intervening factor in their achievement. The result of this variable in the present study is in conformity with this. This suggests that significant difference in mean achievement of high and low ability groups may not be due to the language but due to other unknown and intervening factors which might have remained out of the scope of this study.

The relationship between achievement through the instructional strategy and academic motivation was not found significant. The mean achievement of students belonging to high, average and low academic motivation groups did not differ significantly. Thus, students having different academic motivation benefitted equally through the teaching of present instructional strategy. Academic motivation of students did not play significant role in learning through the developed instructional strategy.

CHAPTER V

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