CHAPTER - I

INTRODUCTION
student according to his needs so that he can choose, those best suited to his requirements and characteristics.

3. Ability to understand Instruction

Ability to understand instruction is the ability of the student to understand the nature of the learning task and the procedures, he/she is to follow during the course of learning. The teacher can use the variety of instructional strategies such as small group study sessions, tutorial help, alternative textbook, workbook and programmed instruction according to the differing needs of their students. Alternative methods of instruction are used to improve the quality of instruction in relation to the ability of each student.

4. Perseverance

Carroll(1963) defines perseverence as the time, the learner is willing/motivated to spend in learning. If a student is not provided required time to learn which he / she is willing to spend, he/she will not be able to master the learning task. Perseverance is related to student attitudes towards and interest in learning (Husen 1967). If a student is successful in his previous efforts he/she is motivated to spend more time to learn the next task in the series. But if he/she was frustrated or unsuccessful in his past learning, he/she is likely to devote
less time to the next task in the series. Perseverance can be 
enhanced by increasing the frequency of reward and evidence 
of learning success or by reducing the frequency of failure.

5 Time allowed for Learning

Majority of the students can achieve mastery, if they are 
allowed to spend the required amount of time on a learning. 
The students with high aptitude levels requires less time for 
learning than students with lower aptitude levels, some slow 
learner students, may need to spend six time as much time as 
others to master a particular learning task Bloom(1971).
According to Carroll, the time spend on learning is the key to 
mastery. His argument is based on the assumption that the rate 
of learning is determined by aptitude of the learner and that 
most of the students can attain mastery level if they devote the 
amount of time they need for it.

1.1.4 TESTS IN MASTERY LEARNING

In this study mastery level is measured with the help of 
two types of tests, that is, formative tests and Summative 
tests.

Formative tests

Formative tests, also called mastery tests provide the 
necessary information to design instruction appropriate to the
needs of the individual for achieving mastery level. Formative tests are administered during the process of mastery learning to find out the extent of pupil's achievement in a particular area of content and to diagnose pupil's difficulties. These tests are administered at the completion of each learning unit. On the basis of feedback provided by these tests, the instruction are designed accordingly. The scores on formative tests determine the pupil's achievement of mastery level. For the purpose of present study the mastery level decided is 80% to 90% learning achieved by 80% to 90% of the pupils.

**Summative tests**

Summative tests, is also known as criterion achievement tests are administered at the completion of major units of instruction. Its primary aim is to assess or evaluate the degree of the pupils achievement and to grade them according to their performance.

**1.2.0 INQUIRY TRAINING MODEL (ITM)**

Inquiry training is designed to bring students directly into the scientific process through exercises that compile the scientific process into small periods of time. Schlenker (1976) reported that inquiry training resulted in increased understanding of Science, productivity in creative thinking, and
skills for obtaining and analyzing information. He reported that it was not more effective than conventional methods of teaching in the acquisition of information, but that it was as efficient as recitation or lectures accompanied by laboratory experiences. Ivany (1969) and Collins (1969) reported that the ITM works best when the confrontations are strong, arousing genuine puzzlement, and when the materials the students use to explore the topics under consideration are especially instructional. Both elementary and secondary students can profit from the model (Voss, 1980). In an intriguing study, Elefant (1980) successfully carried out the model with deaf children, which suggests that the method can be powerful with students who have severe sensory handicaps.

SYNTEX

Inquiry training has five phases. The first phase is the student’s confrontation with the puzzling situation. Phases two and three are the data gathering operation of verification and experimentation. In these two phases student ask a series of questions to which the teacher replies yes or no, and they conduct a series of experiments on the environment of the problem situation. In the fourth phase, students organize the information they obtained during the data gathering and try to
explain the discrepancy. Finally, in phase five student analyze the problem solving strategies they used during the inquiry.

Phase one requires that the teacher present the problem situation and explain the inquiry procedures to the students (the objectives and the procedure of the yes/no questions). The formulation of a discrepant event such as the problem taken in the lessons plans.

Phase two, verification, is the process whereby students gather information about an event they see or experience. In experimentation, Phase three, students introduce new elements into the situation to see if the event happens differently. Although verification and experimentation are described as separate phases of the model, the students thinking and the types of questions they generate usually alternate between these two aspect of data gathering.

In phase four the teacher call on the students to organize the data and to formulate an explanation. Some students have difficulty making the intellectual leap between comprehending the information they have gathered and constructing a clear explanation of it. They may give inadequate explanations, omitting essential details. Sometimes several theories or explanations are possible based on the same data. In such
cases, it is often useful to ask students to state their explanations so that the range of possible hypothesis becomes obvious. Together the group can shape the explanation that full responds to the problem situation.

Finally, in phase five the students are asked to analyze their pattern of inquiry. They may determine the questions that were most effective, the lines of questioning that were productive and those that were not or the type of information they needed and did not obtain. The phase is essential if we are to make the inquiry process a conscious one and the systematically try to improve it.

1.3.0 JUSTIFICATION OF THE PRESENT STUDY

Though the place of teaching of science is at the top of hierarchy of different subjects, the researches in this area have been relatively scanty. The teaching of science in school generally conforms to traditional methods and continues to be dominated by teacher making it as dull and uninspiring as ever before. Therefore, indepth research is needed to evolve effective methods and models of teaching science to replace the old and stereotyped methods of teaching.

A scrutiny of the Fourth Survey of Research in Education (1991) reflects that the effects of certain models of teaching
on science have been studied on a variety of variables such as Achievement, Self-Concept, concept attainment in Science etc. The models extensively tried include; individualized instructions, concept attainment, mastery learning, programmed learning etc. (Buch, 91). On reviewing the research literature in the teaching of Science extensively, it is observed that the models of teaching of the ‘Behavioural systems family’ in general and the Inquiry training model, in particular, has not attracted the attention of researchers so far to investigate their effectiveness, usefulness, and validity in enhancing the academic achievement of students.

Jangira and Hooda (1983) developed Mastery Learning Model keeping in mind the needs of Indian situations, Mathur (1983), Hooda (1983), Singh (1983), Chand (1984), Yadav (1984), Patodia (1987) and Vaidya (1989) have also studied the effectiveness of mastery learning model in Indian conditions and found it effective in enhancing students achievement.

It is apparent from the researches conducted in India on the use of inquiry training model and Mastery Learning Model that very little work has been done in this field. The need to compare the effectiveness of inquiry training model in the
teaching of Science, particularly has not been given due consideration. Since the subject of Science occupies an important place in the school curriculum, there is need to probe the effectiveness of Inquiry training model and Mastery Learning Model so that it may be implemented at school level to improve students achievement in Science. Hence, the researcher has selected two models of teaching to find out their relative effectiveness on students achievement, self-concept and creativity.

1.4.0 STATEMENT OF THE PROBLEM


1.5.0 OPERATIONAL DEFINITIONS OF THE TERMS USED

1. Inquiry training model

The definition given by Joyce Bruce and Marsha Wiel (1985) has been adapted as an operational definition which states that Inquiry training model is a "process for investigation and explaining unusual phenomena".
2. **Mastery learning**

It is systematically planned programme of instruction adopted by a teacher to enhance the achievement of students to predetermined mastery level. It involves presentation (Cues), feedback (mastery testing), correction (using alternative instructional material and method) till practically all students achieve the desired mastery level.

3. **Conventional method of teaching**

In Conventional method of teaching, the teacher is the only active participant in the teaching learning process and the pupils are the passive listeners. He gives lecture to a class of nearly forty students, gives home assignments and administers test periodically. These tests are given only to give marks to the students and have no value in terms of improving the quality of instructions.

4. **Achievement in Science**

It is the level of learning and attainment in a particular area of the subject in terms of knowledge, understanding, skill and application.

In the present investigation achievement in
Science refers to the scores obtained on achievement test in Science developed by the investigator related to units taught to experimental and control groups.

5. **Self-Concept**

The definition given by Sarswat has been adopted as the operational definition of self concept. Self-concept means those perceptions, beliefs, attitudes and feelings which individual views as a part of characteristic of himself. It is his own conception of his health and physique, intellectual abilities, academic status, behaviour, temperamental qualities, mental health, emotional tendencies and socio economic status.

6. **Creative abilities**

The individual expresses whatever creativity he possesses. These abilities are somewhat general and can be applied to variety of tasks. They are not associated with particular subject matter or discipline. These abilities together constitute creative thinking. The distinctive aspects of creative thinking is divergent thinking, which is characterized by among
other thing, fluency flexibility, originality & elaboration.

Fluency: Fluency is the ability to produce a large number of ideas. Fluency of thinking, which has to do with fertility of ideas.

Flexibility: Flexibility is the ability to produce a large variety of ideas. Flexibility of thinking, consisting of two factors namely, spontaneous flexibility and adaptive flexibility which facilitates the production of a most unusual type of solution.

Originality: Originality is the ability to generate novel or unusual solutions and ideas, one that would not occur to most people. It indicated by unusualness of responses, clever responses or remote associations and relationship.

1.6.0 OBJECTIVES

The present study purports to realise the following objectives:

1. To design and develop instructional plans for teaching selected units in science from amongst the prescribed course of study at class VIIIth stage based on

   (i) Mastery learning strategies

   (ii) Inquiry training model of teaching
2. To construct and standardize achievement test in science for VIIth class.
3. To study the effect of mastery learning strategy and inquiry training model of teaching on achievement in science.
4. To compare the effect of mastery learning strategy and inquiry training model of teaching on achievement in science.
5. To study the effect of mastery learning strategy and inquiry training model of teaching on self-concept of students.
6. To compare the effect of mastery learning strategy and inquiry training model of teaching on self-concept of students.
7. To study the effect of mastery learning strategy and inquiry training model of teaching on creativity of students.
8. To compare the effect of mastery learning strategy and inquiry training model of teaching on creativity of students.
9. To study the effect of mastery learning strategy and inquiry training model of teaching on fluency dimension of creativity.

10. To compare the effect of mastery learning strategy and inquiry training model of teaching on fluency dimension of creativity.

11. To study the effect of mastery learning strategy and inquiry training model of teaching on flexibility dimension of creativity.

12. To compare the effect of mastery learning strategy and inquiry training model of teaching on flexibility dimension of creativity.

13. To study the effect of mastery learning strategy and inquiry training model of teaching on originality dimension of creativity.

14. To compare the effect of mastery learning strategy and inquiry training model of teaching on originality dimension of creativity.

1.7.0 HYPOTHESES

1. H₁, "At post-test stage, there will be no significant difference in the mean achievement scores of students taught through
(i) Mastery learning model and Inquiry training model.
(ii) Mastery learning model and Traditional method.
(iii) Inquiry training model and Traditional method.

2. H2. "At the post test stage there will be no significant difference in the mean gain achievement scores of students taught through

(i) Mastery learning model and Inquiry training model.
(ii) Mastery learning model and Traditional method,
(iii) Inquiry training model and Traditional method.

3. H3. "At the post test stage there will be no significant difference in the mean self-concept scores of students taught through

(i) Mastery learning model and Inquiry training model.
(ii) Mastery learning model and Traditional method.
(iii) Inquiry training model and Traditional method.

4. H4. "At the post test stage there will be no significant difference in the mean gain self-concept scores of students taught through

(i) Mastery learning model and Inquiry training model.
(ii) Mastery learning model and Traditional method.
(iii) Inquiry training model and Traditional method.
5. H₅, "At the post test stage there will be no significant difference in the mean scores of creativity of students taught through
   (i) Mastery learning model and Inquiry training model.
   (ii) Mastery learning model and Traditional method.
   (iii) Inquiry training model and Traditional method.

6. H₆, "At the post test stage there will be no significant difference in the mean gain scores of creativity of students taught through
   (i) Mastery learning model and Inquiry training model.
   (ii) Mastery learning model and Traditional method.
   (iii) Inquiry training model and Traditional method.

7. H₇, "At the post test stage there will be no significant difference in the mean scores of fluency of students taught through
   (i) Mastery learning model and Inquiry training model.
   (ii) Mastery learning model and Traditional method.
   (iii) Inquiry training model and Traditional method.

8. H₈, "At the post test stage there will be no significant difference in the mean gain scores of fluency of students taught through
   (i) Mastery learning model and Inquiry training model."
(ii) Mastery learning model and Traditional method.

(iii) Inquiry training model and Traditional method.

9. Hg, "At the post test stage there will be no significant difference in the mean scores of flexibility of students taught through

   (i) Mastery learning model and Inquiry training model.

   (ii) Mastery learning model and Traditional method.

   (iii) Inquiry training model and Traditional method.

10. H_{10}, "At the post test stage there will be no significant difference in the mean gain scores of flexibility of students taught through

     (i) Mastery learning model and Inquiry training model.

     (ii) Mastery learning model and Traditional method.

     (iii) Inquiry training model and Traditional method.

11. H_{11}, "At the post test stage there will be no significant difference in the mean scores of originality of students taught through

     (i) Mastery learning model and Inquiry training model.

     (ii) Mastery learning model and Traditional method.

     (iii) Inquiry training model and Traditional method.
12. $H_{12}$, "At the post test stage there will be no significant difference in the mean gain scores of Originality of students' taught through

(i) Mastery learning model and Inquiry training model.

(ii) Mastery learning model and Traditional method.

(iii) Inquiry training model and Traditional method.

1.8.0 DELIMITATION

Keeping in view the time available and limited resources the study has been delimited as under:

1. The study was delimited to the 7th class in a single school of Rohtak city of Haryana.

2. The effect of only inquiry training model and mastery learning model have been studied.

3. The effectiveness of inquiry training model and mastery learning model was studied in the subject of science only.

4. Although the entire syllabus of science could have been taught, but due to the constraint of time only six units of the science were taught.

5. The study could have been conducted on a variety of other educational outcomes but it was conducted only on self concept, Creative abilities and achievement.
6. No randomization has been exercised in selection of the sample.

7. The study was confined to three sections of class VIIth students so as to conduct horizontal study i.e. three groups were taught through three different methods i.e. Mastery learning model of teaching, Inquiry training model of teaching and conventional method. These groups have been studied in their natural setting.

8. No deliberate attempt was made to match the groups on the basis of age, race and other such intervening variables.