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CHAPTER 1
Introduction

1.0 INTRODUCTION

Present world is changing at a rapid rate. The generation of new information/knowledge is accelerating at an alarming rate. Psychologists, educationist, and researchers felt that individual differences among students are so extreme and unique that have a particular way to make learning. Hence there is an urgent need to examine each individual learner living in different type of environment to identify exactly how he or she is likely to learn most effectively. To know about students (how, when, what and where- they learn best) is very much helpful to be aware of their learning process. No two persons have the same perception about himself or about world as the individual’s cognitions/thinking reflect his own environment, his wants, his goals, his experiences etc.

The phenomenon of the process of learning in a classroom context or in open life situation is characterized by its individual nature. The activities by teacher in the classroom are to direct and stimulate student-learning. Students learn by using/performing his/her individualized tactics, techniques and strategies in learning. It is essential for the teacher to teach according to the various learning styles of students to improve the effectiveness of teaching-learning process.

STATEMENT OF THE PROBLEM

The statement of the problem for the present study reads as under:

“A Study of Learning styles in concept attainment in relation to learners’ intelligence and self concept”
1.1 OPERATIONAL DEFINITIONS OF KEY TERMS USED

The following words used in the title are defined with a view to clarify the connotation in which they are use in the present study-

1. STUDY: The making of a search or inquiry; Systematic examination; Careful and minute research;

2. LEARNING STYLES: The way he/she prefers to learn; Predisposition to adopt a particular learning strategy; Habits or regular mental behaviors; concerning Learning; Hemispherical preference of cerebral.

3. CONCEPT ATTAINMENT: Attainment of LPG concept by the students as reflected through achievement test prepared by investigator.

4. LEARNERS: Students studying at +1 level in Sonipat district of Haryana.

5. INTELLIGENCE: Intellect; To understand; To think; To deal with; Measure by intelligence test.

6. SELF-CONCEPT: Totality of descriptions which a person holds for self; Self-image; Thinking aspect of self.

7. PRIVATE SCHOOLS: Managed by private organizations or individuals, either partially or totally.

8. GOVERNMENT SCHOOLS: Sole management of government officials.
1.2 LEARNING STYLES

It is commonly believed that most people favour some particular method of interacting with, taking in, and processing stimuli or information. Based on this concept, the idea of individualized “learning styles” originated in the 1970’s and has gained popularity in recent years. Learning styles are important because they are the education-relevant expressions of the uniqueness of the individual. Individual differences are to be prized because they are the expression of the uniqueness of personalities. It has been proposed that teachers should assess the learning styles of their students and adapt their classroom methods to best fit each student’s learning style.

Some students find the theory to be easier to understand and others find practical work more interesting and easy. Learning depends on many factors i.e., environment, position in class, previous learning etc. The active participation of students in their own learning process makes them feel empowered, develop sense of achievement and enhance the self-esteem/self-concept and provide the direction for effective learning. Various researchers have shown that teaching material adjusted with the learning style helps all students in better learning. The knowledge of learning styles helps the teacher in developing instructional design. Teaching individuals through their learning styles enhances their academic attainment and self-esteem/self-concept.
Learning style is a generic concept that frequently includes cognitive styles, personality styles, sensory modes etc. Learning styles include habits of information processing representing the learner’s typical mode of perceiving, thinking, problem-solving and remembering. Learning style may be determined to provide guidance to a student who is struggling academically or to modify delivery methods to better suit the diversity of learning styles in a classroom to ensure student learning.

1.2.1 DEFINITIONS OF LEARNING STYLES

The range of definitions that have been adopted to describe the construct of learning style is large. Many attempts have been made to define it, ranging from definitional statements to elaborate categorizations of learning style elements. Those definitions range from concern about preferred sensory modalities (e.g. visual, tactile etc.) to descriptions of personality characteristics that have implications for behavior patterns in learning situation (e.g. need for structure versus flexibility).

Gregore (1979) views a learning style as:

"consisting of distinctive behaviors which serve as indicators of how a person learns from and adapts to his environment. It also gives clues as to how a person’s mind operates."
Hunt (1979) believes that learning style:

"describes a student in terms of those educational conditions under which he is most likely to learn. Learning style describes how a student learns, not what he has learned."

Keefe (1982) perceives learning style as:

"characteristics cognitive, affective, and psychological behaviour that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment."

Dunn, Dunn & Price (1979) describe learning style as:

"the manner in which at least 18 different elements from four basic stimuli affect a person's ability to absorb and retain."

[These 18 elements from four types of stimuli are: sound, light, temperature, design (environmental); motivation, persistence, responsibility, need for structure (emotional); working alone, working with another students, working with many students, working with a team of students, working with an adult, working with some]
combination of adults and peers (sociological); perceptual strengths, intake, time of day, need for mobility (physical).]

Litzinger & Osif (1973, 92) describe learning style as:

"the different ways in which children and adults think and learn."

[In order to better understand the learning process, they break it down into following processes:

1. Cognition→ how one acquires knowledge.
2. Conceptualization→ how one processes information.
3. Affective→ people's motivation, decision making styles, values and emotional preferences will also help to define their learning styles.]

Oxford & Ehrman (1988) stated that:

"learning style is a blend of cognitive, affective, and behavioral elements."

Biggs (1984) describe learning style as:

"predisposition to adopt a particular learning strategy."
Draper (2005) describes that:

“learning styles are habits, strategies, or regular mental behaviors concerning learning, particularly deliberate educational learning, that an individual displays, and has built on his/her underlying potentials.”

Rosenberg (1968) defines learning style as:

“an individual's characteristic pattern of behavior when confronted with a problem.”

James and Gardner (1995) define learning style as:

“complex manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store, and recall what they are attempting to learn.”

Merriam and Caffarella (1991) define learning style as:

“individuals characteristic way of processing information, feeling, and behaving in learning situations.”
Dunn and Dunn (1992) define learning style as:

"the way in which individuals begin to concentrate on, process, internalize and retain new and difficult academic information."

Learning style is

"the complex manner in which, and conditions under which, learners most efficiently and most effectively perceive, process, store and recall what they are attempting to learn." (James and Gardner, 1995, p.20)

"an individual’s characteristic way of processing information feeling, and behaving in learning situation." (Merriam and Caffarella, 1991, p.176)

"the cognitive, affective, and physiological factors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment." (Swanson, 1995, p.2)

"the preference or predisposition of an individual to perceive and process information in a particular way or combination of ways." (Sarasin, 1998, p.3)

Learning style can be comprised as a consistent pattern of behaviour but with a certain range of individual variability. When
persons learn, they use learning styles that are uniquely their own, but make moment-by-moment style adjustments, depending on the nature of the task.

An approach to learning styles is a theory based on the specialized functions of the cerebral hemispheres (Reynolds, Riegel & Torrance, 1977). Applying their research in hemispheric specialization, Reynolds et. al. defined learning styles as preferred modes of information processing. Three styles are specified: Left-dominant (active, verbal, analytic, and logical), right-dominant (receptive, non-verbal, spatial, and intuitive), and whole-brained (complementary, integrated, simultaneously left and right). Students with left-dominant learning styles may be better able to generate logical relationships among alternative scientific constructs than those with right-dominant learning styles where-as the latter may have the intrinsic capacity to understand abstract ideas.

This way of looking at learning styles is to determine hemispheric dominance. Whether person works as right-brained or left-brained. The researches related to brain confirms that both sides of the brain are involved in every activity, we know that the left side of brain is the seat of language and processes in a logical and sequential order, while the right side is more visual and processes intuitively, holistically, and randomly. The different researches have shown that the two different sides or hemispheres of the brain are responsible for different manners of thinking. The following table illustrates the differences between left-brain and right-brain thinking:
LEFT-BRAIN
Logical
Sequential
Rational
Analytical
Objective
Looks at parts

RIGHT-BRAIN
Random
Intuitive
Holistic
Synthesizing
Subjective
Looks at wholes

Every one has one particular style (either Left-brained or Right-brained) to work. Left-brained scholastic subjects focus on logical thinking, analysis and accuracy. Right-brained subjects focus on aesthetics, feeling and creativity. Several brain researches show that the brain performs many functions simultaneously—thoughts, emotions, imagination and prepositions—which are continually interacting within social and cultural contexts. This functioning for each individual is unique, which is “as individual as a signature”.

1.2.2 CLASSIFICATION OF LEARNING STYLE

A student’s learning style may be classified in parts by the answers to five questions:

1. What type of information does the student preferentially perceive: sensory—sights, sounds, physical sensations, or intuitive—memories, ideas, insights?

2. Through which modality is sensory information most effectively perceived: visual—pictures, diagrams, graphs, demonstrations, or verbal—sounds, written and spoken words and formulas?
3. With which organization of information is the student most comfortable: inductive—facts and observations are given, underlying principles are inferred, or deductive—principles are given, consequences and applications are deduced?

4. How does the student prefer to process information: actively—through engagement in physical activity or discussion, or reflectively—through introspection?

5. How does the student progress toward understanding: sequentially—in a logical progression of small incremental steps, or globally—in large jumps, holistically?

1.3 MODELS OF LEARNING STYLE

The term “Learning Style” was probably, first used by Thelen (1954) in discussing the dynamics of group at work. The term has been conceptualized in several ways since that time. At present time, two lines of research which attempt to explain the underlying processes of learning and teaching are explained below:

One group is working with applied models of learning style e.g., Hill (1976); Hunt et. al. (1978); Dunn and Dunn (1978). Interview techniques or self-report questionnaires are used to identify students’ perceptions of their own characteristic traits.
Second group of researchers retains a strong preference for the cognitive style dimension. Such types of models are bi-dimensional rather than simple bi-polar. An example of this type model is developed by Mckenney, which identifies the human information processing into two dimensions: information gathering (perceptive Vs. receptive) and information evaluating (systematic Vs. intuitive).

A few models are discussed in brief as follows:

1.3.1 **DUNN & DUNN MODEL**

—a Comprehensive Model

This model is constructed in terms of individual student reactions to 23 elements that affect how people concentrate on process, absorb, the retain information and skills. Psychologists have identified which elements of style are biologically imposed and which develop as an outgrowth of individual life experiences *(Restak, 1979).*

**Dunn (1986)** believes that although style can change over time as a result of maturation,

a) strong preferences change only over years,

b) preferences tend to be overcome only by personal motivation,

c) teachers cannot identify students' learning styles easily without proper instrument, and
d) when students are taught in ways that complement their styles, its results significantly increase in achievement as well as improvement in attitudes and behaviors.

According to Dunn’s model each person’s style is comprised of a combination of environmental, emotional, sociological, physical and psychological elements that permit individuals to receive, store, and then use their knowledge of skills (see fig. 1.1).

![Learning Style Model by Dunn & Dunn](image)

**Fig. 1.1: Learning Style Model by Dunn & Dunn**

The description of Dunn & Dunn Modal is as stated.

- The environmental strand incorporates individual’s preferences for the elements of sound, light, temperature, and seating design.
The emotional strand focuses on students' levels of motivation, persistence, responsibility, and need for structure.

The sociological strand addresses students' preference for learning alone, in pairs, with peers as part of team, with either authoritative or collegial instructors, or in varied approaches (as opposed to in patterns).

The physiological strand examines perceptual strengths (visual, auditory, kinesthetic or tactile), time-of-day energy levels, and the need for intake (food and drink) and mobility while learning, and

Psychological strand incorporates the information-processing elements of global versus analytic and impulsive versus reflective behaviour.

**Dunn & Dunn Model** is based on the following theoretical assumptions:

1. Most individuals can learn.

2. Instructional environments, resources, and approaches respond to diversified learning style strengths.

3. Everyone has strengths, but different people have very different strengths.
4. Most teachers can learn to use learning styles as a cornerstone of their instruction.

5. Many students can learn to capitalize on their learning style strengths when concentrating on new/or difficult academic material.

The Dunn and Dunn model measures preferences rather than strengths. A positive feature of this model is that it affirms preferences rather than aiming to remedy weaknesses. It does not stigmatize different types of preferences. Supporters argue that anyone can improve his/her achievement and motivation if teachers match preferences with individualized instruction and changes to environment, food and drink intake, time of the activities performed in a day and opportunities to work alone or with others.

An important principle in the Dunn and Dunn model is the idea that students potentials and achievement are heavily influenced by relatively fixed traits and characteristics.

1.3.2 KOLB’S LEARNING STYLE MODEL

In the early 1970s, Kolb developed an experiential learning model and identified two major dimensions of learning, perception, and processing, and maintained that learning results from the way people perceive and then process what has been perceived. He described two opposite kinds of perceptions. At one extreme are people
who perceive through concrete experience and at the other extreme are people who perceive through abstract conceptualization. As he explored differences in processing, Kolb also found examples at opposite ends of a continuum. Some people process through reflective observation. The juxtaposition of the two ways of perceiving and the two ways of processing led Kolb to describe a four-quadrant model of learning styles (see fig. 1.2). These actions serve once more as guides in creating new experience:

![Kolb's Learning Style Dimensions](image)

**Fig. 1.2: Kolb’s Learning Style Dimensions**

In Kolb’s upper-right hand quadrant, type-I learners are those who perceive through concrete experience and process through reflective observation. The second quadrant called type-II learners, are those who perceive through abstract conceptualization and process
through reflective observation. The third quadrant comes with type-III learners, are those who perceive through abstract conceptualization and process through active experimentation. The learners come in forth quadrant called type-IV learners, are those who perceive through concrete experience and process through active experimentation.

Learning styles identified by Kolb, could be seen on a continuum running from:

1. **Concrete experience**: being involved in a new experience.

2. **Reflective observation**: watching others or developing observations about own experience.

3. **Abstract conceptualization**: creating theories to explain observations.

4. **Active experimentation**: using theories to solve problems make decisions.

### 1.3.3 McCarthy’s 4MAT SYSTEM

McCarthy was interested in implication of hemispheric specialization for learning style and looking carefully at each of four types of learners and to explore how the right and left hemisphere would function for these unique learning styles. This resulted into the imposing of the right and left specialization on each of the four learning styles, which calls the 4MAT System (see fig. 1.3).
Following is the description of the four types of learners (Guild & Garger, 1985), which is viewed from the perspective of left and right brain processing styles:

**Type-I learners** perceive in a concrete sensing/feeling way and process in a reflective/watching way. Their right hemisphere searches for personal meaning through an experience, and the left hemisphere seeks to understand the experiencing by analyzing it. These learners seek a reason for learning and knowing something. They often ask “why”.

**Type-II learners** perceive in an abstract and thinking way and again process in a reflective and watching way. For them the most important question is “what”. Their right hemisphere seeks to integrate experience with what they know and to clarify their need for more knowledge, while their left hemisphere seeks that new knowledge.
Such type of learners wants to get accurate information. They want to deal with facts and right answers and to be able develop concepts and theories in an organized system. Important thing for these learners about learning is identifying what can be known and seeking knowledge carefully and fully.

**Type-III learners** also perceive by thinking and abstracting but they process by actively trying out and doing. For these learners, the most important question is “how does it work?” Their right hemisphere looks for an individual application and use of the learning, while their left hemisphere looks for more general “what has other people done?”

**Type-IV learners** perceive through concrete sensing and feeling and process by doing. These learners ask the question “if”. Their right hemisphere seeks to develop extensions of their learning, and the left hemisphere seeks to analyze the learning for relevance and significance. These types of learners want to see relationships and connections between things; they want to be inspired to do things that are really important in life. These learners understand and accept complexity.

**McCarthy** believes that all learners and all learning experiences should start with quadrant-I.

### 1.4 CATEGORIZING LEARNING STYLES

Specific and identifiable learning styles characterized by students have been suggested by Fischer and Fischer (1979). Most
teachers can think of students who exemplify the following learning styles (Henson and Borthwick, 1984):

1. *Incremental learner-* needs a highly structured approach designed to permit the student to reach a generalization.

2. *Intuitive learner-* unsystematic, sporadic learner who often is unable to explain what has been learned in any organized manner.

3. *Sensory specialist-* relies upon one sense (e.g., visual or auditory) even though all are sufficiently operating.

4. *Sensory generalist-* depends upon all senses.

5. *Emotionally involved-* requires an environment both physically and mentally stimulating to “cause a high emotional charge.”

6. *Emotionally neutral-* requires a “Low-Key” atmosphere.

7. *Explicitly structured-* needs clear objectives and organized lesson.

8. *Open-ended structure-* prefers an open-ended rather than highly structured environment.

9. *Damaged learner-* a physically normal student with a damaged self-concept and social skills.
10. *Eclectic Learner-* can alter learning styles to fit the occasion despite having a preference for one or another.

1.5 INTELLIGENCE

The term ‘intelligence’ is usually used to describe a person’s general mental abilities in a number of different areas including verbal and motor skills. The concept of intelligence occupies a peculiar position within the field of psychology. Intelligence is the ability to undertake activities that are characterized by difficulty, complexity, adaptiveness to a goal, the emergence of originals, and a resistance to emotional forces. But defining intelligence is highly problematic. That is because intelligence consists of knowledge, skills and many other aspects related one’s life. Intelligence also connects to the causes and potential solutions of deep-rooted social problems. Is there an ‘intelligence’ that equips us to solve all kinds of problems and answer all questions, regardless of their nature? Or are there different intelligences that help us to deal with particular problems and solutions?

The first intelligence test, devised by Frenchman Alfred Binet, was constructed for the purpose of predicting success in school. In the book “The Teaching of Thinking”, Nickerson et al. (1985) describe intelligence from a pedagogical point of view as a multi-faceted concept which manifests itself in many ways. People considered intelligent are likely to give evidence of possessing a variety of intellectual skills. Six features are in their view definitely connected to the label ‘intelligent’:

1. The ability to classify patterns.
2. The ability to modify behavior adaptively through learning.

3. The ability to reason deductively.

4. The ability to reason inductively.

5. The ability to develop and use conceptual skills.

6. The ability to understand.

These abilities enable people to perceive the world around them: they enable them to process information as kind of a knowledge processing through categorizing it, drawing inductive or deductive conclusions from situations to build up concepts (induction). Operationally, Intelligence is the performance of the subjects on the verbal group test of general mental ability.

1.5.1 DEFINITIONS OF INTELLIGENCE

Intelligence is a property of mind that encompasses many related mental abilities, such as the capacities to reason, plan, solve problem, think abstractly, comprehend ideas and learn.

At least two major "consensus" definitions of intelligence have been proposed. First, from intelligence: known and unknowns, a report of a task force convened by the American Psychological Association in 1995:
“Individuals differ from one another in their ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought. Although these individual differences can be substantial, they are never entirely consistent: a given person’s intellectual performance will vary on different occasions, in different domains, as judged by different criteria. Concept of ‘intelligence’ is attempts to clarify and organize this complex set of phenomena.”

A second definition of intelligence comes from Mainstream Science on Intelligence, which was signed by 52 intelligence-researchers in 1994:

“a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather, it reflects a broader and deeper capability for comprehending our surroundings – “catching on”, “making sense” of things, or “figuring out” what to do.”

Many prominent researchers have offered their own definitions of intelligence:
Alfred Binet: "...... judgment, otherwise called good sense, practical sense, initiative, the faculty of adapting one's self to circumstances ...... auto-critique."

David Wechsler: "...... the aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment,"

Cyril Burt: "...... innate general cognitive ability."

Howard Gardner: "to my mind, a human intellectual competence must entail a set of skills of problem-solving-enabling the individual to resolve genuine problems of difficulties that he or she encounters and, when appropriate, to create an effective product-and must also entail the potential for finding or creating problems-and thereby laying the groundwork for the acquisition of new knowledge."

Herrnstein and Murrey: "...... cognitive ability."

Sternberg and Salter: "...... goal directed adaptive behavior."

John Kotter on Leadership Intelligence: "A 'keen mind' i.e., strong analytical ability, good judgment, and the capacity to think strategically and multidimensional."
1.6 CONCEPT ATTAINMENT

This (concept attainment) was used by Bruner to refer to the state of having achieved a concept, the terminal point of concept formation (A dictionary of the mind, brain and behaviour by Dr. Chris Evans). Concept attainment is the process of defining a 'big idea' by attending to essential attributes, distinguishing them from associated attributes that are not essential to the meaning. Concept attainment consists of a class discussion, moderated by teacher, seeking and listing attributes. The concept attainment is to define or identify by finding those attributes that are absolutely essential to the meaning of the concept and disregarding those that are not.

1.6.1 WHAT IS CONCEPT?

It is generally observed that the students feel difficulty in learning the subjects because they do not understand the concepts. If concepts are not clearly understood then further knowledge cannot be built up well. As a result the learners feel the subject tough and lose interest in studying the subject/topic. Concepts are the key building blocks for the structure of knowledge of the various academic disciplines. The teacher should adopt an appropriate method to teach the concepts which helps in attaining the concepts meaningfully.

Dececco (1968) defined concept as a class of stimuli, which have common characteristics.
Farnham Diggory (1972) defined concept as coding system we use to clarify from the world around us.

Good (1959) defined concept as a representative of all those common elements and characteristics, which differentiates the groups or categories.

Terrison defined concept as a group of specific things, symbols or events, having similar characteristics and can be expressed by specific name and symbols.

1.6.2 CHARACTERISTICS OF CONCEPT

The following characteristics are present in each concept:
1. Concept is expressed by name or symbol;

2. Concept has more than one example or branch;

3. Concept always represent a group;

4. New concepts are always to develop.

Concept attainment should be used to help students inductively develop a definition for a concept that has clear critical attributes.
1.7 SELF-CONCEPT

By self, we generally mean the conscious reflection of one's own being or identity, as an object separate from other or from the environment. There are a variety of ways to think about the self. Self is the interaction of "I" and "Me" aspects. It is apparent that the "I" is private but that the "Me" is public or represent the social attitude. Two of the most widely used terms are self-concept and self-esteem. Self-esteem is the affective or emotional aspect of self and generally refers to how we feel about or how we value ourselves (one's self-worth), while self-concept is the cognitive or thinking aspect of self (related to one's image) and generally refers to the totality of a complex, organized and dynamic system of learned beliefs, attitudes and opinions that each person holds to be true about his or her personal existence. Self-concept can also refer to the general idea we have of ourselves and self-esteem can refer to particular measures about components of self-concept. Some authors even use the two terms interchangeably.

Self-concept is defined as the totality of description which a person holds for self. Rosenberg (1979) views the self-concept in three categories:

1. How you view yourself (the extant self),

2. How you would like to see your self (the desired self), and

3. How you show yourself to others (the presenting self).
Franken (1994) states that

"There is a great deal of research which shows that the concept is, perhaps, the basis for all motivated behavior. It is the self-concept that gives rise to possible selves, and it is possible selves that create the motivation for behavior."

Different components of the physical as well as psychological worlds in the self-concept development have been given by Cattell and Dreger (1974) in the following (fig. 1.4):

![Diagram](https://example.com/diagram.png)

**Fig. 1.4:** *Impact of environmental influence of the developing Self-Concept of the child*

There are several components of self-concept: physical, academic, social and transpersonal. The physical aspect of self-concept related to that which is concrete: what we look like, our sex, height, weight, etc. Our academic self-concept relates to how well we
do in school or how well we learn. There are two levels: a general academic self-concept of how good we are overall and a set of specific content-related self-concepts that describe how good we are in math, science, language, etc. The social self-concept describes how we relate to other people and the transpersonal self-concept describes how we relate to the super natural or unknowns.

Marsh (1992) showed that the relationship of self-concept to school achievement is very specific. And found specific measures of self-concept are highly related to success in particular content area. Hamachek (1995) also asserts that self-concept and school achievement are related.

1.8 IMPORTANCE OF THE STUDY

Concepts of learning styles and strategies have been advocating that every learner has his/her unique way of learning i.e., learning style enables learner to learn best. To know about students’ learning styles is also helpful to improve teaching-learning process to the teachers. Teacher needs to identify the styles and strategies of teaching of his/her students to prepare instructional strategies to make them effective learners. Learning style plays an important role in concept attainment, which also get affected by many other variables i.e., intelligence, self-concept etc.

A host of researchers have found that learning styles and academic achievement is closely related (Smith, 1976; Martin, 1977; White, 1981). Geisler-Brenstein and Schmeck (1988) and Schmeck
et. al (1991) reported the positive association between self-concept and deep-processing style, which shows that there is close relation between self-concept and learning styles. Schultz (1997) suggested that awareness and understanding of different learning styles or strategies help the teachers in becoming diagnosticians, prescribers and educational designers.

The issue of learning style is based on the concept of cognitive style. Learning is ability to look at objects, stable and a meaningful perspective. As learning styles include the characteristics of cognitive, affective and physiological behaviour of the learners.

1.9 OBJECTIVES OF THE STUDY

Every study/research is taken up with some definite objectives. The present study was carried out with the following objectives:

1. To study the relationship between cerebral hemispherical preference and concept attainment.

2. To study the relationship between cerebral hemispherical preference and intelligence.

3. To study the relationship between cerebral hemispherical preference and self-concept.

4. To study the relationship between:
i. Cerebral hemispherical preference (right and left) and Sex (male and female).

ii. Cerebral hemispherical preference (right and left) and Locality (rural and urban).

iii. Cerebral hemispherical preference (right and left) and types of school (government and private).

iv. Cerebral hemispherical preference (right and left) and Intelligence (high and low).

v. Cerebral hemispherical preference (right and left) and Self-concept (high and low).

vi. Cerebral hemispherical preference (right and left) and Concept-Attainment (high and low).

5. To study the difference of means between cerebral hemispherical preference and Intelligence.

6. To study the difference of means between cerebral hemispherical preference and Intelligence among the students of H.B.S.E. and C.B.S.E. affiliated schools.

7. To study the difference of means between cerebral hemispherical preference and Intelligence among the students of government and private schools.

8. To study the difference of means between cerebral hemispherical preference and Intelligence among rural and urban students.
9. To study the difference of means between cerebral hemispherical preference and Intelligence of male and female students.

10. To study the difference of means between cerebral hemispherical preference and Self-concept.

11. To study the difference of means between cerebral hemispherical preference and Self-concept among the students of H.B.S.E. and C.B.S.E. affiliated schools.

12. To study the difference of means between cerebral hemispherical preference and Self-concept among the students of government and private schools.

13. To study the difference of means between cerebral hemispherical preference and Self-concept among rural and urban students.

14. To study the difference of means between cerebral hemispherical preference and Self-concept of male and female students.

15. To study the inter-correlations among cerebral hemispherical preference, concept-attainment, self-concept and intelligence.

16. To study the interaction effect of intelligence and self-concept on cerebral hemispherical preference.

17. To study the interaction effect of intelligence and self-concept on concept attainment.
18. To study the interaction effect of schools affiliated to H.B.S.E. and C.B.S.E., locality and sex on cerebral hemispherical preference.

19. To study the interaction effect of schools affiliated to H.B.S.E. and C.B.S.E., locality and sex on concept attainment.

1.10 HYPOTHESES OF THE STUDY

In the present study the following null hypotheses had been tested-

1. There is no significant relationship between cerebral hemispherical preference and concept attainment.

2. There is no significant relationship between cerebral hemispherical preference and intelligence.

3. There is no significant relationship between cerebral hemispherical preference and self-concept.

4. There is no significant relationship between:
   i. Cerebral hemispherical preference (right and left) and Sex (male and female).
   ii. Cerebral hemispherical preference (right and left) and Locality (rural and urban).
   iii. Cerebral hemispherical preference (right and left) and types of school (government and private).
iv. Cerebral hemispherical preference (right and left) and Intelligence (high and low).

v. Cerebral hemispherical preference (right and left) and Self-concept (high and low).

vi. Cerebral hemispherical preference (right and left) and Concept-Attainment (high and low).

5. There is no significant difference of means between cerebral hemispherical preference and Intelligence.

6. There is no significant difference of means between cerebral hemispherical preference and Intelligence among the students of H.B.S.E. and C.B.S.E. affiliated schools.

7. There is no significant difference of means between cerebral hemispherical preference and Intelligence among the students of government and private schools.

8. There is no significant difference of means between cerebral hemispherical preference and Intelligence among rural and urban students.

9. There is no significant difference of means between cerebral hemispherical preference and Intelligence male and female students.

10. There is no significant difference of means between cerebral hemispherical preference and Self-concept.
11. There is no significant difference of means between cerebral hemispherical preference and Self-concept among the students of H.B.S.E. and C.B.S.E. affiliated schools.

12. There is no significant difference of means between cerebral hemispherical preference and Self-concept among the students of government and private schools.

13. There is no significant difference of means between cerebral hemispherical preference and Self-concept among rural and urban students.

14. There is no significant difference of means between cerebral hemispherical preference and Self-concept of male and female students.

15. There are no significant inter-correlations among cerebral hemispherical preference, concept-attainment, self-concept and intelligence.

16. There is no significant interaction effect of intelligence and self-concept on cerebral hemispherical preference.

17. There is no significant interaction effect of intelligence and self-concept on concept attainment.

18. There is no significant interaction effect of schools affiliated to H.B.S.E. and C.B.S.E., locality and sex on cerebral hemispherical preference.
19. There is no significant interaction effect of schools affiliated to H.B.S.E. and C.B.S.E., locality and sex on concept attainment.

1.11 DELIMITATIONS OF THE STUDY

The present study has following delimitations:

1. The study is delimited to 683 students to government and private senior secondary schools.

2. Schools are taken from Sonipat district of Haryana state only.

3. The study is limited to four variables i.e., learning styles, concept attainment, intelligence, and self-concept.

4. In present study, only brain preference of learning style is used. While many psychologists have identified various types of learning style.