CHAPTER IV

VALIDATION OF THE STRATEGY

A detailed description regarding the development and initial tryout of the software material for the various components of the instructional strategy has been given in chapter III. The present chapter deals with the validation of the material thus refined. It stands to reason that once the instructional material is designed, developed and refined through initial tryout, it has to be validated against suitable criteria to study the nature of operation and the extent to which it would be effective in the real teaching situation for which it was intended. Validation also would yield empirical evidence as to the suitability of the strategy to the group, the effectiveness of each component which constituted the strategy as well as the strategy as a whole in achieving the set objectives. In other words validation of instructional material is to be carried out in order to determine whether the measured outcomes for given set of instructional inputs match the intended or prespecified outcomes.

Apart from this, evaluation becomes all the more imperative when the instructional material developed is intended to be exemplary. Evaluation would tell whether the extra effort put into its conception and development worth its trouble. In

addition, it would highlight whether the programme needs improved implementation or rather it should undergo refinement. In short, instructional material validation, as Tuckman (1979) puts it, is generally intended for 'acquiring information about program outcomes and input use that can be compared to desired target levels.'

According to Tuckman (1979) instructional programme evaluation may be carried out in three ways namely formative, summative or ex-post-facto. In formative approach to evaluation, results are fedback into the system in order to improve its function and quality. The purpose of evaluation in this case is not to judge but to improve and enhance programme operations and is based on comparing programme outcomes with programme goals. Unlike the first, the second category of evaluation namely summative, is meant for demonstration as well as documentation purposes. This type of evaluation determines the extent to which measured results on the objectives match or exceed results from alternative input systems thus bringing a comparison dimension to programme evaluation. The third category namely ex post facto is the study over blocks of time, of students and programmes. It attempts to reconstruct the past by examining past outcomes in order to determine whether programmes are producing desired results. This evaluation, thus, makes use of possible longitudinal approach.

A scrutiny of the above paragraph would doubtlessly point out the fact that evaluation of instructional material is carried out either internally or externally or through a combination of

both. Internal evaluation procedures may mainly be based on the study of criterion test scores both at unit as well as comprehensive levels. It may also be based on the reactions of students towards the different components of the programme in particular or the programme in its totality. The internal evaluation of instructional programmes may also be carried out in terms of expert opinion regarding its content, clarity, format, sequence, etc. The main purpose of the evaluation in this case, as already noted, is to revise the material in terms of sequence, language, and illustration basing on the empirical results with a view to improving the effectiveness of the material.

External evaluation of instructional material may be carried out against some external criteria. The external criteria may possibly be based on some other methods of instruction followed in teaching the same units under same environment so that a comparison of the performances through these could be seen in terms of the achievement scores. Such comparisons would throw light as to which instructional materials is better. The underlying purpose of the type of evaluation is that it can tell much about the advantages and weaknesses of the different programmes.

Although instructional programmes as already noted, could be evaluated externally and internally, it must be acknowledged that in the present study no attempt was made to evaluate the

the programme externally. The material used in the present study was textured out of a number of components selected, incorporated, sequenced and integrated on the basis of certain sound principles of teaching and learning. The programme made use of PLM as its main component which as noted in chapter II has been proved to be teaching as well as or even better than the traditional methods. So when PLM is integrated with other techniques at appropriate places, the resultant programme is supposed to be superior to any single traditional method and as such is not in an equal footing with other traditional methods to be compared for its effectiveness. Thus, as the present instructional material is the result of an eclectic approach to instruction, it was assumed that an external evaluation in this case was not of much importance.

Owing to reasons mentioned above, the present study was subjected only to internal evaluation. This is all the more so because evaluation of the material in this instance is not seen as 'a content to determine how good a program is or which programme is better' but 'to provide both a gauge of success that one can attempt to exceed as well as suggestions for program improvement' (Tuckman, 1979). In other words, evaluation, in this case, is meant for pointing to areas in which improvement is desired as well as suggesting ways of achieving improvement.

In the above paragraphs why and how evaluation of instructional programmes may be carried out has been discussed.

Agaim, it has been stated that as far as the present study is concerned only internal evaluation is attempted. In this connection it should be noted that in evaluating instructional programmes internally, output measurement may be taken into consideration more often than any other aspect. This is primarily so because these output represent the product of the instructional system. Moreover the output tells in clearcut terms how far the instructional goals have been achieved. Another reason why output has been focused as measures of the programme is owing to the fact that one can measure more skillfully and precisely the performance of the students than the performance of the system. Owing to reasons discussed above, the performance of the pupils both on comprehensive and criterion tests has been selected as an important base for evaluating the instructional material.

Another base on which internal evaluation of an instructional programme may be carried out is the reaction of the students. This is so because the students have learnt the course through the interaction with the material and therefore they know to what extent each of the component in the strategy has contributed to their achievement. So they, more than anybody else, would be in a position to react on the effectiveness of the various aspects of the material so as to help the evaluation of it.

As discussed above, an instructional strategy could be evaluated internally on the grounds of the performance of the students through it and through their reaction towards it. However, evaluation may not be perfect in every aspect as the pupils who learnt through it are often not in a position to react over it authoritatively regarding the mode of presentation, sequence, clarity, correctness of usage, etc. Only experts in the field will be in a position to do this precisely and accurately. Hence it is necessary that this aspect of evaluation should be included when a strategy of instruction is evaluated for the first time as it would lead a great way towards a better evaluation of the material under consideration.

In what follows an attempt is made to provide the details of the evaluation of the multimedia instructional strategy on lines mentioned above. It has been evaluated, as already seen, in terms of (i) students' performance in the criterion tests as well as comprehensive test, (ii) students' reaction towards the material and (iii) experts' reaction towards the material.

Sample : The experiment was carried out over a period of two academic years. All the students of Std. IX of the academic year 1977-78 of Navrachana High School, Baroda and the same students in the subsequent year (1978-'79) as they were promoted to Std. X were utilized as sample for validating the strategy. The sample consisted of only the experimental group as there was only internal evaluation. So all the 28 students mentioned above were utilized as sample for the evaluation of the strategy in

terms of achievement as well as reaction towards the instructional strategy.

The sample for studying the reaction of the experts consisted of three experts in the content area. One of the experts belonged to the English Department of M.S. University of Baroda and has a number of years experience in reaching pre-degree as well as degree class students, English grammar. Another was a school teacher of a reputed school. She had over a decade of experience in teaching secondary and higher secondary classes English to her credit. The third person belonged to an Institute of English and he has much insight into the content matter and its imparting.

Tools of Measurement : As for collecting data necessary for the evaluation of the instructional strategy in terms of achievement of the students through the strategy, they were collected through the development of a number of criterion measures. The details regarding the composition of these tests are given in chapter III under 'Criterion and Comprehensive Tests.'

In order to measure the reaction of the students towards the multi-media instructional strategy, a reaction scale has been developed by the investigator. The questionnaire structured for this purpose contained items regarding each component of the strategy. The items were based on the objectives the component was intended to attain in the strategy. Items were to be responded to a four point scale ranging from 'Did not help at all to 'Helped Very Much'. The validity of this instrument was determined through the opinions of experts and modified accordingly. The modified

form

form administered on the learners is presented in the appendix.

To measure the reaction of the experts, a questionnaire was prepared by the investigator. It consisted of a number of open ended questions pertaining to content matter, sequence, presentation, clarity, aptness, etc. with regard to each component of the strategy as well as the strategy in general. The questionnaire also provided enough scope for their suggestion regarding each aspect. The validity of the tool was determined towards the opinions of experts and was modified accordingly. The modified form which was administered on the experts is given in the Appendix.

Data Collection : The following procedure was followed in collecting data for the evaluation of the instructional strategy.

As mentioned earlier, the evaluation was partly based on the study of criterion test scores obtained through the administration of the test at the end of every unit. In addition to this, a comprehensive test also was developed for this purpose. The course being a compulsory one, all the students of the sample learnt through it. At the beginning of the course, students were given orientation regarding the instructional procedures to be adopted for the particular course. Then each student was given a copy of the material to enable him to work independently and at his own speed. In this way each unit was completed. At the end of each unit, before passing on to the next, a unit test for that unit was taken. Thus all the nine unit tests were

administered. After the completion of all the nine units, the comprehensive test was taken. All these tests including the comprehensive test were made on the basis of the terminal behaviours pertaining to the various units. Once the administration of the tests was complete items in the tests were scored and analysed for the purpose of validating the strategy.

The data regarding the reaction of the students towards the strategy was collected through the administration of the reaction's scale. For this purpose, the reaction scale was administered after the completion of all the nine units. The reaction of the students have been computed for the evaluation purpose.

For collecting data regarding experts' reaction towards the strategy the following steps were followed. First the concerned experts were told about the different objectives of the present study. They also told about the composition of the material and the theory behind it. Then they were given a copy of the whole material developed for the study. After studying the material, they were asked to put down their reactiom in the questionnaire supplied to them for this purpose. Their reactions were analysed for evaluation purpose.

1. The Strategy and the Student Performance

One of the ways of validation of the strategy, as already stated, was in terms of the students' performance. For this purpose the mean, S.D. and percentiles of the scores of both the comprehensive as well as unit tests were calculated so that

the distribution of the scores could be studied. The result is presented in Table IV-1 given below.

Table IV-1 : Percentiles, Mean, and S.D. of Scores Unit Tests I to IX and Comprehensive Test

	Unit I	Unit II	Unit III	Unit IV	Unit V	Unit VI	Unit VII	Unit VIII	Unit IX	Comprehensive Test
P_{90}	93.00	80.83	72.50	85.82	89.85	95.85	91.00	91.00	92.50	92.50
P_{80}	88.50	77.90	69.00	82.90	87.50	93.65	84.00	84.00	89.75	88.90
P_{75}	87.07	76.50	63.00	81.50	86.33	92.64	80.50	80.50	89.14	87.50
P_{70}	85.00	75.22	60.10	80.00	85.20	91.80	77.00	79.10	88.50	86.10
P_{60}	81.50	73.22	57.30	76.50	83.20	89.50	69.75	76.30	87.25	82.75
P_{50}	79.07	71.20	53.80	73.00	81.20	87.15	68.00	73.00	85.95	78.00
P_{40}	77.07	69.38	49.50	69.85	78.70	84.20	66.25	68.50	81.00	74.00
P_{30}	74.50	67.63	46.00	67.50	75.90	79.90	61.90	62.85	78.30	72.17
P_{25}	72.16	66.75	44.25	66.33	74.25	78.50	60.50	60.50	77.16	70.50
P_{20}	68.75	65.88	42.50	63.50	72.50	77.10	57.00	59.10	76.00	68.17
P_{10}	66.50	60.00	36.50	57.75	68.50	74.10	40.15	56.30	66.84	60.30
P_{00}	56.00	50.00	24.00	46.00	64.00	71.00	37.00	52.00	62.00	54.00
M	79.43	70.68	54.07	72.64	80.50	85.86	68.36	72.29	82.47	77.80
S.D.	9.95	8.20	13.91	10.40	8.50	8.06	16.26	12.92	9.25	13.34

The above table gives the result of the achievement of students both on the criterion tests as well as comprehensive test. When the unitwise analysis is studied from the table, it is observed that the percentage of students scoring 80 % and above of total marks is 40 percent in Unit I, 10 in Unit II, 30 in Unit IV, 50 in Unit V, 65 in Unit VI, 25 in Unit VII, 25 in

Unit VIII and 60 in Unit IX. In the comprehensive test only 40 percent of the students scored 80 percent and above. The result shows that there is a tendency of being close towards the mastery level of 100 percent scores in the subject. The result is moderately favourable in the case of Units I, II, VI and IX and in the comprehensive test. It is less favourable in the case of Units II, IV, VII and VIII whereas it is not very favourable in the case of Unit III.

If the mean scores are observed, it can be noted that the mean score in Unit I, II, IV, V, VI, VIII and IX is above 70 percent. In the case of Unit III and VII, the result is 54.07 percent and 68.36 percent respectively. Hence the mean scores in all units except III and VII are above 70 percent.

When the scores of S.D. are studied, it can be observed that in all units except III, IV, VII and VIII, the S.D. values are not higher than 10. In Unit III and VII where low performance is marked, the S.D. values are very high. It means the scores around the means of these two units are distributed in a more scattered manner.

The result shows that there is a general tendency of being close to mastery level. This means that most of the students who studied through the present multimedia instructional material, although have reached certain extent towards mastery level, have not achieved the optimum level.

2. The Strategy and the Student Reaction

The validation of the strategy, as discussed earlier, was also carried out on the basis of students' reaction. For this purpose the percentage for every alternative in each item in the reaction scale had been found and the chi-square test of equal probability has been applied. The result obtained is presented in the Table that follows. (Table IV-2)

Table IV-2 shows the students reaction towards the various components. Item I (a), (b) in the table shows the students' reaction towards the first component namely 'Introduction by the teacher'. Out of the two items pertaining the component, almost all the students opted either for 'Helped very much' or 'Helped to some extent'. The χ^2 values computed on both the items regarding this component are 29.99 and 28.56 respectively. These values are much more than the required value (11.35) to be significant at .01 level. This shows that students have highly positive reaction towards the component named 'Introduction by the Teacher.'

The Second item in the table shows students' reaction towards the second component namely Programmed Learning Material (PLM). Item II (i) (a) to (f) pertains to linear form. In all six items, the observed chi-square values, as the table indicates, are more than the required value (11.35) to be significant at .01 level. This means in all cases, almost all the students either opted for 'Helped very much' or 'Helped to some extent'.

Table IV-2 : Students' Reaction

Table of Chi-square values of Students' Reaction to Various Instructional Components

Sr. No.	Items	Alternatives				Chi-square value	Level of Significance	Interpretation at .01 level
		Helped very much	Helped to some extent	Did not help much	Did not Help at all			
1	2	3	4	5	6	7	8	9
I	Introduction by the teacher :							
	(a) the conversational style adopted in giving the introduction	18	9	0	1	29.99	11.35	Significant
	(b) in preparing for learning the content matter discussed in each unit	5	19	3	1	28.56	"	"
II	The reading of the PLM :							
	(i) Linear :							
	(a) The way of giving information in small steps in a sequential order	19	9	0	0	35.14	"	"
	(b) The response you have to make at each step.	11	15	2	0	22.14	"	"
	(c) The immediate knowledge about the correctness of your answer	13	13	2	0	20.85	"	"
	(d) The facility provided in the matter of time in going through the material at your own speed.	9	19	0	0	35.14	"	"
	(e) The continuous and uninterrupted way of the presentation of the matter.	12	11	5	0	13.42	"	"
	(f) The clues (prompts) provided in each frame in making your answer as accurate as possible	12	12	4	0	12.42	"	"

(Table IV-2 continued)

1	2	3	4	5	6	7	8	9
	(ii) Deviated Linear :							
	(a) The continuous description and development of each point at a stretch in a single frame	15	8	4	1	15.70	11.35	Significant
	(b) The emphasis given to the main points by underlining them	17	11	0	0	30.56	"	"
	(c) The brevity of the units owing to non-repetitive nature of the frames	15	5	8	0	16.85	"	"
	(iii) Branching :							
	(a) The comparatively bigger frames in this type of instructional material	6	11	9	2	9.42	"	Not Sig.
	(b) The employment of multiple choice questions at each branching frame	21	6	1	0	40.28	"	Significant
	(c) The detailed explanation of the concepts provided through the remedial frames	16	12	0	0	29.14	"	"
	(d) The leading of the learners to different instructional frames with the help of multiple choice items.	13	12	3	0	17.90	"	"
	(e) The stimulation given to the learner through the provision of alternative answers	11	15	2	0	21.99	"	"
III	Tables :							
	(a) The emphasis made in each table on the matter under discussion by marking it off by special columns	17	8	3	0	23.70	"	"

(Continued...)

(Table IV-2 continued)

1	2	3	4	5	6	7	8	9
	(b) Tables helped you in consolidating what had been learnt through the PLM	19	7	2	0	31.14	11.35	Significant
IV	Exercises :							
	The facility provided through exercises for putting into practice the principles you have learnt through the frames.	23	5	0	0	51.14	"	"
V	Key to Exercises :							
	The giving of the answers to each exercise at the end of every unit.	13	9	5	1	11.42	"	"
VI	Summary :							
	The summary helped in recalling or revising the matters already learnt	18	9	1	0	29.99	"	"
VII	Unit Tests :							
	(a) The unit tests given at the end of each unit helped in regular study.	22	6	0	0	46.28	"	"
	(b) The encouragement given to you for better learning by the continuous evaluation through the Unit Tests.	17	10	1	0	27.70	"	"

Hence students are found having high positive reaction towards this particular form of the component called Linear.

Item II (ii) (a) to (c) pertains to the Deviated linear form of the second component. In all the three points related to this form of PLM, most of the students have bee chosen either 'Helped much' or 'Helped to some extent'. Hence the observed chi-square value in all three cases (15.70, 30.56, 16.85) are more than the required value (11.35) to be significant at .01 level. The result shows that students have highly positive reaction towards the Deviated Linear form of PLM.

Item II (iii) (a) to (e) are related to the Branching form of the second component namely PLM. Out of the five points pertaining to Branching form of PLM, in four (b, c, d, and e) almost all the students opted either for 'Helped very much' or 'Helped to some extent'. The observed chi-square value in all four cases (40.28, 29.14, 17.90 and 21.99) are much more than the required value (11.35) to be significant at .01 level. However, in Item II (iii) (a) namely the comparatively bigger frames of branching form were not found to be as much helpful to all the students as in other cases. Here as many as 9 students found the bigger frames not to be of much help and two of them found that they have not helped at all. The observed chi-square value is 9.42 which is less than 11.35, the value required for being significant. Hence students do not have very significant reaction towards this point.

Except for this particular item, in all other points regarding the three forms of PLM, students have highly positive reaction. This shows that students have highly positive reaction to all the three forms of PLM.

The third component of the strategy is 'Tables'. The two items under this component are shown high positive reaction by the students. The computed chi-square value in these cases are 23.70 and 31.14 respectively and as such they are more than the required value to be significant at .01 level. This shows that most of the students have highly positive reaction towafds the component called 'Tables'.

The fourth component in the instructional strategy is 'Exercises'. The students have reacted positively towards this component. Almost all the students found exercises to be of much help. The observed chi-square value is 51.14 and it is much more than the required value to be significant at .01 level. Hence students have highly positive reaction towards this component 'Exercises'.

The fifth component of the strategy is Key to the Exercises. The observed chi-square value in this instance is 11.42 which is more than the required value for being significant at .01 level. Hence it shows that it is just significant at .01 level.

The sixth component is 'Summary'. The only item under it was found to be significant at .01 level as the observed

chi-square value 29.99 is more than 11.35 the required value to be significant at .01 level. This shows that the students have positive reactions towards 'Summary'.

The last of the components is Criterion tests. The students have shown high positive reaction towards this componemt as the observed chi-square value of the two items under it are 46.28 and 27.70 respectively. These values are much more than the required value to be significant at .01 level.

In short, it is noticed that out of the 23 items given regarding the various instructional components, most of the students opted either for the first alternative ('Helped very much') in 13 items or the second alternative ('Helped to some extent') in 9 items. However, in the remaining one item (II (iii) (a)) in the reactions of the students, there was no significant difference among the various alternatives. The above results shows that the students have highly positive reaction towards the instructional material in general and the different components in specific.

3. The Strategy and Experts' Reaction

The evaluation of the strategy as already discussed has also been carried out in terms of experts' reaction. For this purpose, their reaction has been obtained by means of the questionnaire prepared by the investigator. The data, then, were analysed qualitatively and put down as given below.

All the three content experts, whose opinion was being sought on the various aspects of the instructional material found the style of presentation of the first component namely 'Introduction by the teacher' quite satisfactory. They found it useful and attractive. One of them in fact remarked that students would be all the more 'attracted by the conversational style than by a cursive pattern or presentation through isolated sentences.'

On analysing the opinion of these experts regarding the logical sequence in the presentation of the content through PLM, two of them felt that logical sequence is maintained throughout the material. However one of them expressed doubt as to the logical sequence int the branching form of the PLM Method. As for the clarity, vividness and elaboration in the presentation of the content matter, two of them felt to be satisfactory. The third, however, felt certain doubt as to the clarity aspect of the Branching form of PLM.

All the three experts found the inductive way of presentation adopted useful. One of them has remarked that this form of 'presentation helps students to arrive at their own generalization of rules.'

When the opinion expressed by these experts about the usefulness of the component, 'Tables' was analysed, all of them were found unanimous in their opinion regarding their utility. Two of them felt that they were 'fairly well worked out' and are 'capable of rendering practical help' and would provide enough

pattern practice. All three of the experts felt that these tables are precisely, accurately and well thought out. One of them, however, suggested that had they been arranged on difficulty level, they would have been better.

On examining their opinion regarding the usefulness of the Exercises, all three of them were found to have felt that they were quite useful. In the same way they felt that the exercises were of good quality. One of them remarked that the same could even be used in the junior college classes. They were also favourable to the giving of the key to all the exercises. One of them, in fact, remarked that this would make the matter quite handy and would give a kind of reinforcement.

On explicating their reaction on the Summary Component, all three of them were found to have reacted unfavourably as it would help easy recapitulation.

On analysing their views on the usefulness of the Unit Tests, from the point of view of continuous evaluation and the subsequent motivation, two of them were found to have agreed that they are useful and will help in showing the extent of retentiveness and also help cumulative way to evaluate the students. One of them, however, differed in his opinion. He remarked that 'apparently the test that is added at the end of each unit would render itself to redundancy'. At the same time, he continued to remark that 'All the same patient work on the material will be fruitful.'

When examining the opinion expressed by the experts on the strategy as a whole, it was found that all of them have favourable reaction towards it. One of them remarked that it was prepared 'with a lot of study and thought given to the language teaching techniques.' Another remarked that the material 'takes care of a purely practical need... The material does serve a good practical purpose of providing matter for inculcating self study on some aspects of pedagogical English grammar.' In short all the three felt that the material would help the student in building up his knowledge about the language and give him practice in language work. They also felt that the strategy could profitably be utilized by a large number of students for learning language.

Discussion

The validation data presented above show that the instructional strategy has been successful to a certain extent in bringing about the desired output and that it has drawn positive reaction not only from the part of the pupils who have learnt through it but also from the content experts who examined it. This reveals that the hypothesis namely the multi-media strategy would be an effective one has been supported by empirical evidence. However, it should be acknowledged that the study has not achieved optimum level of mastery learning. Now one has to think why the instructional strategy has fallen short of the mastery level. Perhaps the strategy might not have employed all the requisites that would lead to mastery learning.

Instruction for mastery is almost always outcome based and as such it provides multiple ways for each student to reach the expected outcome. Although mastery learning instruction initially start with group based instruction, with each formative test, the teacher starts assigning various alternative instructionals to each student in accordance with his calibre. The laternative instructionals assigned may range from learning aids such as different text books, work books, audio-visuals, academic games and puzzles to effective exercises to co-operative small group study sessions and individual tutoring by classmates. Each student is also permitted to go at his own pace through the assigned track or stream to achieve the pre-determined standard of achievement. It should be acknowledged that in the present study, although a set of auto-instfuctionals were introduced allowing the pupils to go through them according to their own pace, and individual case had been taken, facility for alternative instructionals was not provided. All the pupils of the present study, irrespective of their levels of intelligence or calibre, went through a single set of instructionals from the beginning to the very end. Perhaps this might have been one of the causes why the instructional strategy has fallen short of mastery level.

It should be noted again that the pupils in this case had to work with the fixed framework of the prescribed syllabus where, except for this innovation, instruction for the most part was carried out through the traditional methods. Hence

pupils might have found themselves hardpressed for time and that they might have found it rather difficult to put up with such a situation. Although the material provided scope for the pupils to proceed at their own rate, the practicability of the instructional strategy in the existing educational system might have put certain restraint on the time allotted to each unit. Therefore, students might not have devoted as much time as required for learning through it systematically owing to responsibility in studying other subjects which are equally important.

Again, in the teaching of languages, multi-sensory devices such as T.V., films etc. can play a vital role. The inclusion of these into the texture of instruction would help speedier learning. Perhaps the gap between the result of the present study and mastery level may some extent be attributed to the non-inclusion of these devices in the present study. Had they been introduced into the structure of the study, perhaps a better result would have been possible.

As for the reaction of both the pupils and the content experts towards the strategy, it is highly on the positive side. Since each and every objective in teaching the units is identified and methods are selected, incorporated and integrated in such a manner as to meet the objectives, and the content matter is preserved its proper sequence, no wonder that the strategy has won highly positive reaction not only

from the experts but also from the students. Moreover the strategy allowed the pupils to interact with it in their own way and to study through it accordingly to their own pace. Thus, it provided not only active participation from the part of the pupils but also immediate feedback. Because of these reasons, no wonder, the pupils as well as content experts reacted positively to that extent as indicated by the validation data. Hence the hypothesis that the multimedia strategy would draw high positive reaction from the pupils as well as experts has come to be supported by the empirical data, as far as the present study is concerned.

Again, as noted in the foregoing section of this chapter, the instructional strategy, while possessing some of the good qualities that brought positive reaction from the pupils as well as content experts and mastery learning to a certain extent from the part of the pupils, has fallen short of bringing about the optimum level of results. Some of the possible reasons as why this had happened, have already been discussed. While discussing, it has been noted that the present study did not provide alternative instructionals to pupils. As everyone knows it is not an easy task not only because of the multiplicity of techniques and methods available but also because of the non-availability of proper knowledge regarding how they function under various situations with pupils of varied calibre. Hence various techniques used for instruction are to be brought under

testing whereby empirical evidences can be obtained regarding their functioning. This will tell in unambiguous language how each technique functions with different groups of pupils in bringing about mastery learning. If the nature of the functioning of such techniques are determined on the basis of adequate and valid empirical data during the formation of strategies such as this, it would take one a long way towards the attainment of mastery level. Once details regarding the various techniques or modes of presentation and how they function with individuals of varying calibre under given situation are available, they would help mastery learning to a greater extent. Visualising this, the present study has attempted to learn about the comparative effectiveness of the three forms of PLM namely linear, deviated linear and branching. Details regarding their aspects of the study are presented in the ensuing chapter.
