method of teaching and lack of proper material amenities tended to make education a burden rather than a figous experience." Report of Education Commission (1964-66) surprisingly speaks of the same thing, "...the present system of education... will need radical changes if it is to meet the purposes of a modernising democratic and socialist society-changes in objectives, in content, in teaching methods, in programmes, in size and composition of the students body, in the selection and professional preparation of teachers in organisation." National Education Policy (1986) has also observed that the goals of education system, in terms of relating it more closely to the lives of people, raising the quality of education development of science and technology, have not been achieved. Hence a strong feeling of apprehension exists about the quality of education. Keeping in view the gloomy condition of education in the country, these Education Commissions have suggested changes in the education and have provided new curricular designs, guidelines for teaching and instructional materials. But unfortunately many of the recommendations of these commissions have remained confined to educational writings only. They are seldom reflected in actual teaching and learning operations of the classroom. Till date, the classroom which is a means to reach the desired ends, represents an inadequate conception of learning. The cause for such an inadequacy lies in the gap between researches in the field of curriculum design and those in the field of teacher education. The same factors led to
listening or receiving alone. Teacher and learner must be actively engrossed in manipulating the system of objects and organisms of interest so that inherent regulation in the experience can be discovered.

**Education** plays a vital role in the building of a nation. The progress of a nation in various spheres like science, technology, literature, commerce etc. depends on an effectively planned system of education. Education has become a complex process with time because of the complex nature of modern industrial civilization and explosion of knowledge due to scientific discoveries and inventions. In order to understand the progressive nature of society and to meet the challenges of time and educational aspirations of society, there is a need for effective system of education. Hence to appraise the prevailing conditions of education in the country, various Education Commissions and Committees were set up from time to time by Govt. of India. A critical analysis of the reports of different Education Commissions and Committees right from Secondary Education Commission (1955) to National Education Policy (1986) shows that there has been only quantitative growth in education and by and large the problems, drawbacks, corrective measures pointed out are not really very different as is clear from the various statements of different commissions.

Secondary Education Commission (1955) pointed out that, ".... education was too bookish and mechanical, stereotype and rigidly uniform... The stress on examinations, the overcrowded syllabus, the
failure of the world's major curricular reforms like New Mathematics, Physical Science Study Committee, New Social Studies and Biological Science Study Committee.

The situation is quite similar in India also as has been rightly pointed out in 'An Effective Use of School Curriculum' (NCERT, 1978), that during the past few decades curriculum researchers and planners have been mainly concerned with curriculum as 'intention' but have not given much attention to curriculum as 'transaction'; it is the latter which is of utmost importance. Commendable efforts have been made to make curriculum more meaningful and realistic for the child but very little has been done by way of preparing the teacher to achieve the goals of education through an effective use of school curriculum. As a result of this, the students in the classroom do not understand the specific items of knowledge and are unable to comprehend the knowledge gained. Thus real understanding is hardly achieved by the students as they try to cram the subject matter to pass the examination. Hence the talent of the child is not developed fully and so a voice of dissatisfaction is audible about the quality of education in schools. Educationists, planners, teachers and enlightened parents have raised their voice to improve the quality of education. A high level of achievement is expected from the students but in actual practice, it has been observed that a high degree of underachievement is present at all the different stages of education. An assessment of pupils' achievement reveals that there is no uniformity in their achievements. Some of them do
CHAPTER-I
INTRODUCTION

1.0.0 INTRODUCTION

Pedagogy is not a profession but a mission. Missionary zeal as opposed to necessary task, imbibes a spirit of fallow-feelings, sympathy, love, cooperativeness etc. towards the individual or the group wherein the missionary undertakes the job. According to Milton, "Teaching is not a bow for everyone to shoot." It is not a "giving" matter as is generally understood by layman but a giving and taking affair or pedagogically speaking a teaching learning process, where in the teacher not only teaches but learns also, as teaching and learning are complementary process. Learning to learn is not just a slogan. It denotes a specific pedagogic that experiences to the requirements of the learner. If the teacher is to adopt restructure and learning experiences to meet the observations, interests and capabilities of the learner, his approach to teaching should be in relation to objectives of the teaching, nature of the learner and nature of the content. All this requires training for effective teaching as a pre-requisite condition. Therefore training for effective teaching has become a fundamental goal underlying teacher training programmes.

Measure of effective teaching strategy is the teaching-learning outcome, which in turn, is function of interaction between teacher, content and learner. Here teaching is not taking or giving alone and learning is not
very well while some others achieve relatively less. There are still those who do very poorly. The latter two categories of children are those of underachievers. According to researchers, the problem can be attributed to a number of factors. Chandra (1975) found that lack of learning material, proper co-ordination and lack of good rapport are the causes of low achievement.

The study by Z.N. Doctor (1984) indicated a relationship between classroom climate and academic achievement. Academic achievement was found to be dependent on teachers' and pupils' behaviour, pupils' psyche and classroom climate. Upadhyaya's study (1984) also revealed that each of the three aspects of classroom environment namely interpersonal relationship, goal orientation and system maintenance and change was significantly related to academic achievement.

Pandey (1981) and Puri (1984) studied the influence of environment as factor to promote academic achievement among pupils. The former concluded that an urban environment was more conducive to better achievement than the rural environment while the latter observed that the effect of environmental facility on both general academic achievement and achievement in English language was significant. Trivedi (1987) reported better achievement by the pupils belonging to upper socio-economic status group. Besides the studies of sociological factors, there are many researches that reveal how inherent variables of the pupils like intelligence, interest, aptitude, anxiety etc. and the various
teaching methods and techniques influence the achievement of pupils.

These studies on achievement of pupils indicate that achievement in a child is caused, promoted and affected by a number of variables such as variables arising out of the person or self, variables arising out of the teaching-learning set up, variables arising out of the home, variables arising out of subject of study, and so on. Each one of them is actually a cluster of variables which individually or on interaction with others have their influence on achievement.

The question - how to raise achievement of largest number of pupils to the optimum level has received considerable attention from researchers and teachers. To raise achievement and hence to improve the quality of education in the classroom and to make the effective use of school curriculum, it is required to select and implement the appropriate teaching strategies. The appropriateness of teaching strategies is determined by the proper synchronisation of educational objectives, nature of subject matter and nature of the learner and his environment. Crawfod and others (1972) found that some new curricula and instructional strategies result in superior learning by pupils as compared with more conventional approaches. At the same time, Joyce and Weil (1972) also observed the same thing. Similarly, the model developed by Carroll is also based on the assumption that the achievement of pupils can be optimised provided suitable techniques are used in a systematic manner. Based on Carroll's model of school learning, a teaching approach
was developed by Bloom which is known as Mastery Learning Strategy while the different teaching approaches summarised by Joyce and Weil have been given the name Models of Teaching.

1.1.0 MODELS OF TEACHING

There is hardly any universally accepted and tested theory of teaching in existence. The researchers have probably been believing that as there exist several theories of learning, the teacher can always act upon these theories for teaching effectively in the classroom. (Gage, 1963). Because there is a need for separate theory of teaching with a view to maximising learning on the part of learners. (Smith, 1961). Such a theory of instruction should specify the (i) experience which are likely to facilitate learning; (ii) ways in which the body of knowledge could be structured so that it is easily grasped by the learners; (iii) most effective sequences in which the material is to be presented; and (iv) the nature and pacing of reward and punishment in the process of teaching and learning (Bruner 1986). Though no generalised theories of teaching have so far been evolved, researchers have developed various teaching models.

A model of teaching is defined as a plan or pattern that can be used to design face to face teaching in classroom or tutorial setting and to shape instructional material including books, films, tapes and curricula (Joyce and Weil 1992). Eggen defines models of teaching as perspective teaching strategies which are used to realise specific instructional goals. Thus, in real sense increasing aptitude to learn is a fundamental purpose of these
models, a model enables the teacher to enhance the ability of students to achieve various learning objectives and is not a substitute for learning skill. During last two decades lot of attention was paid to improve the process of teaching which resulted in the development of a number of models of teaching by various researchers, like Mosstons (1992). Among them the work of Joyce and Weil (1992) is monumental who classified various models of teaching into four categories as:

i) The Information Processing Family:

The models in this family aim at increasing the students' ability to seek and master information, organise it, build and test hypotheses.

ii) The Social Family:

The models in this family capitalise on our nature as social creatures to further learning and to expand our ability to relate productively to one another.

iii) The Personal Family:

The personalistic models focus on the development of the integrated feeling, thinking self the personal identify shaping the environment around the capacity for self education, need to develop self awareness and understanding.
iv) The Behavioural Systems Family:

Models of this family are based on human being's ability to modify behaviour in response to tasks and feedback and are used in teaching concepts, skills, etc.

1.1.1 The Behavioural Family

A common theoretical base - most commonly called social learning theory, but also known as behaviour modification, behaviour therapy, and cybernetics - guides and design of the models in this family. The stance taken in that human beings are self-correcting communication systems that modify behaviour in response to information about how successfully tasks are navigated. Capitalizing on knowledge about how people respond to tasks and feedback, psychologists (see especially Skinner, 1953) have learned how to organize task and feedback structures to make it easy for human beings' self-correcting capability to function. The result is for example, programs for reducing phobias, learning to read and compute, developing social and athletic skills, replacing anxiety with relaxation, and learning the complexes of intellectual, social, and physical skills necessary to pilot an aeroplane or a space shuttle. Because these models concentrate on observable behaviour and clearly defined tasks and methods' for communicating progress to the student, this family of teaching models has a very large foundation of research. Behavioural techniques are amenable to learners of all ages and to an impressive range of educational goals.
Eight models of teaching have been grouped under the family of Behavioural Systems family. Each has distinct goal. Table 1.1 gives the name of each model with its goals and name of theorists on whose work the model was developed.

**Table 1.1**

**The Behavioural Family Models**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Model</th>
<th>Major Theorist</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mastery Learning</td>
<td>John Carroll</td>
<td>One of the important applications of behavioural systems theory is in the development of systems that enable learning tasks to be regulated according to the progress of the learners and which teach students to pace themselves for optimal performance. Often these systems organize material to be learned in relatively small, sequenced, instructional &quot;Modules&quot; that are presented to students with assessment of learning embedded in them. These &quot;mastery learning&quot; or &quot;direct-instruction&quot; systems have been employed successfully in a wide variety of areas involving academic, physical, and mental development.</td>
</tr>
<tr>
<td>2.</td>
<td>Learning Self-Control</td>
<td>Carl Thoresen et.al.</td>
<td>Teaching students how to modify their patterns of behaviour using behaviour of systems principles, Carl Thoresen and his colleagues have developed procedures for placing control in the hands of the learners by teaching them how patterns of behaviour develop and change.</td>
</tr>
<tr>
<td>3.</td>
<td>Simulation Model</td>
<td>Karl U. Smith and Margaret Foltz Smith</td>
<td>In industrial, military, athletic, and educational settings researchers have developed procedures for developing skills and enabling those skills to be used effectively in work and education.</td>
</tr>
<tr>
<td></td>
<td>Model</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>The Conditions of Learning Model</td>
<td>Robert Gagne and his colleagues have developed a classification of learning goals that enables us to organise objectives and place them in appropriate sequence.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Contingency Management Model</td>
<td>This model utilizes behavioural theory, particularly stimulus control and reinforcement principles, for the creation of learning environments, curriculum materials, and individual management programs. In recent years contingency management has been widely used in educational settings. Research studies indicate the model is very effective with certain students and particular educational problems.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Stress Reducing Model</td>
<td>Behaviour therapy addresses the task of stress management. This model is an effective method for learning to relax and reduce anxiety. Its procedures are applicable to many educational settings.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Desensitization Model</td>
<td>The techniques of the relaxation model and of visualization are applied to helping learn to cope better with anxiety-producing situations. Useful in reducing ‘test anxiety’ and managing tension in social situations.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Assertive Training Model</td>
<td>A major task in childhood and adolescence is learning to express feelings honestly and to deal with social conflict. This model, originating from behaviour therapy, assists people in asserting themselves in personally and socially productive ways.</td>
<td></td>
</tr>
</tbody>
</table>

As the present study aims to investigate the effectiveness of gaming and Mastery learning Models, it will be dealt with in detail in the following pages.
1.2.0 GAMING

Game is a new term in the sense that it is linked with simulation in the literature on training technology. Simulation is an attempt to give the appearance or/and effect of something else. By implication, educational simulations have the model of reality which is manipulated by the learner in order to learn. When an element of competition and chance is added to this, it becomes a game and the technique gaming.

Game is used because the environment and activities of participants have the characteristics of games. Players have goals, sets of activities to perform, constraints on what can and cannot be done, and payoffs (Good and Bad) as consequences of their actions.

The movement of games into the schools in the early 1960s was primarily in the fields of business and social science. Within a short time the technique spread to other subject areas, and it enjoyed a meteoric rise for several years. There are numerous claims about the results of teaching with games and simulations but the central hypotheses concern increases in motivations and interest, affective learning (about oneself and about others i.e. empathy), and cognitive learning.

Although there is evidence that cognitive learning takes place, most studies have revealed little difference in the amount of cognitive learning with games as compared to more traditional techniques. It should be noted, however, that students do not appear to learn significantly less cognitive material while showing the other gains already mentioned.
Findings of non-significant difference in cognitive learning have often been accompanied by caveats that gaming teaches systematic understanding which is difficult or impossible to measure with traditional Pen & Pencil short-answer tests of the sort that have often been used to measure comparative learning with different techniques.

Thus gaming as a model of teaching has been designed on the principle of SIMULATION, where the students learn from the dynamic consequences of their interactions to each other.

1.2.1 Gaming Model of Teaching

Gaming has been successfully used in the teaching process. The advantages of gaming may be that, the learning tasks can be made much less complex than they are in the real world, so that the students may have the opportunity to master tasks that would be extremely difficult when all the factors of real world operations impinge upon them. A very good example of this is the flying of an airplane. Learning how to fly a complex airplane without the aid of a simulator leaves very little room for errors the student pilot has to be everything adequately the 1st time or the plane is in difficulty with the use of simulator the training can be staged.

A second advantage is that they permit the students to learn from self generated feedback that they experience themselves. As the student pilot turns the wheel of the great plane to the right for example, he can feel the plane bank, he can feel the loss of speed in some respects and he can learn how to train the craft during the turn. In other words, he can learn through his own senses rather than simply through verbal descriptions.
1.2.2 The Teacher's Role

The teacher has a minimal role to play in the learning situation. People tend to believe that a well designed game will teach itself. But this is only partly true. Cybernetic psychologists find that educational simulations enable students to learn first hand from the simulated experiences built into the game rather than from teacher's explanations or lectures. However, because of their intense involvement, students may not always be aware of what they are learning and experiencing. Thus the teacher has an important role to play in raising students consciousness about the concepts and principles underpinning the simulations and their own reactions. In addition teacher has important managerial functions. With more complex games and issues the teachers activities are even more critical if learning is to occur. There are four roles for the teacher in the simulation model: Explaining, Refereeing, Coaching and Discussing.

One of the most important feature of Gaming is that during the process of game as a process of learning students behaviour, the teacher begins to modify his own behaviour by asking questions which require more thinking from the students and challenge them more completely.

1.2.3 The Values of Gaming in Education

The primary objective of instructions in school is to bring certain desirable changes in the behaviour of the children through the process of teaching. The change in the behaviour takes place due to self learning i.e. learning through own experiences when he play different roles in schools which leaves permanent imprint and upon his life. A teacher has to locate
all those qualities which help a student in his real life. By adopting gaming as a method of teaching, a teacher can inculcate the following qualities in him.

**i) Healthy Competition:**

In the process of gaming there is a competition where tension is produced while striving against obstacles for attaining the objectives. One tries to dominate the other. At one time he speaks as a leader of the group and other time he is a follower. The participation of the type when a student is to play different roles create feeling of healthy competition.

**ii) Cooperation:**

No educational game can afford ruthless completion because if it is not played in cooperative manner it looses its value and worth. In gaming cooperation is a must for success. Only that team can score reasonably high where there is cooperation among the pupils.

**iii) Development of Concepts:**

The process of gaming is uniquely constructed to convey conceptual knowledge. The importance of teaching concepts has been enthusiastically endorsed by the way it is played.

**iv) Learning Skills:**

When the student is learning through play his environment is responsive to his own actions. It is through the learning of skills which are
necessary for attaining the objective. Learning through gaming is not only beneficial to the students but the teacher involved in the process also gain knowledge. It is a two way process.

v) To Think Critically:

In the process of gaming a player examines various alternatives. He anticipates and analyses the validity of his alternative. In this process the students are exposed to various situations, where his ability to think critically is very important. The most vital part of learning process in games is postmortem period, when the teacher encourages the pupils to criticize the game on its own terms, whether, its rules and outcomes were satisfactory. In the game the student are asked to analyse the defects or short comings in the system.

1.2.4 Syntax of Gaming:

The design of game is derived from the perspective of gaming as a communication device. The emphasis is on thoughtful review of alternative ways of presenting the material with clear specification of what is to be conveyed. The emphasis is laid on the evaluation of completed procedure to know whether the players have benefit through this gaming.

There are four different phases of gaming

i) Orientation

ii) Participant training

iii) Simulation

iv) Debriefing
Table 1.2
Syntax of Gaming Model

<table>
<thead>
<tr>
<th>Phase One: Orientation</th>
<th>Phase Two: Participant Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present the broad topic of the simulation and the concepts to be incorporated into the simulation activity at hand</td>
<td>Set up the scenario (rules, roles, procedures, scoring, types of decision and to be made goals)</td>
</tr>
<tr>
<td>Explain Simulation and Gaming</td>
<td>Assign roles, hold abbreviated practice session.</td>
</tr>
<tr>
<td>Give an overview of the Simulation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phase Four: Participant Debriefing</td>
</tr>
<tr>
<td></td>
<td>(Any or all of the Following Activity)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Three: Simulation Operations</td>
<td></td>
</tr>
<tr>
<td>Conduct game activity and game</td>
<td>Summarize events and perceptions.</td>
</tr>
<tr>
<td>administration.</td>
<td>Summarize difficulties and insights.</td>
</tr>
<tr>
<td>Obtain feedback and evaluation (of</td>
<td>Analyze process.</td>
</tr>
<tr>
<td>performance and effects of decisions)</td>
<td>Compare simulation activity to the real world.</td>
</tr>
<tr>
<td>Clarify misconceptions.</td>
<td>Relate simulation activity to course content.</td>
</tr>
<tr>
<td>Continue simulation.</td>
<td>Appraise and redesign the simulation.</td>
</tr>
</tbody>
</table>

i) Orientation Phase:

In the orientation phase, the teacher present the topic to be explored, the concepts that are embedded in the actual gaming, an explanation of the game if this is the students' first experience with it, and an overview of the game itself. This part should not be lengthy but can be an important context for the reminder of learning activity.

ii) Participant Training:

In phase two, the students begin to get into simulation at this point the teacher sets up the stage by introducing the students to the rules,
roles, procedures, scoring, type of decisions to be made and goals of the
game. Abbreviated practice session is organised to ensure that the
students have become well conversant with all the rules and directions
that are to be followed while carrying out the game.

**iii) Simulation:**

At this stage of administration the actual game starts. Students
take part in the game and teacher role as a referee or coach also start.
Whenever teacher requires that there are certain points or occasion where
the students require feedback or clarifying it is done and their doubts are
cleared.

**iv) Debriefing:**

Phase four consist of summarising events. The teacher notes
perceptions and reactions of the students. The simulation is compared
with the real world and activity to course content which leads to appraising
and redesigning the simulation.

In the present study the second model whose effectiveness was
investigated is that of Mastery Learning. This model was developed by
Carroll. Which is based on the assumption that the achievement of pupils
can be optimised provided suitable techniques are used in a systematic
manner. Based on Carroll’s Model of school learning, a teaching approach
was developed by Bloom (1976) which is known as Mastery Learning
Strategy. In the present investigation the Indian Model of Master
Learning developed by Hooda and Jangira (1983) was used which is
described in the following pages.

1.3.0 MASTERY LEARNING

Mastery learning is a theory of school learning which views human potential optimistically. This approach makes use of the existing curricula, but seeks teaching procedures and a set of feedback and correction techniques to ensure a high level of learning by majority of students.

According to Bloom, mastery learning theory suggests that schools can provide not only equality of educational opportunity but also equality of educational outcome.

Mastery learning is an educational procedure in which the subject matter is arranged in a hierarchical way. This learning hierarchy is divided into small units. Students are required to master each unit before proceeding to the subsequent unit. Attainment of mastery is determined by unit tests and predetermined standards. When non-mastery in the unit is detected, the student is provided with adequate remedials. This cycle continues till all the students attain mastery.

1.3.1 Carroll's Model

Carroll's model is based on the assumption that achievement of students can be optimised provided suitable techniques are used in a systematic manner. His model, as summarised by Bloom (1976), states that if students are normally distributed on the basis of their aptitude for
a given subject and all are provided precisely the same instruction (in terms of quantity and quality of instruction and learning time allowed), achievement measured at the completion of the subject will also be normally distributed. Under such conditions the correlation between aptitude measured at the beginning of instruction and achievement measured at the end of instruction will be relatively high (typically about +0.70). On the other hand, if students are normally distributed w.r.t. aptitude but the quality of instruction and learning time allowed are made appropriate to the need of each learner, majority of students will achieve mastery of the subject. In such a case the correlation between aptitude and achievement should approach zero.

Based on Carroll's model of school learning, Bloom developed mastery learning strategy for optimising pupils' learning in different areas of curriculum. The basis of his strategy is that most pupils can attain a high level of learning capability if instruction is approached sensitively and systematically, if pupils are helped when and where they have learning difficulties, if they are given sufficient time to achieve mastery, and if there is some clear criterion of what constitutes mastery (Bloom, 1976).

Bloom stresses that mastery learning strategies can produce outcomes that are both equal or very similar and at high level of achievement. Bloom (1971) maintains that 95% of the learners can master 95% of instructional contents if tutored through different strategies of
mastery learning. Block's findings (1971, 1974) also are in the same line. He has concluded that the achievement levels of 75% of all pupils can be raised to the achievement levels now enjoyed by only top 25% of pupils. Burns' (1979) analysis of 157 mastery learning studies revealed that most of the results were statistically significant in favour of mastery learning. Hyman and Cohen (1979) also found that mastery learning was consistently more effective than traditional curriculum.

Thus, it is a well documented fact that mastery learning is an effective strategy to raise pupils' achievement to the optimum level.

1.3.2 Major Variables in Mastery Learning Model:

The major variables in a mastery learning model based on the work of Carroll (1963) and Bloom (1971) and supported by the ideas of Morrison (1926), Skinner (1954), Goodlad and Anderson (1959), Bruner (1966), and Glaser (1968) are the following:

1. Aptitude and rate of learning.
2. Quality of instruction
3. Ability to understand instruction.
4. Perseverance, and
5. Time allowed for learning.

1. Aptitude and Rate of Learning

The main idea in mastery learning is based on Carroll's perspective on the meaning of the term Aptitude. Traditionally aptitude
has been thought of as a student characteristic that correlates with his/her achievement. The more the aptitude one has, the more he/she is likely to learn. Carroll, however, views aptitude as the amount of time it will take someone to learn any given material, rather than his or her capability to master it. Thus, according to this view, learners with very high aptitude w.r.t. a particular type of learning will take a much shorter time to reach mastery level than learners with a lower aptitude. Hence this view implies that it is possible for nearly all students to master any given set of objectives, if sufficient time for learning is provided, alongwith appropriate materials and instruction.

2. Quality of Instruction

Block (1974), in his studies has observed the large individual differences in rate of learning. According to him poor instruction is the cause of these difference. Positive correlation between quality of instruction and learning rate was also found by Carroll (1967) and Merrill (1970).

Carroll (1963) in his paper on a model of school learning defined the quality of instruction in terms of the degree to which the presentation, explanation and ordering of elements of learning tasks approach the optimum for a given learner. He assumed that each student can learn, if the instructor approaches the optimum for him or her. It implies that the quality of instruction has to be made suitably appropriate to the needs of each learner for optimum outcome. Bloom also agrees with Carroll's view
that students differ in the quality of instruction they need to learn a given task but he differs with him on what is involved in quality of instruction. Bloom (1976) has defined quality of instruction in terms of interaction between instruction and students. He has suggested cues, participation, reinforcement, feedback and corrective measures as the major characteristics of instruction. It has been observed that these four elements of instruction account for 20-25 percent variation in achievement. The quality of instruction proves more helpful in the case of those who have not developed mature learning procedures. There are many studies which suggest that, in general, the quality of instruction is of the greatest significance for groups of pupils at the lower position of the ability of achievement distribution (Coleman et al. 1966). This proves effective if the quality of instruction is designed appropriately to meet the special needs and characteristics of the individuals in the class.

3. Ability to Understand Instruction

The ability to Understand Instruction may be defined as the ability of the learner to understand and comprehend the nature of the learning task and the procedures, he is to follow in his learning. There are a number of instructional techniques and aids that may be employed to meet appropriately the requirements and characteristics of the learners. Different instructional strategies like small group study sessions, tutorial help, alternative textbook, work book, programmed instruction, educational games, audio-visual material, etc. may be used by the teachers to fit their instruction to the differing needs of all their students. These
alternative instructional materials are used in such a way that quality of instruction in relation to the ability of each student is improved and difficulties faced by students during the process of learning are overcome.

4. Perseverance

Carroll (1963) defined perseverance as the time, the learner is willing to spend in learning. If a student is not given as much time to learn as he is willing to spend, this student will not be able to master the learning task.

Carroll found a close relationship between motivation and perseverance. Perseverance is dynamic and not static. It can be increased by increasing the frequency of reward and evidence of learning success or by reducing the frequency of failure. According to Husen (1967), perseverance is related to students’ attitudes towards and interest in learning. Perseverance of learner is also influenced by quality of instruction.

5. Time Allowed for Learning

According to Carroll, the time spent 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. Bloom (1971, 1976, 1978, 1980) in his studies asserts that individual differences in learning rates and time needed to learn are artifacts of the schooling process. He believes that learning rates of
students become progressively slower when they begin to learn a new unit without having mastered prerequisites. Bloom even suggests that individual differences in learning rate and time needed to learn will vanish provided the learner proceeds through the adequate mastery learning procedures. Anderson (1976) also found that as student in a mastery learning treatment became homogeneous w.r.t. prerequisites for each succeeding step, they also became homogeneous w.r.t. time needed to attain mastery.

1.3.3 Bloom’s Model

Based on Carroll’s model of school learning, Benjamin S. Bloom (1976) developed mastery learning strategy for optimising students’ learning in different areas of curriculum. The basis of his strategy is that most students can attain a high level of learning capability if

i) instruction is approached sensitively and systematically.

ii) students are helped when and where they have learning difficulties;

iii) they are given sufficient time to achieve mastery;

iv) there is some clear criterion of what constitutes mastery.

Bloom converted the conceptual model of school learning given by Carroll into the working model for classroom instruction. This theory attempts to explain school learning in terms of a small number of
interdependent variables. These interdependent variables mainly account for much of the variation in school learning. The three interdependable variables which are central to Bloom's Model of School Learning are:

1. The extent to which the student has already learned the basic pre-requisites for the new learning task (Cognitive Entry Behaviour).

2. The extent to which the student is motivated to engage in the new learning task (Affective Entry Characteristics).

3. The extent to which the instruction to be given is made appropriate to the student (Quality of Instruction).

More specifically, the model deals with student characteristics, instructions and learning outcomes.

Bloom's Model of School Learning can be represented by the following chart:

**Figure 1.1**

**MAJOR VARIABLES IN THEORY OF SCHOOL LEARNING**

<table>
<thead>
<tr>
<th>Student characteristics</th>
<th>Instructions</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-requisites (Cognitive)</td>
<td>Pupils Entry Behaviour</td>
<td>Learning Task(s)</td>
</tr>
<tr>
<td>Pre-requisites (Affective)</td>
<td>Quality of Instruction</td>
<td>Level and type of Achievement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Affective Outcomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rate of Learning</td>
</tr>
</tbody>
</table>
Major Variables in Theory of School Learning

Cognitive entry behaviour represents those pre-requisite types of knowledge, skills and competencies which are essential to the learning of a particular new task. In the absence of these pre-requisites the learning of the new task becomes difficult, thereby, adversely affecting the achievement of students. The studies conducted by Anderson (1973), Arlin (1973), Block (1970), Levin (1975), Payne (1963), Bracht & Hopkins (1972), Gagne and Paradise (1961), Sinha (1968) and Menon (1973) make it clear that there is a strong positive relation between the cognitive entry behaviour of a student and his achievement in subsequent learning tasks or courses. On the basis of the findings of such studies, Bloom (1976) estimated that cognitive entry behaviour accounts for about 50 percent of the variation in achievement. This emphasises the vital role these behaviours play in students’ learning and their achievement.

The affective entry behaviours are learner's interests and attitudes towards the subject, the school and schooling; also include self-concepts and personality characteristics. These behaviours are required by the learner during his school experiences. When students enter a learning task with enthusiasm and interest, they learn it easily, more rapidly and to a higher level of achievement than those who approach it with lack of enthusiasm and interest. Researches conducted by Anderson (1973), Bhasin (1974) and Block (1976) established significant relationship between affective entry behaviours and school achievement of
students. Block (1976) reported that effective entry characteristics can account for up to 25 percent of the variance on relevant cognitive achievement measures.

Bloom refers quality of instruction as the interaction between instruction and students. The major characteristics of quality of instruction, namely, cues, participation, reinforcement, feedback and corrective procedures determine and influence the quality of instruction and their effects on student learning. It is required to make these characteristics appropriate to the needs of the learner in order to raise his learning achievement. The studies available indicate that quality of cues, participation and reinforcement can account for at least 20 percent of the variance while feedback and corrective procedures can account for about 25 percent of the variance in pupil learning.

Some pre-conditions, operating procedures and evaluating procedures were identified by Bloom, while developing the mastery learning model. This model has been adapted in India also to meet the peculiar conditions of Indian Educational System (Hooda and Jangira, 1980; 1983).

1.4.0 INDIAN MODEL OF MASTERING LEARNING

Operating Procedure

The mastery learning model (MLM) follows several activities in a sequence. The sequence of activities can be summarised as in Table 1.3.
<table>
<thead>
<tr>
<th>Phase</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Selecting content to be taught. Developing sequential teaching units. Deciding goals in terms of specific objectives (Deciding Mastery Level). Teaching for learning task.</td>
</tr>
<tr>
<td>II</td>
<td>Core Teaching Session</td>
</tr>
<tr>
<td></td>
<td>Informing the pupils about the instructional objectives. Making the expected mastery level explicit to the students. Presenting the learning task to the class as a whole. Administering unit formative test-I and diagnosing student difficulties.</td>
</tr>
<tr>
<td>III</td>
<td>Differential Teaching Session</td>
</tr>
<tr>
<td></td>
<td>Classifying pupils according to achievement levels on the formative test-I</td>
</tr>
<tr>
<td></td>
<td>Providing alternative learning materials.</td>
</tr>
<tr>
<td></td>
<td>Organising small group instruction with peer teachers.</td>
</tr>
<tr>
<td></td>
<td>Organising tutoring pairs with peers.</td>
</tr>
<tr>
<td></td>
<td>Organising individual study.</td>
</tr>
<tr>
<td></td>
<td>Organising small group and tutoring.</td>
</tr>
<tr>
<td></td>
<td>Administering unit formative test-II and diagnosing pupil difficulties.</td>
</tr>
<tr>
<td></td>
<td>Providing alternative learning materials.</td>
</tr>
<tr>
<td>IV</td>
<td>Intensive Teaching Session</td>
</tr>
<tr>
<td></td>
<td>Tutoring by the peers and the teacher.</td>
</tr>
<tr>
<td></td>
<td>Providing further material for practice.</td>
</tr>
<tr>
<td></td>
<td>Consolidation of the gains in differential session.</td>
</tr>
<tr>
<td></td>
<td>Administering unit formative test-III</td>
</tr>
</tbody>
</table>
A brief discussion of the activities of these phases is given below:

**Phase-I**

Selection of contents to be taught is the first important step in mastery learning strategy. Contents of the curriculum are organised sequentially in the form of units. The hierarchical order of different concepts is followed in preparing the sequence of teaching units. In such arrangements, each learning unit becomes a pre-requisite for the subsequent unit. The level of achievement of each task influences the learning of the later task and each task has a necessary relation to the later tasks in the series. The teacher tests the pre-requisites possessed by students. If all the students have the necessary pre-requisites for a particular task, they would tend to learn it with less variation in the level and rate of learning than if the students vary greatly in their attainment of the pre-requisites. The students deficient in pre-requisites have to be helped in acquiring the required pre-requisites.

**Phase-II**

Second step of mastery learning strategy is core teaching students are told about the units to be covered. Concepts, rules and processes involved are specified to the students besides instructional objectives and mastery level. First unit from amongst the decided content is taught by the teacher to the class as a whole using the usual techniques of teaching with a view to achieve maximum learning for maximum number of pupils. The
presentation of learning task is followed by assessment of the mastery level of the pupils by administering the formative test-I and diagnosing pupils' difficulties. On the basis of the result of formative test-I, the students can be classified into different groups according to the level of their mastery.

**Phase-III**

It is a differential teaching session of the model. Pupils who score 80% or above in the formative test-I are placed in one group called the mastery group. Rest of the students who are placed in non-mastery group are further divided into sub-groups. Students attaining 60% to 79% marks need a little more practice with additional materials related to the learning task to reach mastery level. This group can achieve mastery level by working on its own. The students scoring marks in the range of 40-59% are divided into further smaller groups who may be helped by small group peer instruction by the pupils of mastery group under the guidance of the teacher. The pupils in the learning range of 20-39% are taught individually by peers. The teacher teaches intensively to the students scoring 0-19% marks.

The teacher tells the students about their strengths and weaknesses on the basis of their performance in formative test-I.

They are also told about the corrective measures to overcome their weaknesses.
Formative test-II is then administered to pupils. The students are again divided into mastery and non-mastery groups. Results of the formative test are used for planning further strategy to improve the non-mastery group of students to the mastery level.

Phase-IV

Phase-IV of the Mastery Learning Model is known as intensive teaching session. The size of the non-mastery group being small, pupil-tutoring and teacher-tutoring is done using alternative instructional material. The teacher works with the students falling at the lowest range on the unit formative test-II. They are given assignments for practice and drill. The unit formative test-III is administered to them. A few students who are still unable to achieve the desired mastery level are helped outside the class by teachers or parents.

All the other units are also taught using the same procedure. It is ensured that all the learners achieve mastery level in the unit taught before proceeding to the next unit.

These activities of MLM can be shown diagrammatically as in Figure 1.2.
Figure 1.2
MASTERY LEARNING MODEL (MLM)

PHASE-I
Selecting content to be taught
Developing sequential teaching units
Deciding goals in terms of specific objectives
(deciding mastery level)

Teaching for learning task: Pre-requisite

Pre-requisite available

Pre-requisite not available

Providing necessary assistance in terms of reference and home assignments

PHASE II
Core teaching session

Performance Assessment
Administering Unit Formative Test-I
1.5.0 EMERGENCE OF THE PROBLEM

In order to make teaching in schools according to need of Twenty First Century, the whole thrust has to change from ‘rote memory based,’ learning to ‘comprehension based’ learning as is clear from the two principal objectives of the formal education system stated below:

1. The long term acquisition and retention of stable, organised and extensive bodies of meaningful and generalizable knowledge; and

2. Growth in the ability to use this knowledge in the solution of particular problems including those problems which, when solved, augment the learner’s original store of knowledge.

The research evidences indicate clearly these objectives cannot be achieved if education is imparted by using conventional methods of teaching but they are achievable to a great extent if better methods of teaching like gaming and mastery learning models are used.

The research evidences thus indicate clearly gaming and mastery learning model can prove very effective in utilising the potential of the learners to the maximum level. It can in this way help remedy the chronic problems of under achievement, and the like. But in order to achieve the best possible outcome, it should be developed to meet the special requirements of Indian conditions.

The effectiveness of gaming has been studied by Sushila (1982), Hooda (1988), Kumar (1989), Kaur (1992) and Kumar (1996), Hooda and Jangira (1983) developed mastery learning model which is more

Sushila (1982) found that pupils trained in classroom questioning through gaming increased the incidence of pupil questioning considerably at all levels of learning.

Sharma (1986) compared the achievement of pupils in chemistry by teaching two groups of 9th class using conventional method in one group and gaming in the other. It was found that student taught chemistry through gaming exercises achieved significantly higher as compare to with the students taught chemistry through conventional method.

Grover (1987) tested the effectiveness of gaming in the subject of physics with pupils of 10th class and observed that it resulted in significantly higher achievement of pupils taught physics through gaming as compare to conventional method.

Hooda (1988) studied the effect of gaming on achievement of pupils of VIII class in the grammar and she reported that students taught Hindi grammar through gaming showed significant improvement in achievement as compare to those taught Hindi Grammar through conventional method.
Kumar (1989) found that Xth class pupils taught mathematics through gaming gave significantly higher achievement than pupil taught through conventional method.

The study conducted by Kaur (1992) on the effectiveness of training using games on the classroom questioning behaviour of the students reported that it is possible to train pupil in classroom questioning behaviour using games. Firstly it revealed that content free training in classroom questioning using games helps in increasing the incidence of questions asked by the pupils in the real classroom instruction. Secondly, through systematic feedback pupils can be helped to improve the structural characteristics and the levels of questions. Thirdly, the competence to ask questions in the classroom acquired by the pupils in the content free gaming exercises is transferred to classroom instructional transactions as indicated by the post-training measures on classroom questions obtained in actual teaching situations. Lastly, the delivery behaviours need to be studied with control of examination potential in the experimental and control groups.

Kumar (1996) studied the role of quiz gaming in teaching of science at elementary level. He reported that students definitely gain significantly higher when taught science by quiz gaming as compare to lecture method in terms of achievement.

Mathur (1983) compared the achievement of pupils in Physics taught in two groups of XI class using conventional method in one group and Individually Guided system of Instruction in the other. It was found
that 75% of the pupils taught by IGSI scored above 70% while only 25% of the group taught by conventional method scored above 70% on the summative test.

Hooda (1983) found that pupils taught through mastery learning strategy gave significantly higher outcomes than pupils taught through conventional teaching. But he reported that it showed no significant impact on self-concept or attitude of pupils towards mathematics.

Singh (1983) tested the effectiveness of the strategy with the subject of social studies with pupils of class IX and found that it resulted in higher achievement of the pupils.

Yadav (1984) worked with pupils of class IX to test how for the strategy could be effective in teaching of mathematics. His study showed higher achievement, more positive attitude and improved self-concept on the part of the pupils taught through mastery learning strategy as compared to those taught through conventional approach.

Chand (1984) conducted a study using Bloom’s mastery learning strategy and personalised system of instruction to ascertain their effects on retention of high school children in the science stream. He reported no difference in achievement or retention after two to six weeks when pupils learnt a segment of science by either PSI or mastery learning strategy.

The study made by Koul (1986) showed that mastery learning strategy was effective in improving significantly the achievement
motivation of pupils. He also found that there was a decrease in magnitude of test anxiety of pupils who received instruction through mastery learning strategy.

Patadia (1987) reported that Mastery Learning Model was helpful to 68.63% pupils in attaining mastery in mathematics.

Chaudhary and Vaidya (1988) employing Mastery Learning Model (MLM) and Concept Attainment Model (CAM) in language learning found the MLM to be more effective than the CAM and traditional method of teaching.

The results of the study conducted by Vaidya (1989) also indicate that mastery learning strategy is effective in improving achievement, self-concept and attitude of learners towards the subject of study i.e. Hindi.

Ranjna (1992) reported that the pupils instructed through Mastery Learning Strategy exhibited significant improvement in their self concept and class room trust behaviour towards the subject of science.

Dahiya (1995), studied the effect of mastery learning strategy in pupils achievement in mathematics and their creative abilities. It was reported that student who were taught mathematics through mastery learning model have shown significant improvement in their achievement in mathematics than the student who were taught through the conventional method. It was further reported that the group of students who were taught mathematics through mastery learning model have
shown significantly high gain in various dimensions of verbal and non-verbal creativity than the group of pupils who were taught mathematics through conventional method.

Renu (1997) reported that mastery learning strategy and concept attainment model are effective in raising the achievement of pupils in the subject of science. It was also reported that mastery learning strategy and concept attainment model both improve student classroom trust behaviour when compared with conventional method of teaching. She suggested that concept attainment model is better approach than mastery learning study in improving achievement in students in science.

It is evident from this brief survey of researches conducted in India on the use of gaming and Mastery Learning models that very little work has been done to test their effectiveness in Indian situations and to adopt them it to our peculiar needs. Effectiveness of gaming and mastery learning models in teaching of Hindi particularly has not been attended to adequately. Since the subject is gaining importance in school curriculum, research to use gaming and mastery learning model to improve pupils achievements in Hindi needs to be conducted. The effects of two approaches on pupils self-concept call for and in depth investigation.

1.6.0 STATEMENT OF THE PROBLEM

A COMPARATIVE STUDY OF THE EFFECTIVENESS OF GAMING AND MASTERY LEARNING MODELS ON PUPILS' SELF-CONCEPT AND ACHIEVEMENT IN TEACHING OF HINDI.
1.7.0 DEFINITION OF THE TERMS USED

1.7.1 Gaming

The term gaming is used in various ways. The investigator follows the academic gaming. These are currently very popular in India. Some specific type of gamings are used on the television e.g. Quiz Time, Quest-a program produced by Calcutta Doordarshan, and On the Spot Program etc. These all are examples of gaming.

1.7.2 Mastery

80% of the learners acquired at least 80% of the content taught through the use of appropriate material and they attain 80% level in summative evaluation.

1.7.3 Mastery Learning

Mastery learning is essentially an instructional technique for the teaching and learning of hierarchical sequential material. It is systematically planned programme of instruction adopted by a teacher to raise 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.

1.7.4 Mastery Learning Model

In order to achieve the goal of raising teaching and learning to optimum level, Bloom and his associates developed mastery learning strategy. In developing the mastery learning strategy, they have tried to
identify some pre-conditions, operating procedures and evaluations of outcomes. Based on Bloom and his associates work Hooda and Jangira (1980; 1983) developed Mastery Learning Model to meet the peculiar conditions of Indian Educational System. The Mastery Learning Model developed by Hooda and Jangira has been used in the present study.

1.7.5 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 thirty five students, gives home assignments and administers test periodically. These tests are given only to give marks to the pupils and have no value in terms of improving the quality of instructions.

1.7.6 Achievement in Hindi

It is the level of learning in a particular area of the subject in terms of knowledge, understanding, skill and application. It is the performance as indicated by the scores of pupils on the Hindi achievement test developed by the investigator.

1.7.7 Pupils' Self-Concept

Pupils' 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. In this study the measure of self concept is summative score of any pupil on the self concept test developed by Sherry, Verma and Goswami.

1.7.8 Formative Tests

Formative tests, also called Mastery tests, have been used here as they provide the information necessary to make instruction appropriate to the needs of the individual for achieving mastery level. Formative tests are administered during the course of mastery learning to find out the levels of student's achievement in a particular area of content and to diagnose pupils' difficulties. These tests are given at the completion of each learning unit. They serve the vital function of providing feedback necessary to design the quality of instruction accordingly.

The scores on different formative tests indicate the pupils' achievement of mastery level. For purpose of present study, the mastery level decided is 80% learning achieved by 80% of the pupils.

1.7.9 Summative Test

Summative test, also known as criterion achievement test, is administered at the end of major units taught. Its primary aim is to assess or evaluate the degree of the students' achievement and to grade them according to their performance.

1.8.0 OBJECTIVES

1. To compare the mean achievement scores on the criterion achievement test in Hindi, of the three groups of pupils, taught
Hindi with the use of Mastery Learning Model (MLM), Gaming Model (GM) and Conventional Method (CM) of teaching, before the experimental treatment.

2. To compare the mean achievement scores on the criterion achievement test in Hindi, of the three groups of pupils taught Hindi with the use of MLM, GM and CM of teaching, after the experimental treatment.

3. To compare the mean gain scores, on the criterion achievement test in Hindi, of the three groups of pupils, taught Hindi with the use of MLM, GM and CM of teaching, after the experimental treatment.

4. To compare the mean scores, on the test of self-concept, of the three groups of pupils, taught Hindi with the use of MLM, GM and CM of teaching, before the experimental treatment.

5. To compare the mean scores, on the test of self-concept, of the three groups of pupils, taught Hindi with use of MLM, GM and CM of teaching, after the experimental treatment.

6. To compare the mean gain scores, on the test of self-concept, of the three groups of pupils, taught Hindi with the use MLM, GM and CM of teaching, after the experimental treatment.

1.9.0 HYPOTHESES

In order to realise the objectives of the study following hypotheses were tested:
$H_1$ There is no significant difference in the mean score, on the criterion achievement test in Hindi, of the three groups of pupils, taught Hindi with the use of MLM, GM and CM of teaching, before the experimental treatment.

$H_2$ There is a significant difference in the mean scores, on the criterion achievement test in Hindi, of the three groups of pupils, taught Hindi with the use of MLM, GM and CM of teaching, after the experimental treatment.

$H_3$ There is a significant difference in the mean gain scores, on the criterion achievement test in Hindi, of the three groups of pupils, taught Hindi with the use of MLM, GM and CM of teaching, after the experimental treatment.

$H_4$ There is no significant difference in the mean scores, on the test of self-concept, of the three groups of pupils, taught Hindi with the use of MLM, GM and CM of teaching, before the experimental treatment.

$H_5$ There is a significant difference in the mean scores, on the test of self-concept, of the three groups of pupils, taught Hindi with the use of MLM, GM and CM of teaching, after the experimental treatment.
H₆ There is a significant difference in the mean gain scores, on the test of self concept, of the three groups of pupils, taught Hindi with the use of MLM, GM and CM of teaching, after the experimental treatment.

1.10.0 DELIMITATIONS

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

1. The study was confined to a single school in Charkhi-Dadri in order to control effectively the variable of institutional variation.

2. The sample for the study constituted the girl students of VI Class.

3. The study was conducted in the subject of Hindi only. In Hindi the content was further limited to Hindi Grammar only.

4. Only six chapters of the prescribed syllabus of Hindi Grammar for VI standard in Haryana Schools were chosen for the study.

5. Although there are various teaching models, the present study was confined to gaming and mastery learning model.

6. The study can be conducted on a variety of other educational outcomes but it was conducted only on achievement and self-concept.

7. The experiment was limited to fourteen weeks of the academic session.