CHAPTER  I

INTRODUCTION

1.0 INTRODUCTION

“Education is not preparation for life; education is life itself.” ~John Dewey.

Learning and education are the essence of life in contemporary society. In higher education, successful learning is equivalent to self-regulated learning and metacognition is an important aspect of self-regulated learning. Educationists and educational psychologists have realized the importance of metacognition and self-regulated learning in academic achievement.

The pivotal role played by metacognition in higher education has compelled the researcher to undertake the present research entitled “A Correlational Study of Metacognition from Educational Perspective.” The current chapter presents the purpose, statement of the problem, background of the study, conceptual framework, research questions, hypotheses, definition of terms delimitations, limitations, and significance of the study,
1.1 Background of the Study

Metacognition, or “The Seventh Sense” as coined by Nisbet and Shucksmith, (1984) and cited by (Nicholls, 2003) has only relatively recently become a focus of research as an influential variable in the learning process. Nelson & Narens (1994) mentioned that “metacognition is simultaneously a topic of interest in its own right and a bridge between different areas; therefore, the construct of metacognition need to be investigated”.

Noushad (2008) points out that relating metacognition to one's self-knowledge and ability to 'learn how to learn' resulted in metacognition being awarded a high status in the arena of learning. Noushad explains further that metacognitive knowledge becomes crucial in the scenario of constantly changing technological world where not only it is impossible for individuals to acquire all existing knowledge, but it is also difficult to envisage what knowledge will be essential for the future.

In education, many metacognitive skills and knowledge are of importance. Due to informational technology the availability and accessibility of information has become vast and fast. However, as pointed by Ledziński & Czerniawska (2008), the information technology also leads to the phenomenon of overproduction of information, sometimes called information overflow or information flood. They suggest, one must have metacognitive competencies to deal with the challenges posed by the information overflow. Metacognitive competencies involve knowledge of cognitive functioning and regulation of the cognitive activity. According to Ledziński
The nurturing of metacognition seems to be a major challenge for contemporary education.

The discussion thus far supports the pivotal role played by metacognition in the field of education. Hence, focus of the present research is ‘metacognition from educational perspectives’. The following sections deal with a brief discussion on the concepts considered for this study, namely, metacognition, academic self-concept, hemispheric dominance, learning styles, academic achievement and gender differences.

1.1.1 Metacognition

Metacognition is a complex and multi-faceted phenomenon. Flavell coined the term ‘metacognition’ to mean “knowledge and cognition about cognitive phenomena,” or more simply “thinking about thinking” (Flavell, 1979, p. 906). Metacognition was originally referred to as the knowledge about and regulation of one’s cognitive activities in learning processes. Metacognition essentially means cognition about cognition; that is, it refers to second order cognitions: thoughts about thoughts, knowledge about knowledge or reflections about actions (Papaleontiou, 2008).

Schraw (1994) refers metacognition, “to the ability to reflect upon, understand and control one’s learning.”

Martinez (2006) defines metacognition as “Monitoring and control of thought” p.696. He further clarifies that metacognition has several “diverse functions as
language” such as meta memory, meta comprehension, problem solving and critical thinking.

Lai (2011) observed that the original meaning of the term given by Flavell is retained in the subsequent definitions offered. As an example he cites the definition of Cross and Paris,(1988,p.131) “The knowledge and control children have over their own thinking and learning activities”.

Metacognition is a considered as a conscious activity but there are some metacognitive activities that we perform automatically. Conscious processes and automated processes can often complement one another in complex cognition.(Martinez 2006).

Marzano (2000) calls “metacognitive system as the mission control of the thinking process and regulates all the other systems.”

These definitions enlighten us about the nature of metacognition as a higher order cognitive process that operates at meta level with executive functions of monitoring and controlling of our thought processes.

Are we aware of our own metacognitive process? In view of this question it is worth noting the distinction made by Martinez (2006) between conscious and automated processes of metacognition. According to him metacognitive processes operate at both conscious and automated levels. Thinking that occurs without much awareness or effort is called automated. The metacognitive processes that operate at conscious level are accessible to the individual and one is aware of them. These metacognitive processes that the individual is aware constitute metacognitive
awareness. Metacognitive awareness refers to conscious metacognitive activity and is accessible.

Metacognition is sometimes considered as a complex and fuzzy concept (Flavell, 1981). This is because of the all-inclusive nature of the construct. Morck (2009), for example, notes that metacognition serves as an ‘umbrella’ term for many other concepts (e.g., metacognitive experiences, metacognitive skills, metacognitive awareness etc.), but its association with some of them such as self-regulation is unclear. The term ‘metacognition’ is employed in a number of different contexts (Efklides, 2008) and has been defined in different ways. Veenman, et.al., (2006) observed that while the different terms helped to focus research, the domain of metacognition is still one that lacks coherence. According to them the importance of metacognition is now well-accepted, however, an inconsistency in the conceptualization persists. This lack of clarity and coherence in the domain of metacognition calls for more research.

Models of Metacognition

Various models of metacognition have been proposed. This section deals with general models of metacognition, i.e., Flavell’s, Brown’s, Tobias and Everson’s and Nelson and Naren’s models of metacognition. Another model briefly presented is Anastasia Efklides’s multifaceted and multilevel model that broadens Nelson and Naren’s conceptualization of metacognition.

Flavell’s (1979) Model of Metacognition

In his classic article “Metacognition and Cognitive Monitoring”, Flavell (1979) proposes a model of cognitive monitoring/regulation. According to this model
metacognition includes four components: (a) metacognitive knowledge, (b) metacognitive experiences, (c) goals or tasks, (d) actions or strategies. A person’s ability to control a wide variety of cognitive enterprises depends on the actions and interactions among these components.

**Brown’s (1987) Model of Metacognition**

According to Brown (1987) metacognition comprises of two broad categories: (1) knowledge of cognition, and (2) regulation of cognition, therefore, it is also referred as two-component model of metacognition.

Koriat (2007) presents the following description of the two components of Brown’s model. Knowledge of Cognition refers to the activities that involve conscious reflection on ones cognitive abilities and activities. It is considered as stable, often fallible, and often late developing information that human thinkers have about their own cognitive processes. It requires that learners step back and consider their own cognitive processes as object of thought and reflection.

Whereas regulation of cognition consists of the activities used to regulate and oversee learning. These processes include planning activities prior to undertaking a problem; monitoring activities during learning; and checking outcomes. It has been assumed that these activities are relatively unstable, not necessary stable (may not be brought to the level of conscious awareness and reported on to others), and relatively age independent (i.e., task and situation dependent).[Koriat, 2007]. Brown’s model views that the two components of metacognition are interrelated, but at the same time they can be readily distinguishable.
Tobias & Everson’s (2002) Hierarchical model

Koriat (2007) states that Tobias and Everson (2002) model consider metacognition as a compound of skills and knowledge - knowledge of cognition, monitoring of one’s cognitive and learning processes, and control of those processes. This model is similar to the other two models mentioned above. However, they organize these components into a hierarchical model, where the metacognitive skill of knowledge monitoring is a pre-requisite for activating other metacognitive skills.

They define knowledge monitoring (KM) as the ability of knowing what you know and knowing what you don’t know. (Tobias and Everson, 2002). Tobias and Everson have investigated largely the monitoring aspect of metacognition,

Nelson and Naren’s (1990) Model

Nelson and Naren’s (1990) theoretical framework for metacognition is based on three principles: (a) Mental processes are divided into an object-level (i.e. cognition) and a meta-level (i.e., metacognition), (b) the meta-level contains a dynamic model of the object-level, which is the source of metacognitive knowledge, and (c) there are two processes. The two processes differ in terms of the function and flow of information; from the object-level to the meta-level (i.e., monitoring) and from the meta-level to the object-level (i.e., control). The meta-level or monitoring is assumed to oversee object-level operations (monitoring) and return signals to regulate them actively in a top-down fashion (control). The object-level, in contrast, has no control over the meta-level and no access to it (Koriat, 2007).
**Metacognition and it’s relation with other factors:**

Learning does not take place in a void, and neither does metacognition. We need to know a lot more about how individual differences and contextual factors interact with metacognition and its various components. (Veenman, et.al., 2006). Sternberg (1998) also pointed out that metacognition interacts with many other aspects of the student: abilities, personality, learning styles and so on.

Further, Veenman, et.al., (2006) pointed out that metacognition need not be studied in isolation, instead its relation with other individual differences need to be investigated.

The preliminary literature survey revealed that metacognition is an important concept in higher learning. Some variables studied in relation with metacognition are academic performance (Panaoura, Gagatsis, Demetriou, 2009; Rahman, Jumani, Chaudry, Chisti and Abbasi, 2010; Rahaman et.al., 2011) learning strategies (McCabe, 2010; Cao and Nietfeld, 2007), writing tasks (Hammann 2005), internet and library habits (Rahman, Jumani, Ajmal, Chisti, and Iqbal, 2011) management development (Kumar, 1998).

A few studies are done with selected variables of the present study, such as Academic Self Concept (Hartman, Everson, Tobias, and Gourgey, 1991). Academic Achievement (Landline and Stewart 1998; Trainin and Swanson, 2005; Coutinho, 2007; Young and Fry, 2008) hemispheric dominance (Oliver, 2009) learning styles (Vermunt, 1996) and gender (Rahaman, 2010). However, there is a need of empirical
studies with ecological validity that explore the relationships between metacognition and other relevant factors in the field of education.

Therefore, the present study focused on metacognitive awareness and it’s relation with selected educational perspectives, namely: academic self-concept, hemispheric dominance, learning styles and academic achievement. In addition, gender differences are also studied. Hence, these constructs are briefly discussed in the following sections.

1.1.2 Academic Self-Concept

According to Bong and Skaalvik (2003) academic self-concept refers to individual’s self-concept and self-efficacy belief that are formed specifically toward academic domains.

Academic self-concept is a component nested within total self concept. However Academic self-concept, can be studied as a separate construct (Bennett, Roger, 2009). Arens, et.al. (2011) point out that students’ academic self-concept has received a lot of attention in educational research during the last two decades. They suggest that this is due to predictive power of academic self-concept for a broad scope of academic outcomes, such as interest, persistence, coursework selection, and academic achievement. Further, they suggest, a high level of academic self-concept is thus seen as both a desirable outcome in itself and as well as a mediator leading to other favorable educational outcomes.
A literature survey reveal a number of studies related to academic self concept (Ahmed and Bruinsma, 2006; Trautwein et.al., 2006; Wamathai, 2006; Cristina, 2010; Rinn, Plucker and Stocking, 2010; Zahra, 2010; Arens et.al., 2011; Tang,2011). But there are not many studies, except a few (Hartman, Everson, Tobias and Gourgey,1991) on interrelations between metacognitive awareness and academic self concept.

Researchers have pointed a number of beneficial effects of high academic self-concept such as on achievement (Olatunde,2010; Marsh, Trautwein, Ludtke, Koller and Baumert,2004) effects on adjustment (Wouters, Germeijs, Colpin and Verschueren, 2011), effects on future educational goals (Hope,2009) and academic self efficacy (Rawlinson, 2005) motivation (Ommundsen, Haugen and Lund, 2005; Isiksal, 2010). It is interesting to note that gender affects academic self concept (Skaalivik and Rankin,1990).

Bennet (2009) points out, low academic self-concept results in students’ underestimating their learning capacities, lack of self-confidence in academic ability, anxiety about academic life, unassertive and self-effacing behaviour, and refusal to engage in academic activities for fear of making mistakes.

1.1.3 Hemispheric Dominance

Galaburda, Le May, Kemper and Geschwind (1978) suggest that structural asymmetries between the hemispheres are found in the human brain. This may help to explain the range of human talents, recovery from acquired disorders of language
function and certain childhood learning disabilities. Many further researches has been done in this area. Thus hemispheric dominance became an idea that psychologists have been discussing for some time. Hemisphericity refers to the idea that each individual may tend to rely on a preferred mode of cognitive processing which in turn implies the predominant activity of either of left or right brain cerebral hemispheres (Beaumont, Yound and McManus, 1984).

Leng and Hoo (1997) stated that we are biologically equipped to process information in two distinct and complementary modes. According to them, these specializations are not absolute but are rather a matter of relative predominance of one of the hemispheres.

Morton and Rafto (2006) are critical about the view that hemisphericity is gradient between right and left brain dominance with most people being intermediate. In their opinion, hemisphericity is due to an inherent biological location of the ‘executive system’ within the asymmetrical bilateral brain. This ‘executive system’ is either on left or right hemisphere depending on the hemispericity of the individual. Further, they suggest that hemisphericity results into an inherent bias in thinking orientation, behavioral style, and personality.

Now it is understood that both sides of the brain are equally important, also connected via the corpus callosum, and each side is specialized in different tasks. (Oliver 2009). Generally it is accepted that the left hemisphere of the brain deals primarily with verbal logical, convergent and analytical functions and right brain can
be connected with intuitive, divergent, visual, spatial, and gestalt functions (Leng and Hoo 1997; Gulpinar, 2005).

Morton and Rafto, (2006) classify hemisphericity into left or right brain orientations. Further, they present the characteristics of different brain-orientations. Left brain-oriented person [L-bop's] cognitive and behavioral orientation is a splitter: top-down, self survival, important details view. Right brain-oriented person [R-bop] is a Lumper: biased toward a bottom-up, group survival, global orientation.

The present study was interested to find out the relation between metacognitive awareness and hemisphericity. Since metacognitive processes are assumed to be higher order thinking processes that regulates cognitive processes and brain hemisphericity is related to left or right brain orientation; this study was interested to investigate the relation between these two constructs.

1.1.4 Learning Styles

Educators acknowledge that there are individual differences in learning methods of students and such differences in learning methods are referred to as learning styles. (Garg, 2011). Learning styles is based on the assumption that different individuals receive, perceive and process information in different ways (Felder and Silverman, 1988).

The Felder-Silverman Learning styles model [FSLSM] is concerned with how students preferentially perceive information (sensing/intuitive), take in external
information (visually/verbally), process information (actively/reflectively) and progress towards understanding (sequentially or globally) (Felder and Silverman, 1988).

Vermunt (1996) observed that majority of studies in study strategies research in higher education is on cognitive processing strategies and motivation. Only recently the researches have focused on metacognition. He further noted that little is known about the manner in which students carry out the regulation of learning styles in a real educational context, and about the way in which this execution is regulated by internal and external sources.

In line with the foregoing observations of Vermunt (1996), the present study assumes that ‘learning styles’ of the learner are monitored and regulated by metacognitive aspects. This study, therefore, attempted to find the interrelations between metacognitive awareness and learning styles.

1.1.5 Academic Achievement

According to Dixit (2011) the use of metacognition helps an individual to be a good learner. Metacognitive strategies assist one to become more efficient in learning because they help in finding information, evaluate when we need additional resources, and understand when to apply different approaches to solve the problems. Mastery of these strategies help children to learn more effectively and intentionally. Researches have observed that metacognition is positively related to academic achievement and enhanced learning outcomes (Vermunt 1996; Landine and Stewart,
In the present study academic achievement is selected as a variable to find the relation with metacognition in the Indian context along with other educational variables.

1.1.6 Theoretical Background

A brief description of theoretical models used in their study are presented in the following sections to provide the theoretical background. The primary theoretical construct used in this study is metacognition. Based on the literature survey in the area of metacognition, Schraw and Dennison’s model was taken as theoretical base to study metacognitive awareness. An inventory based on the model was used to measure metacognition.

Learning styles is another variable of study, and Felder-Silverman Learning styles model (Felder & Silverman, 1988) is taken as theoretical framework. An inventory based on the model was used to measure learning styles was used.

1.1.6.1 Schraw and Dennison (1994) Model of Metacognition

Magno (2009) observed that compared to other models, the model presented by Schraw and Dennison (1994) not only brings clarity to the concept of metacognition but also confirmed its factors. Schraw and Dennison (1994) also constructed an inventory to measure metacognitive awareness, and this inventory is used by many contemporary researchers (Kumar, 1998; Burchard and Swerdzewski, 2009; Memnum and Hart, 2012) in the field of metacognition. This study is based
on the conceptual framework provided by Schraw and Dennison (1994). A brief description of this model is presented below.

Schraw and Dennison (1994) model is based on previous two component models of metacognition. In this model, metacognition consists of two components and eight factors. The two major components are, Knowledge of cognition and regulation of cognition.

Knowledge of Cognition (KC) or Metacognitive knowledge is what we know about our own cognitive processes (Schraw and Dennison 1994; Schraw and Moshman, 1995). Further they elaborates that KC includes three types of knowledge: declarative, procedural and conditional.

i) Declarative Knowledge: The factual knowledge the learner needs before being able to process or use critical thinking related to the topic. Knowing about, what, or that.

ii) Procedural Knowledge: The application of knowledge for the purposes of completing a procedure or process. Knowledge about how to implement learning procedures (e.g. strategies).

iii) Conditional knowledge: The determination under what circumstances specific processes or skills should transfer. Knowledge about when and why to use learning procedures.

Regulation of Cognition:

Schraw and Dennison (1994) referred to the second component of MC as Regulation of cognition. They divided the category into five skills: i) Planning, ii) Information
management strategies, iii) Comprehension monitoring, iv) Debugging strategies and v) Evaluation. A brief description of these components are given as presented in Schraw and Dennison,( 1994); Schraw and Moshman (1995).

i. Planning: Includes planning, goal setting, and allocating resources prior to learning.

ii. Information management strategies: Skills and strategy sequences used to process information more efficiently (e.g., organizing, elaborating, summarizing, selective focusing).

iii. Comprehension Monitoring: Assessment of one’s learning or strategy use.

iv. Debugging Strategies: They are strategies used to correct comprehension and performance errors.

v. Evaluation: Analysis of performance and strategy effectiveness after a learning episode

1.1.6.2 **Felder-Silverman Learning Styles Model [F-SLSM]**

Felder-Silverman Learning styles model (Felder & Silverman, 1988) was originally developed to address learning issues in the context of engineering education at university level. The F-SLSM adopted information processing perspective, therefore, learning in a structured educational system is viewed as a two-step process, i.e., receiving and processing of information.

Felder (1993, p. 286) poses the following four questions and the derived answers represent the four dimensions of the F-SLS model.
1. Perception: What type of information does the student preferentially perceive? Sensory or Intuitive.

2. Input or Receiving: Through which mode does the student most effectively receive external information? Visual or Verbal.

3. Processing: How does the student prefer to process information? Actively or Reflectively.

4. Understanding: How does the student progress toward understanding? Sequentially or Globally.

The FSLSM describes the learner on these four dimensions: Sensing – Intuitive, Active- Reflective, Visual – Verbal, Sequential-Global. Therefore, F-SLSM is concerned with the learner’s characteristic preferences for perceiving information (sensing/intuitive), receiving information (visual/verbal), processing information (active/reflective) and understanding the information (sequential or global).

No learning style should be considered as preferable or superior to another. Each learning style has its own unique strength and weaknesses (Felder & Brent, 2005). The preferences within a dimension are descriptive. Further Learning styles seem to be less fixed, changeable and are influenced by external factors such as the context, course, time, and experiences. (Felder and Silverman, 1988)

1.2 NEED OF THE STUDY

A preliminary survey of literature in the field of education revealed that very limited research has been conducted on metacognition and its
relationship with various student-related factors such as: academic self-concept, hemisphericity and learning styles, particularly in Indian educational context.

Considering the importance of metacognition in learning and academic achievements and the limited research available in India, the present study has been undertaken.

1.3 STATEMENT OF THE PROBLEM

The purpose of the research was to investigate metacognition from educational perspectives. In this study, the phrase ‘educational perspectives’ is delimited to academic self-concept, hemispheric dominance, learning styles, academic achievement and gender of students. Based on the preliminary survey of related research, the research problem was identified and a statement of the problem was formulated for the present research.

‘A Study of Metacognitive Awareness and its Relation with Academic Self-Concept, Hemispheric Dominance, Learning Styles, Academic Achievement and Gender in Class Eleven Students.’

1.4 OBJECTIVES

The following objectives were delineated on the basis of the statement of problem of the study.

1. To study the relation between metacognitive awareness and academic self – concept.
2. To study the relation between metacognitive awareness and hemispheric dominance.

3. To study the relation between metacognitive awareness and learning styles.

4. To study the relation between metacognitive awareness and academic achievement.

5. To examine gender differences in metacognitive awareness.

1.5 RESEARCH HYPOTHESES

In order to realize the stated objectives, the following research hypotheses were formulated.

**Hypothesis 1 [H1]:** There is significant positive correlation between metacognitive awareness as measured by Metacognitive Awareness Inventory [MAI] and academic self-concept as measured by Academic Self-Concept Scale (ASCS) in class eleven students.

**Hypothesis 2 [H2]:** There is significant positive correlation between metacognitive awareness as measured by Metacognitive Awareness Inventory [MAI] and hemispheric dominance as measured by the Styles of Learning and Thinking (SOLAT) in class eleven students.

**Sub Hypothesis 2.1 [H2.1]:** There is significant positive correlation between metacognitive awareness as measured by Metacognitive Awareness Inventory [MAI] and left hemispheric dominance as measured by the Styles of Learning and Thinking (SOLAT) in class eleven students.

**Sub Hypothesis 2.2 [H2.2]:** There is significant positive correlation between metacognitive awareness as measured by Metacognitive Awareness Inventory [MAI] and right hemispheric dominance as measured by the Styles of Learning and Thinking (SOLAT) in class eleven students.
Inventory[MAI] and right hemispheric dominance as measured by the Styles of Learning and Thinking (SOLAT) in class eleven students.

**Sub Hypothesis 2.3 [H2.3]:** There is significant positive correlation between metacognitive awareness as measured by Metacognitive Awareness Inventory[MAI] and whole brain dominance as measured by the Styles of Learning and Thinking (SOLAT) in class eleven students.

**Research Hypothesis -3 [H3]:** There is significant correlation between metacognitive awareness as measured by Metacognitive Awareness Inventory[MAI] and learning styles as measured by Index of Learning Styles (ILS) in class eleven students.

**Sub Hypothesis 3.1[H3.1]:** There is significant correlation between metacognitive awareness as measured by Metacognitive Awareness Inventory [MAI] and active -reflective dimension of learning styles as measured by Index of Learning Styles (ILS) in class eleven students.

**Sub Hypothesis 3.2 [H3.2]:** There is significant correlation between metacognitive awareness as measured by Metacognitive Awareness Inventory [MAI] and sensation –intuitive dimension of learning styles as measured by Index of Learning Styles (ILS) in class eleven students.

**Sub Hypothesis 3.3 [H3.3]:** There is significant correlation between metacognitive awareness as measured by Metacognitive Awareness Inventory [MAI] and visual -verbal dimension of learning styles as measured by Index of Learning Styles (ILS) in class eleven students.

**Sub Hypothesis 3.4 [H3.4]:** There is significant correlation between metacognitive awareness as measured by Metacognitive Awareness Inventory
[MAI] and sequential –global dimension of learning styles as measured by Index of Learning Styles (ILS) in class eleven students.

**Research Hypothesis -4 [H4]:** There is significant positive correlation between metacognitive awareness as measured by Metacognitive Awareness Inventory[MAI] and academic achievement as measured by cumulative percentage of marks [P] obtained in Xth standard annual examinations

**Research Hypothesis -5 [H5]:** There is significant difference between metacognitive awareness as measured by Metacognitive Awareness Inventory[MAI] of male and female students of class eleven.

### 1.6 DEFINITIONS OF KEY TERMS AND PHRASES

#### 1.6.1 Educational Perspectives:
The phrase ‘Educational perspectives’ includes academic self-concept, hemispheric dominance, learning styles, academic achievement and gender of students.

#### 1.6.2 Metacognitive Awareness [MA]
refers to the ability to reflect upon, understand and control one’s learning,” (Schraw and Dennison, 1994, p. 460). In the present study metacognitive awareness is assumed to consist the following two components of metacognition:

i. **Knowledge of Cognition [KC]** refers to reflective aspect of learning and it consists of declarative, procedural, and conditional knowledge

ii. **Regulation of Cognition [RC]** refers to control aspect of learning. Regulation of cognition corresponds to knowledge about the way students plan, implement strategies, monitor, correct comprehension errors, and...
evaluate their learning (Schraw, and Dennison, 1994, p.460).

1.6.3 **Academic Self Concept [ASC]** refers to an individual’s perception of his/her academic abilities [Reynolds, et.al., 1980].

1.6.4 **Learning Style [LS]** refers to the characteristics, strengths and preferences to receive and process information (Felder & Silverman 1988). The eight learning styles are defined as follows: [Felder and Spurlin, 2005.]

i. **Active Learning Style [ACT]** refers to learning by trying things out, enjoy working in groups.

ii. **Reflective Learning Style [REF]** refers to learning by thinking things through, prefer working alone or with one or two familiar partners.

iii. **Sensing Learning Style [SEN]** refers to concrete, practical, orientated towards facts and procedures.

iv. **Intuitive Learning Style [INT]** refers to conceptual, innovative, oriented toward theoretical and underlying meanings.

v. **Visual Learning Style [VIS]** refers to preference for visual representations of presented material, such as pictures, diagrams and flow chart.

vi. **Verbal Learning Style [VER]** refers to preference for written and spoken explanations.

vii. **Sequential Learning Style [SEQ]** refers to linear thinking process, learning in incremental steps.

viii. **Global Learning Style [GLO]** refers to holistic thinking process, learning in large steps. [Felder and Spurlin, 2005.]
1.6.5 **Hemispheric Dominance [HD]** refers to "the tendency for a person to rely more on one than the other cerebral hemisphere in processing information" Torrance (1982) (p. 29). Hemispheric dominance is classified into three types: left-hemispheric dominance [LHD], right-hemispheric dominance [RHD] and Whole-brain orientation [W].

1.6.6 **Academic Achievement [AA]:** refers to knowledge attained or skills developed by pupils usually in the school subjects, measured by test scores or by marks assigned by teachers (Chaudhary, 2004).

1.6.7 **Gender:** Refers to the respondents’ sex categorized into male or female.

1.6.8 **Central Board of Secondary Education (CBSE):** CBSE refers to the Board of Education for public and private schools, under the Union Government of India.[www.cbse.nic.in](http://www.cbse.nic.in).

### 1.7 BASIC ASSUMPTIONS

The study is based on the following basic assumptions:

1. Metacognition consists of two components: knowledge of cognition and regulation of cognition.

2. Metacognition functions at both conscious and automated levels. ‘Metacognitive awareness’ is concerned with the conscious level operations and are accessible to the person.

3. ‘Academic self-concept’ exists at two levels: General and local (task- or domain-specific knowledge). The general level of academic self-concept is considered in this study.
4. Four dimensions of learning styles as described by Felder and Silverman’s model are used to learn in educational situations.

5. The percentage of marks \( P \) obtained by students in their examination are assumed to be indicators of academic achievement.

6. Participants of the study responded to the questionnaires truthfully.

1.8 DELIMITATIONS

The researcher is aware of the wide scope of the subject area, hence, the study is delimited to:

1. Geographical location of Roorkee city, Uttarakhand, India.
2. Schools affiliated to Central Board of Secondary Education [CBSE].
3. Students from English Medium schools.
4. Class Eleven students.

1.9 LIMITATIONS

A brief discussion of the limitations is presented in this section.

1. This study being a correlational research, the cause-effect relations among the variables studied could not be inferred.

2. The data for the present study was collected from verbal self-reports and not on direct observation of the selected variables.

3. Students from English medium schools may not represent the average Indian student.
1.10 SIGNIFICANCE OF THE STUDY

The research findings would provide knowledge about interrelationships among metacognition and the examined educational perspectives. This would not only contribute to the knowledge base of metacognition but may also help researchers to develop programs that promote metacognitive learning.

The findings of this study may encourage teachers to critically examine the interrelations of metacognition with the selected variables and also facilitates the promotion of general metacognitive development of their students.

With respect to students, the findings regarding relations between metacognition and academic achievement may motivate them to develop and use metacognitive skills and strategies in educational contexts. This would help in promoting self-regulated learning and academic competency of the student.

It would also help students to identify and solve problems in learning situations through metacognitive awareness, which subsequently helps in preventing failures and improving academic achievement.

The present research covers both psychology and education, hence interdisciplinary in nature and value.
1.11 ORGANIZATION OF THE THESIS

The present thesis is organized into five chapters as briefly described below:

**Chapter-I:** Chapter one entitled as ‘Introduction’ describes the background of the study. In the later sections of the chapter information about the present study is given. In these sections the statement of the problem, definitions of the terms and phrases used, objectives, delimitations, limitations, the formulated research hypotheses, and the significance of the study are given in detail.

**Chapter-II:** The second chapter entitled ‘Review of Literature’ presents review of related research under the following sections: Metacognition, Academic Self-concept, Hemispshiricity, Learning Styles, Gender Differences and Academic Achievement. Research conducted abroad and in India are given. The chapter is concluded with the importance of the present research study.

**Chapter-III:** Chapter three ‘Methodology’ deals with the methodology and design of the research. The population and the procedure of the selection of the sample are described. The instruments used in the study, and their description, validity, reliability and scoring procedures are described. The procedures of data collection and data analysis are discussed.

**Chapter-IV:** Chapter four ‘Data Analysis and Results’ deals with the statistical analysis of the obtained data. The statistical analyses that were carried out to test the proposed hypotheses, the results of the data analysis are presented in
the form of tables and graphs. This chapter also deals with the observations and interpretation of the data analysis.

**Chapter-V:** In chapter five, each hypothesis is considered, the results were discussed in depth with the support of the earlier researches and conclusions were drawn. Implications of the study are presented and suggestions for future research were recommended.

**1.12 SUMMARY**

Chapter-1, being an introductory chapter, presented a description of the concepts under study. In addition, it has documented statement of the problem, research design, tools used, delimitations, limitations and significance of the study are presented. The next chapter will deal with the review of literature.


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33

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