CHAPTER - V

S U M M A R Y

5.1 Introduction:

Despite great advances in knowledge about student learning and the investment of tremendous amounts of time, effort and money, our schools still have not moved very far towards the goal of increased learning for all students. The present policies and practices continue to reproduce the same normal achievement distribution in the learning of classrooms after classroom of students that was produced in the learning of the students' parents and perhaps grant-parents. Thus the schools continue to provide successful and rewarding learning experiences for only about one-third of our learners.

A student's inability to meet the school's learning requirements tends to cause the development of a negative self concept in minimally the academic area. Such experiences limit an individual's chances for economic survival and security in the world of work. He is likely to acquire neither the basic skills nor the interests and attitudes required to obtain and/or maintain a job which can ensure him a decent standard of living. Such experiences also jeopardize the individual's psychological well-being. Recent researches in the

education field indicate a strong, perhaps causal link between a pupil's history of school learning, success or failure and his personality development. Further, for about 20 percent of all students, the repeated frustration, humiliation and despair engendered by their inability to meet these requirements may cause mental health problems.

Mastery learning (1968) offers a powerful new approach to student learning which can provide almost all students with the successful and rewarding learning experiences which are now allowed to only a few. It proposes that all or almost all students can master what they are taught. Further, it suggests procedures whereby each student's instruction and learning can be so managed, within the context of ordinary group-based classroom instruction as to promote his fullest development. Mastery learning enables 75 to 90 percent of the students to achieve to the same high level as the top 25 percent learning under typical group-based instructional methods. It also makes student learning more efficient than conventional approaches. Students learn more material in less time. Finally, mastery learning produces markedly greater student interest in and attitude towards the subject learned than usual classroom method.

It is high time for us to develop some such strategy for school subjects and to see that students

are benefited by the use of such strategies in attaining mastery level in respective school subjects. Thinking along the same line the present investigation was carried out. The present investigation can be viewed in two parts, which are complimentary in nature. The first part was developmental in nature, the second part was an experimental part. Statement of the present problem, research hypothesis and objectives are stated below.

I. Statement of the Problem:

The present study is titled as "A Strategy for Mastery Learning in Fifth-Grade Geometry".

II. Research Hypothesis:

The strategy for mastery learning will be effective in leading most of the pupils to the mastery level.

III. Objectives:

(i) To develop a strategy for mastery learning in Geometry for the pupils of fifth grade.

(ii) To validate the effectiveness of the developed strategy.

IV. Definition of the Terms Used:

(i) Mastery Learning: For this study mastery learning is defined as follows:

Mastery learning indicates the level which each pupil attains when he/she is able to give

atleast 80 percent correct responses on a formative test/summative test that has been constructed based on the instructional objectives with respect to that unit/course which each pupil is expected to achieve.

(ii) Most of the pupils means at least 75 percent of the pupils under experiment.

(iii) Instructional Strategy: Development of the instructional strategy to attain mastery learning is the main task of the present investigation.

This strategy comprises components which are to be used according to the demands of the teaching learning situation. The components are as follows which were to be employed in suitable combinations in the strategy.

(1) Instruction
(2) Structured lecture
(3) Discussion session
(4) Problem solving
(5) Developing mathematical models
(6) Individualised tutorial
(7) PLM
(8) Text books and work books
(9) Small group study sessions
(10) Mathematical games
(11) Review and Practising

(12) Assignments

(13) Feedback session

(14) Formative and summative tests.

The details of these components is given in the third chapter entitled 'The Problem and Procedure'.

5.2 Research Design:

The study is basically a developmental effort in that the instructional inputs hypothesised to have the potential to yield definite results in terms of pupils' achievement were selected, organised and validated. This effort has been carried out in the actual context without disturbing the setting for experimental purposes so that all variables which are normally at play in teaching learning situations are operative during the investigation. In this way the investigation was designed as per the requirements typical of an 'a experimental' study where the concern is to carry out the investigations under actual field conditions.

The study consisted of two try outs; namely initial tryout and final tryout. During both the tryouts the experimental group which was taught using the developed strategy by the investigator was compared with the other group, namely the control group, in the same school. In both the tryouts the experimental and control groups were matched for the mean and SD of IQ of the groups as it is

impracticable or impossible to set up groups in which subjects have been matched person to person in real classroom situations. The matching variable I.Q. for both the groups was measured with the help of Dr. G. B. Shah's test for measuring intelligence.

The matched groups were compared to study the relative effectiveness in terms of scholastic achievement. Also the relationship between intelligence level and achievement were studied from the data obtained.

It had been decided that the performance of the learners would be continuously assessed by administering a formative criterian test which was also diagnostic in nature after learning through each unit of the developed strategy. A descriptive analysis of these criterion test scores would be able to reflect the effectiveness of the developed strategy in achieving instructional objectives. Measures like mean, SD, t-value, percentiles etc. of the criterion test scores would be computed for indicating the extent of performance of the learners. A summative criterion test has also been provided at the end of the geometry course in order to assess the overall performance of the learners.

5.3 Sampling:

The sample for initial tryout consisted of 55 pupils in the experimental group and 55 pupils in the control group during the months of August and September in the academic session 1984-85 from the Convent of Jesus and Mary School. The experiment was conducted for five weeks.

In the final field tryout sample consisted of 51 pupils in the experimental group and 43 pupils in the control group during the months of November and February of the academic session 1984-85 from the Baroda High School. The experiment was conducted for five weeks.

5.4 Procedure:

This study was conducted under three phases. In the first phase the investigator observed the actual teaching learning process in Mathematics class (only in the fifth grade) in different schools and discussed about the various problems arising during the teaching learning process with different mathematics teachers. This type of observation and discussion was helpful to the investigator to develop appropriate instructional strategy in phase 2.

During the second phase initial tryout was carried out. In this tryout before starting the experiment the experimental group was matched with the other group in

terms of mean and standard deviation of I.Q. of both these groups as it is impracticable to set up groups in which subjects have been matched person to person. An intelligence test developed by Dr. G. B. Shah was used to find out I.Q. of each pupil.

Before actual teaching of Geometry in the experimental group, the entire Geometry course content was arranged in proper sequence and also general and specific objectives were formulated. Then the teaching learning process was started with pupils of the experimental group, i.e. the group-A, of the fifth grade. After completing each unit formative criterion tests were developed consulting subject experts. These formative criterion tests were diagnostic in nature.

The formative criterion test was administered in the experimental group which helped in checking the learning progress of each pupil and provided feedback to the investigator and the learner. Based on this the individual learning difficulties were diagnosed and accordingly the specific remedy was prescribed. Here the correctives were alternative learning resources such as the use of PLM, text book and work book, preparing mathematical model etc. After the corrective process is completed, a second formative test was administered to check on the success of correctives used and to assure

the mastery achieved by the pupils before introducing the next unit.

As the investigator had to take into consideration the time limit given by the school authorities, not more than two formative tests were conducted for each unit.

Instructions for all other units were organised in a similar way utilising a suitable combination of techniques and input materials. To maintain the pupils' learning over a long period of time, review and practice were conducted at some intervals. Then summative evaluation was done after the completion of all units of Geometry course in the experimental group.

At the same time, the same summative test was given to the control group i.e. group-B (which was matched with group-A) in the same school to compare the scholastic achievements of both these groups which were taught by different methods by different teachers. The Group A was taught by the investigator using the developed strategy for mastery learning in the fifth grade Geometry, while the group B was taught by other teacher of the same school using conventional method (lecture method).

The results of the initial tryout were helpful to the investigator to modify the developed strategy and apply it in the third phase i.e. during the phase of final tryout.

In the third phase the final tryout was carried out in another school for five weeks.

During this period, the strategy developed for mastery learning in the fifth grade Geometry in the second phase was applied except for some few changes in the procedure as well as in using combination of instructional components in teaching some concepts of Geometry.

In the third phase before starting the experiment, parents of the pupils were also informed regarding the experiment going on in the school, by sending cyclostyled copies of a letter mentioning about the experiment to the parents; the copy of which is kept in the apendix.After informing the parents about the experiment and requesting them to co-operate during the experiment by sending their children regularly to the school, the actual teaching learning was started in the experimental group by the investigator using the developed strategy. In the final tryout also the experimental and the control groups were matched in the same way as in the initial tryout. After completing each unit of the Geometry course, a formative criterion test was conducted to the experimental group which was diagnostic in nature and also prepared by consulting subject experts. Each formative criterion test which was administered in the experimental group was helpful in checking the learning progress of each

pupil of the experimental group and provided feedback to the investigator and the learner. Based on this, the individual learning difficulties were diagnosed and accordingly the specific remedy was prescribed. Here the correctives or remedials were alternative learning resources or instructional components such as the use of PLM, text-book and work book, preparing mathematical models discussion, mathematical game etc. After the corrective process is completed, a second formative test was administered to check on the success of correctives used and to assure the mastery achieved by the pupils before introducing the next unit. As the investigator had to take into consideration the time limit (five weeks) given by the school authorities, not more than two formative tests were conducted for each unit, even though all pupils of experimental group might not have attained mastery level in respective unit.

Instructions for all units were organised in a similar way utilising a suitable combination of techniques and input materials. To maintain the pupils' learning over a long period of time, review and practice were conducted at some intervals. Then summative evaluation was done after the completion of all units of Geometry course in the experimental group.

At the same time; the same summative test was given to the control group i.e. group B (which was matched with group A on mean and standard deviation of I.Q. of both these groups) in the same school to compare the scholastic achievements of both these groups which were taught by different methods by different teachers. Group A was taught by the investigator using the developed strategy for mastery learning in fifth grade Geometry; while group B was taught by other teacher of the same school using conventional method (lecture method).

After this a questionnaire was given to each pupil of the experimental group to know their reactions about the experiment conducted.

5.5 Data Collection:

The data collected during the experiment was mainly in two forms. One was in the form of scores of scholastic achievement in the formative and summative tests. The second was in the form of answers given to the questionnaire given to the pupils of the experimental group.

Both types of data were further analysed and interpreted as discussed in the fourth chapter namely 'Analysis and Interpretation' based on which some

conclusions were drawn which are given in the next article.

5.6 Major Findings and Conclusions:

1. The hypothesis proposed in this study is "The strategy for mastery learning will be effective in leading most of the pupils to the mastery level" wherein most of the pupils means at least 75 percent of pupils. Since this has not happened, the hypothesis is not fully acceptable. But at the same time one can not reject the hypothesis because 68.63 percent of pupils did achieve the mastery level in Geometry within five weeks (refer Table 4.2.1 (d)). This implies that the strategy developed for mastery learning did work well, and hence the hypothesis is partially retained. The time constraint is the main factor for not reaching the target.

2. As many as 88.24 percent of pupils of the experimental group scored minimum of 70 percent marks in the summative criterion test and except for the two pupils mentioned in the article 4.4 all the pupils have scored minimum of 65 percent of marks; on the other hand just 11.63 percent of pupils of the control group could achieve mastery and as many as 51.16 percent of pupils have

scored below 60 percent of marks. Since the two groups were matched, this much higher achievements of the experimental group must be due to the mastery learning strategy used by the investigator to teach this group. This means the developed strategy is much superior to the conventional method used by another teacher to teach the control group.

3. The values of the mean and the standard deviation for the experimental group at the final tryout are 82.09 and 10.51 respectively, and those for the control group are 58.95 and 15.77 as can be seen from the table 4.2.1 (c). This shows that the experimental group is more homogeneous and its mean achievement is significantly higher than that of the control group. It can be concluded that this must be due to the influence of the mastery learning strategy developed and used by the investigator because the two groups were matched.

4. The different graphs plotted for scholastic achievements versus frequencies of experimental and control groups, that is, the achievement distribution curves of the two groups, clearly show that for the control group they are very nearer to the normal distribution curve and for the experimental group they are left skewed and high peaked towards higher

achievement side. This shows very clearly that the developed strategy is far superior than the conventional method.

5. The t-value obtained between the experimental and the control groups is highly significant at .05 as well as at .01 level in both the tryouts (refer table 4.2.1 (a) and 4.2.1(c)). This must be due to the greater impact of the developed strategy for mastery learning in the experimental group.

6. The values of the corelation coefficient r for the experimental and the control groups are respectively 0.634 and 0.805 at the initial tryout and 0.446 and 0.620 at the final tryout. It can be said from this that the dependence of the achievements of pupils on their I.Q.s can be reduced considerably by using the strategy for mastery learning developed by the investigator. In fact there are several cases wherein pupils with low I.Q. could also score higher marks as those having higher I.Q.s.

7. From the analysis of the responses to the questionnaire given to the pupils of the experimental group it is found that variables such as private personal tuitions and other persons' help in doing homework have the least influence on pupils'

scholastic achievements. Therefore it can be said that the higher achievement of pupils of the experimental group must be due to the greater influence of the developed mastery learning strategy.

8. It can also be said from the analysis of the responses to the questionnaire that components like 'Models preparation' and 'mathematical game' are liked very much by the pupils; thus indicating that 'learning by doing' and 'learning through fun' type activities should be given more weightage while developing such strategies for mastery learning for the pupils of the age group 9 to 11.

9. From the analysis of the lower achievers it can be said that in some exceptional cases the teacher does need the help of parents of a pupil, other teachers and all concerned for removing pupils' complexes and for developing confidence in them. Here, it must be realized that such cases could be brought to the notice of the concerned people because of the mastery learning strategy, as it provides a room for the care, concern and analysis of the low achievers.

10. The strategy used by the investigator takes the same time limit as taken by the teacher of the control group; even then the results of the experimental group are far better than those of

the control group because of the variety of the components used suitably in the strategy during the experiment. The strategy forces the user to work much more than the regular teacher who uses the conventional method.

11. The results of the experimental group show that if a teacher is ready to work hard then not only that the use of the strategy is feasible, as it takes the same time limit as taken by the teacher of the control group, but its use can bring unexpectedly exciting results with the least expense and within short period. It can be concluded that it is always better to use such strategies which loeads to the mastery learning.

12. The investigator feels, from the overall findings, that the use of strategy brings out the best of the pupils because it increases the quality of teaching on the part of a teacher and the ability to learn on the part of a student. The strategy does help, to an extent, to increase the learning rate of a pupil, to remove the inferiority complex from some pupils as they are also able to score more and thus to build in them a greater self-confidence. In fact, the strategy does make pupils to realize their potential and increases their desire and ability to work continuously for achieving the mastery

once they start scoring well in the formative tests of the first unit.

13. In view of the fact that the Geometry portion comprises of one third of the whole of the fifth-grade mathematics, the time of five weeks generally being allotted to Geometry in the schools is indeed very little. Even then 68.63 percent of pupils achieved mastery level, 88.24 percent of pupils have scored minimum of 70 percent of marks and except for two, all the students have scored minimum of 65 percent of marks. Therefore, it is the strong feeling of the investigator that had there been an allocation of fairly proportional time for the Geometry course, the percentages of students attaining the mastery level could have been well over 75 or 80; thus making the proposed hypothesis fully acceptable.

5.7 Scope for further Researches:

Comparison of student's performance with reference to their peers, class or grade has been well known to the class teachers. This type of norm-referenced evaluation has been in vogue ever since the examinations are institutionalised. To what extent a student vis-a-visa class has attained mastery of the concepts in a particular teaching learning unit is not the botheration of the present day teacher. The measurement of achievement of teachers has

not been considered as important a purpose of evaluation as that of judgement making.

Of late there has been growing concern about the improvement of students' learning and as such the proper diagnosis of students' weaknesses and inadequacies in instructional strategies are now considered of great relevance. This has led to the realisation of the need for formulating specific learning outcomes that should act as criterion of acceptable standard of performance and which in turn further led to the realisation of development of strategies for mastery learning. In the present study such an attempt of developing strategy for mastery learning in fifth grade Geometry has been made. The results of the present study are quite encouraging and it can be further suggested that the following types of studies can take place in this area.

(i) Similar type of study can be carried out by developing mastery learning strategies in various school subjects such as science, languages, history etc.

(ii) Similar type of study in developing strategy for mastery learning can be carried out at different levels in schools (at primary, secondary and higher secondary levels) and in colleges in various subjects of learning.

(iii) A study can be carried out regarding the effect of personalised system of instruction, conventional method and mastery learning strategy on retention of high school students taking different subjects of learning such as science, mathematics, history etc.

(iv) A study of effect of personalised system of instruction, conventional method and strategy for mastery learning on retention of college students in various subjects of learning such as mathematics, science, languages etc. can be performed.

(v) A comparative study of the effect of the strategy for mastery learning on pupils of different groups viz;

(1) the group of pupils learning through the mother-tongue and

(2) the group of pupils learning through a language other than their mother tongue

can be performed.