SUMMARY

The present experimental study 'Effect of Mastery Learning Strategy upon Achievement and Scientific Attitude of Students' intends to examine the cognitive and attitudinal changes of the students of the senior secondary stage due to the strategy. In this regard, the various facets of the study have been summarised in this section as follows:

INTRODUCTION

Mastery learning strategy (MLS) is an instructional procedure which gained currency in the last decade as a deviation from the traditional methods of mass instruction. Mastery learning strategy is an individualised instructional approach in which the student usually learns at his own pace, decides when he is ready for the next learning assignment and takes individual guidance from the instructor and peers. The student's proceeding on to the next assignment is decided by his almost near perfect score on a criterion test on his present assignment. The most salient difference between mastery learning strategy and traditional instruction is the amount of control exercised by the student over his own learning. Mastery learning strategy is a student-
directed and student-controlled instruction in contrast to the traditional instruction which is teacher-directed and teacher-controlled.

Mastery learning strategy is based on the principles of operant conditioning and follows Carroll's (1963) theoretical model of classroom instruction. In this model of instruction, the emphasis is on providing enough time to students for learning a given amount of material properly. Bloom (1968) implemented Carroll's model of instruction in the form of mastery learning strategy. Basic to Bloom's mastery learning strategy is that most students can master what teachers have to teach them. Bloom (1971) maintains that most students (perhaps over 90%) can master what we have to teach them, and it is the task of instruction to find the means which will enable students to master the subject under consideration. Our basis task is to determine what we mean by mastery of the subject and to search for methods and materials which will enable the largest proportion of our students to attain such mastery.

Proponents of mastery learning strategy (Carroll, 1963; block, 1968; Mayo, 1970; Bloom, 1971; Corey, 1974) believe that if the aptitude for a learning task is normally distributed and students are exposed to quality
instructions, achievement after instruction will not be normally distributed it will be better rather.

Keller (1968) realised the potential of principles of behaviourist learning and mastery learning and developed a model called Personalized System of Instruction (PSI). Mastery learning based PSI model has features like statement of terminal behaviours, arrangement of subject matter is discreet units, provision of immediate feedback, individual guidance and administration of diagnostic progressive tests to control the entry to next learning unit.

Dillashaw (1980) concluded that mastery learning strategy improved significantly students' achievement and attitude toward science. It was also found that across the three cognitive achievement measures there was consistency.

Davies (1981) found that mastery learning strategy produced significantly positive effect on achievement of students in chemistry with the experimental group consisting of volunteers for the course.

Brooks (1982) studied the effects of mastery instruction on the learning and retention of science and found that the average and above average mastery
instructed subjects scored significantly higher than the non-mastery average and above average students.

Waugh (1984) concluded that with computer administered diagnostic testing, the short and long term achievement under mastery learning situation had positive effects.

Mathur (1983), Hooda (1984) and Yadav (1984) found that mastery learning strategy has positive cognitive effect in science and mathematics learning and induces favourable reactions toward the strategy among students.

Mastery learning strategy has a deep concern about ways in which curriculum and instruction could be improved resulting in better academic performance by students. The strategy also believes that though the personality traits like intelligence and aptitudes are normally distributed but with quality instruction, the achievement by student must have distribution skewed to the higher side.

THE PROBLEM

The problem for the present study is stated as:

"Effect of mastery learning strategy upon achievement and scientific attitude of students".
OBJECTIVES OF THE STUDY

1. To study the effect of mastery learning strategy on achievement in physics by students as compared to the conventional method of instruction.

2. To study the change in scientific attitude of students due to mastery learning strategy.

3. To study the reactions of students towards mastery learning strategy.

HYPOTHESES

The following hypotheses stated in the declarative form were tested:

H1. There will be a significant difference in the achievement of the two comparison groups after the treatment.

H2. There will be a significant change in the scientific attitude of the two comparison groups after the treatment.

H3. There will be a favourable reactions of students towards the mastery learning strategy.
DESIGN OF STUDY

The study was done using the Control-and-Experimental-Group-Design. The experimental group was taught for six weeks by the mastery learning strategy while the control group was taught by the conventional method. The investigator taught both the groups. The two comparison groups were matched on the basis of intelligence and cognitive entry behaviour.

The post-treatment tests were administered after six weeks to investigate the changes in the achievement and scientific attitude. Also, the experimental group students' reactions towards mastery learning strategy were collected using an evaluation questionnaire.

SAMPLE

Fifty students of grade XI studying in the Motilal Nehru School of Sports, Rai (Haryana) - a residential school following 10+2 scheme of the Central Board of Secondary Education (CBSE), Delhi - constituted the sample for the study. The age of the students for the sample ranged from 15 to 17 years. The experimental and control groups consisted of 25 students each and belonged to the upper socio-economic strata.

For the intra-group comparisons of the effects
of mastery instruction; the low, average and high
cognitive entry behaviour groups consisting of six
students each were formed.

TOOLS

The following tools were used for the study:

1. Cattell's 'g' Culture Fair Test
   (Intelligence Test).

2. J.K. Sood's Test for Scientific Attitude.

3. Achievement Tests I and II prepared by
   the investigator.

4. Evaluation questionnaire of R.N. Mathur for
   students' reactions toward mastery learning
   strategy.

STATISTICAL COMPUTATIONS

Statistical computation for matching the two
comparison groups was done by finding the t-values and
level of significance of the differences in the means
of intelligence and cognitive entry behaviour scores.

The U-test was applied to find the gains in
achievement and scientific attitude of the experimental
and control group students after six weeks of treatment.
Likewise, the U-test was applied for comparing the intra-group gains in achievement and scientific attitude.

FINDINGS

The analysis of data and interpretation thereof lead to the following conclusions with regard to the effect of mastery learning strategy on achievement in physics, scientific attitude and understanding of science.

A: Conclusions related to cognitive achievement.

The following conclusions have been drawn from the comparisons of the two groups on various aspects of cognitive achievement.

A-1. The group of students taught physics by mastery learning strategy improved their cognitive achievement ($\chi^2=0.1, d.f.=48$) as compared the group of students taught by the traditional method, thereby accepting hypotheses H I.

A-2. The students of the treatment group gained higher in their knowledge cognition ($\chi^2=0.01, d.f.=48$), comprehension cognition ($\chi^2=0.01, d.f.=48$) and application cognition ($\chi^2=0.01, d.f.=48$) as compared to the group of students taught by the conventional method.
A-3. The low cognitive entry behaviour students of the experimental group following mastery learning strategy did not gain (\(\alpha = 0.1\), d.f. = 10) in their cognitive achievement whereas significantly higher gains in cognitive achievement were shown by the students of the treatment group with average cognitive entry behaviour (\(\alpha = 0.01\), d.f. = 10) and the students with high cognitive entry behaviour group (\(\alpha = 0.05\), d.f. = 10) as compared to their counterparts in the control group.

B: Conclusions related to scientific attitude:

The differences in scores on various aspects of scientific attitude due to the effect of mastery learning strategy lead to the following conclusions.

B-1. The group of students following mastery learning strategy improved their scientific attitude significantly (\(\alpha = 0.01\), d.f. = 46) as compared to the group of students taught by the conventional method, thereby accepting Hypothesis H II.

B-2. The group of students taught physics by mastery learning strategy improved their attitudes toward scientific method, scientific
temper and social implications of t
science at .01 level of significance each.

B-3. Further, the treatment of mastery learning
strategy improved the scientific attitude
of the low and average entry behaviour
students at .01 level and .05 level of
significance respectively, whereas the
high entry behaviour students' scientific
attitude remained unaffected.

C : Conclusions related to reactions of students
toward mastery learning strategy:

On the basis of the opinion of the students on a
five-point course evaluation scale, the following
conclusion has been drawn:

C-1. The students of the experimental group
reacted extremely favourably toward mastery
learning strategy, thereby accepting the
hypothesis H-4.

It can be inferred from the above results that
mastery learning strategy can work as a viable alternative
to the existing teaching strategies of which lecture model
is extremely prominent.