CHAPTER-1
INTRODUCTION

1.0 INTRODUCTION

Today one of the main goals of education is to make the students gain the thinking skills and strategies which they will use throughout their lives, rather than storing information. A good education should be able to show the students how to learn, how to remember, how to motivate themselves and how to control their emotions. For all these reasons, to investigate some cognitive and emotional skills of students is quite important. In India the major emphasis in the contemporary educational circles is both on quantity as well as quality of secondary education. Quality education stresses on all round development of a child in scholastic as well as co-scholastic areas in this relation efforts are being made for imparting value education, strengthening emotional intelligence and meta-cognitive skills, etc. which will make a child to learn more and develop accordingly. Emotional intelligence and meta-cognitive skills are the emerging areas which need to be explored for better schooling of children. In the present work too these areas have been considered important to study in school situation. Value education has come to acquire increasing prominence in educational discussion at all levels during recent times in our country.

Also family and school play an important role in maintaining emotional balance of a child. Parental discord at home or school environment that is not sensitive to a child's needs may lead to the development of negative emotions like pessimism, anxiety, hatred, rebellion in the child. A sizeable number of articles in various newspapers and magazines are devoted to those emotional problems. With this assumption the present study tries to find out the relationship between the affective variable, i.e. emotional intelligence and the cognitive variables, i.e. academic achievement and skills of meta-cognition. However, no study seems to have been conducted on the academic achievement of secondary school students in relation to meta-cognitive skills and emotional competence as professed in the present study.
The Fifth Survey of Educational Research (1997) states, "There have been fewer studies on learning, classroom climate and process of cognitive growth and more on personality patterns and traits - their inter-correlates and distributions, apart from personality correlates." Tactics and strategies and meta-cognitive awareness and execution are important. Therefore, the preceding discussion makes it clear that there is a need to investigate into the cognitive process responsible for the learning achievement. This is a priority area for research."

The goal of this section is to expand on the brief introduction to Emotional Intelligence, Meta-cognitive Skills and Academic Achievement. This chapter provides the details about the concept of meta-cognition, details about the historical roots of the meta-cognition, various models of meta-cognition, different methods of the assessment of meta-cognition, similarly for emotional intelligence and academic achievement.

1.1 EMOTIONAL INTELLIGENCE

“Emotional intelligence” has grown in popularity with theorists and practitioners alike who recognise the possibilities of such a concept in broadening the understanding of human potential. Traditionally, a person’s abilities, accomplishments and successes were predicted solely on verbal and performance-based tasks, known as general intelligence. This, according to Gardner (1999:19-21) was a restricted view of the scope of human potential. He argued that the assessment of intellect based solely on academic tasks is very limiting, as the brain has the ability to harbour an indefinite number of intellectual capacities. It is a person’s culture as well as his life opportunities that usually determine the exposure and development of particular capabilities within the individual. Although other researchers have attempted to broaden the concept of intelligence, it was Gardner (1999:41-43) who developed the concept of “multiple intelligences”. He included seven key areas: verbal, mathematical-logical, spatial, bodily-kinaesthetic, musical and finally the two personal intelligences: intrapersonal and interpersonal. This broadened view of intelligence has resulted in a greater admiration for a variety of abilities and skills within the human realm.

Emotional Intelligence can possibly be regarded as a combination of intrapersonal and interpersonal intelligences. However, in a society which regards emotions as disorganised interruptions to mental activity, it is not surprising that Salovey and Mayer
begin an article on emotional intelligence by asking whether the concept “emotional intelligence” is merely a “contradiction in terms” (Salovey, Brackett, Mayer 2004). Emotional Intelligence, as a relatively new construct, is still evolving: conceptual vagueness results in uncertainty regarding its possibilities. Theorists such as Pfeiffer (2001:138) refer to emotional intelligence as a “popular but elusive construct.” Zeider, Roberts and Matthews (2001: 265) exclaim, “slow down you move too fast,” referring to the limited scientific investigation in this fledgling field. The scope of this dissertation is to examine the concept of “emotional intelligence” as defined by Mayer & Salovey (Salovey & Sluyter 1997:10). The Mayer & Salovey model (Salovey & Sluyter 1997:10) regards emotions as mental abilities, skills or capabilities which play a critical role in reasoning. This conceptualisation aims at recognizing emotions as a distinct intelligence and not a set of personality traits or social skills. This model holds much potential in cementing the concept of “emotional intelligence” as a theoretically sound construct which can stand up to scientific scrutiny. Mayer and Salovey are credited with first coining the term “emotional intelligence” (Pfeiffer 2001:138) and form the focus of this dissertation. The Mayer & Salovey model of emotional intelligence (Salovey & Sluyter 1997:10) details a set of specific skills, which are hierarchically arranged. An understanding of these skills allows practitioners, such as educational psychologists, to come to grips with a concept which is often regarded as vague and indistinguishable, and this allows for accessibility to practice. Pennington (2002:4) discusses the role of counselling centres as being “emotional remediators” rather than “developers.” The development of emotional intelligence skills in children has the potential to act as a preventative measure allowing for greater personal and mental accomplishment. Goldsworthy (2000:44) stresses the importance of emotional intelligence programmes and refers to it as “malleable, that is, capable of growth over a life span.” Emotional intelligence is therefore a dynamic process that can be developed in the individual.

Emotions can be regarded as an “evolved signal system,” where each particular emotion denotes a relationship with oneself or with the outside world. Cobb and Mayer (2000:14) explain that this view of emotional intelligence is based on the ability model, where emotions are signals about relationships. Emotions are thus regarded as a set of abilities enabling one to better extract relevant information from the environment and
assist in reasoning and problem solving. An “ability” can be operationalised, which is critical if emotions are to qualify as a standard form of intelligence (Mayer, Perkins, Caruso and Salovey 2001:133). Operationalising requires that the ability can be broken down into a set of specific skills used for completing a task (Lewis & Haviland-Jones 2000: 509). Mayer and Salovey’s definition of emotional intelligence (Barrett & Salovey 2002:2) follows the ability model and will form the basis of this dissertation. The Mayer & Salovey model emphasises four cognitive components with an emphasis on the role that emotions play in aiding reasoning. Their model involves four tiers of abilities that range from basic psychological processes to more complex processes. The four branches are (Salovey & Sluyter 1997: 10):

- The ability to perceive accurately, appraise and express emotion.
- The ability to access and/or generate feelings when they facilitate thought.
- The ability to understand emotion and emotional knowledge.
- The ability to regulate emotions to promote emotional and intellectual growth.

Van der Zee, Thijs and Schakel (2002:104) consider two important distinctions underlying the Mayer & Salovey model of emotional intelligence (Salovey & Sluyter 1997:10). Firstly, the definition distinguishes between cognitive processes and behavioural processes. Cognitive processes include perception and appraisal of emotions, emotional facilitation of thinking and the analysis and understanding of emotional information. Behavioural components include the expression of emotions and employment of strategies to regulate emotions. The second distinction involves the intrapersonal versus the interpersonal role of emotions. Another significant feature of the Mayer & Salovey model which is accentuated by Mayer, Perkins, Caruso and Salovey (2001:133), is the consideration that a mental ability must develop with age. The skills included in each component are developmentally arranged, from the earliest developing skills placed on the left through to the skill requiring a more integrated adult personality placed on the far right. Please refer to Appendix A for a tabulated representation of the four branches as presented by Mayer and Salovey (Salovey & Sluyter 1997:10).
A clear understanding of these four theoretical branches will assist the researcher in devising an assessment tool based on the Mayer & Salovey model (Salovey & Sluyter 1997:10). A detailed explanation of each component is discussed below.

**Perception, appraisal and expression of emotion**

Being able to perceive, appraise and express emotions is the most basic but also the most essential component of emotional intelligence. Barrett and Salovey (2002:239) explain that social interactions and relationships are guided, and possibly defined, by emotional transactions which require the correct perception, appraisal and expression of emotions. The first consideration involves the ability to inwardly identify and understand emotional information. Bernet (1996:2) distinguishes between the terms “feeling” and “emotion” when discussing internal emotional states. All events trigger a physiological response within one’s body, which in turn results in a feeling, such as a racing heart, loss in lung capacity or the production of adrenaline by the kidneys. These reactions are a natural, physiological process, which are out of our control. Feelings are a signal departure from homeostasis which prompts action. When these feelings are identified and interpreted on any level of consciousness, the process then becomes an emotion. Emotions are conscious and deliberate, and perception of inner emotional states requires that one ‘tunes into’ internal systems to identify and manage physiological feelings as conscious emotions. Emotional perception also involves the identification of the emotions experienced by others. This involves awareness of external signals from the environment which include non-verbal cues such as facial expressions, tone of voice and gesture (Goleman 1996:96). Mayer and Salovey (Salovey, Brackett & Mayer 2004:36) extend external emotional perception to encompass aspects such as artwork, sound and architecture.

The rationale for this is that the emotionally aware individual will be continually in tune with the emotional information available in the environment. The expression of emotions enables the individual to communicate inner states with the outside world. The labelling of emotions requires language ability. The acquisition of language serves the child’s behaviour and emotional control in at least three ways (Salovey & Sluyter 1997:105). Firstly, it serves the executive function of mediating between intention or desire and behavioural action. It also ensures that one is able to communicate internal
states to others. Thirdly, language allows for conscious awareness of how one is feeling. The expression of emotional content improves both intrapersonal and interpersonal relationships.

The appraisal of emotions is the final component included in this first tier. It involves the ability to differentiate between accurate and inaccurate, honest and dishonest expressions of feelings. In order to correctly appraise emotions, the individual needs to make use of the skills which have been previously discussed, such as recognizing physiological signs, interpreting non-verbal cues and understanding emotional language. The second component, as discussed by Mayer and Salovey (Salovey & Sluyter 1997:10), involves the individual’s ability to make use of the information gained from feelings, to aid thinking. This concept will now be discussed in further detail.

**Emotional facilitation of thinking**

Mayer and Salovey (Mayer, Salovey, Caruso & Sitarenios 2001: 234) make a distinction between this second branch and the other three. The other components involve the reasoning of emotions, whereas this component involves using emotions to aid reasoning. Emotions are adaptive, functional and have the potential to organise thinking and subsequent behaviour. Pellitteri (2002:184) explains the importance of being able to access emotions and assimilate our emotions into judgement and problem solving. Emotions act as a signalling system, but in order that this emotional information is effectively and appropriately employed by the individual, these signals need to be analysed, assimilated and utilised by the more consciously controlled, cognitive areas of the brain such as the cortex. The emotional facilitation of thinking involves the ability to harness the motivating properties of affect to guide thinking and subsequently influence action (Barrett & Salovey 2002:2). Firstly, emotions are able to prioritise thinking by directing attention to important information. People automatically appraise salient aspects of their environment to aid judgement by asking themselves, “how do I feel about this?” However, the discriminating effects of feelings to aid judgements and decisions requires an ability to determine when these feelings are appropriate and useful to the decision making process. (Barrett & Salovey 2002:92)

A second contribution of emotions to thinking is the ability to generate feelings on demand, thereby allowing a better understanding of a particular situation (Salovey,
By anticipating the results of a particular situation one is better able to think and plan ahead. The emotions associated with starting a new school, encountering a social criticism or changing jobs should be taken into account prior to making such a decision. Mayer and Salovey (Salovey, Brackett, Mayer 2004:38) refer to this as an “emotional theatre of the mind” whereby emotions can be generated, felt, manipulated and examined in order to be better understood. The more accurately this ‘theatre’ operates, the more it is able to assist the individual in choosing alternative life courses.

The next ability explains how emotionality has the ability to help people consider multiple perspectives. Parrott (2001:199) discusses a study conducted by Forgas and Bower (1987) where a ‘good’ or ‘bad’ mood was induced in participants who were then asked to complete a person perception task. The participants’ moods affected how they read the sentences given to them, the impressions formed about the characters, and later their memory about the characters. The participants who were in a ‘good’ mood formed more favourable impressions of the characters. This illustrates that one’s mood influences one’s point of view and enables one to consider a decision from different points of view based on such mood fluctuations.

Emotions are also able to influence one’s reasoning styles. Typically, people in so-called good moods adopt a quick, heuristic approach to problem solving (inductive reasoning) whereas people in negative moods adopt a more methodical, systematic and analytical approach to solving problems (deductive reasoning) (Parrott 2001:200). The understanding that reasoning is affected by mood assists the individual in recognising that emotions are often the catalyst to our particular reasoning ability, and that reasoning is not fixed but dependent on fluctuating moods. The next component of emotional intelligence, as discussed in the Mayer and Salovey model (Salovey and Sluyter, 1997:10), is an individual’s ability to understand the complex nature of emotions. Barrett and Salovey (2002;271) indicate that emotions can only be put to use if emotional responses are consciously experienced, attended to and reflected upon. The next section discussed the complex nature of emotions in more detail.
Understanding and analysing emotions: employing emotional knowledge

Salovey and Mayer (Salovey & Sluyter 1997:13) discuss that in order to understand the complexity of emotions, one must be able to differentiate between similar emotions and then accurately express those feelings. Steiner (1999:41) explains that we often have several feelings at once. Some of these feelings are strong and obvious, while others are weak and hidden. Differentiation of feelings involves recognising the variance in intensity between irritation and hatred, or affection and passion and then acting accordingly.

The next skill involves the ability to connect emotions to particular situations because this results in a better understanding of emotional information. Mayer and Salovey (Salovey, Brackett and Mayer 2004:39) discuss how emotions are best explained to children within a context. The girl who is sad is aided in recognising that the sadness is connected to her best friend not wanting to spend time with her anymore. Emotions are aimless if they are not related to situations which in turn increase their relevance.

There is a certain amount of consensus connecting emotions to certain situations. Anger arises from the perception of injustice, sadness arises from loss, and fear from threat (Salovey & Sluyter 1997: 13). The complexity of emotions continues into the third skill, which involves the ability to recognise simultaneous emotions. An individual can often experience a range of conflicting emotions towards the same situation. For example, passing a school grade may demonstrate competence and result in satisfaction with the achievement but simultaneously arouse anxiety regarding the forthcoming challenges. Emotional information can also be experienced as a blend of different emotions. Bourne (2000:260) distinguishes between simple feelings and complex feelings. Simple feelings include anger, sadness and fear, which are usually short-lived, more reactive and more tied to involuntary physical reactions; whereas complex feelings involve a combination of emotions and are more linked to thoughts and imagery. Being able to recognise that “awe” is a combination of fear and surprise, and “hope” is a combination of faith and optimism, ensures the better identification and understanding of these complex emotional blends.

The most complex skill in this component involves the understanding that emotions tend to occur in patterned chains (Salovey, Brackett, Mayer 2004:39). Anger
can intensify into fury or diminish into annoyance or could be transformed into satisfaction or guilt, depending on the circumstance. Reasoning about the progression of emotions enables the individual to better understand interpersonal interactions. Emotions do not remain constant, but rather change and adapt. The emotionally intelligent individual is able to be more flexible by better understanding this sequential characteristic of emotions.

The final branch involves the regulation of emotions to promote emotional and intellectual growth. Emotions should be tolerated - if not welcomed - by the emotionally intelligent individual who has developed strategies to suitably manage emotional information and in so doing optimise its benefit.

**Reflective regulation of emotions to promote emotional and intellectual growth**

As explained by Mayer, Salovey & Caruso (Bar-On & Parker 2000:108), emotional regulation is not about getting rid of troublesome emotions because this elimination is likely to stifle emotional intelligence. Emotions are ‘messengers’: the emotionally intelligent person should remain open to emotional information and then decide whether it is necessary to engage or detach from the emotion. The first skill included in this branch involves the ability to remain open to emotions. Bernet (1996:3) asserts that an individual who suppresses his emotions is unable to use this information to guide a situation (Bernet 1996:3).

Once emotions are experienced, the usefulness of the emotion can then be evaluated, and this will determine whether a person engages or detaches from that emotion. This would be the second skill in this component. Individuals have the ability to actively regulate their emotions in an attempt to capitalise on the good features while minimising the negative features (Barrett & Salovey 2002:297). Prior to the regulation of emotional information, the individual should determine how typical, influential or acceptable one’s mood is to a particular situation. Mayer and Salovey (Salovey, Brackett & Mayer 2004:40) refer to this as “meta-evaluation” of mood. These reflections are conscious and assist in directing further action – also known as regulation of the emotion being experienced. Emotional regulation involves the strategies that the individual employs to regulate positive and negative emotions. Emotional regulation is assessed in children by asking them to explain how they cope with stressful situations (Salovey &
Sluyter 1997:170). The process of emotional regulation involves both a stressor, the event that evokes distress in the child, as well as a strategy, namely any effort to manage the distress. Coping strategies are synonymous with emotional regulation. Successful coping strategies are determined by the range of strategies available, the ability to select a suitable strategy and the ability to suitably implement the strategy. The assessment of emotional regulation in children could involve determining the effectiveness of their coping strategies.

The development of effective coping strategies is usually age related (Salovey & Sluyter 1997:169). As children mature cognitively, they seem to be more able to regulate emotions internally rather than rely on others to regulate emotion. Moreover they demonstrate an increased ability to select situationally appropriate strategies (Salovey & Sluyter 1997;169).

This concludes the explanation of the four components of the Mayer & Salovey model (Salovey & Sluyter 1997:10) which form the basis of the assessment tool that will be devised by the researcher. The next section discusses the ability to adequately measure emotional intelligence as well as the difficulties associated with this process. Successful measuring of emotional intelligence is the second criterion to be met if a concept is to be considered a form of intelligence.

THE MEASURING OF EMOTIONAL INTELLIGENCE

Pfeiffer (2001:139) points out that to date there is no objective, theoretically grounded measure of emotional intelligence that stands up to scientific scrutiny and can be regarded as reliable and valid. Pfeiffer (2001:139) contends that without psychometrically sound measures, it is difficult to completely understand the concept of emotional intelligence. A popular method of assessing “emotional intelligence” involves the use of self-report instruments such as the “Bar-On Emotional Quotient Inventory” (Schutte & Malouff 1999:15). The shortcoming of self-report measures is the subjectivity of the responses from the testee. Mayer, Caruso and Salovey (Bar-On & Parker 2000:324) explain that self-report methods are closely linked to accurate self-concepts and that most people tend to over-emphasise their abilities and thus tend to provide inaccurate information. Self-reported intelligence does not correlate highly with actual measures of intelligence, so why should it be any different for emotional intelligence?
Salovey and Mayer’s model (Salovey & Sluyter 1997:10) is regarded as an ability-based model of emotional intelligence and this implies that assessment tasks must demonstrate how emotional intelligence is made operational in the individual. These assessments are usually referred to as performance tests. Salovey and Mayer (1997:16) discuss three criteria which need to be considered when assessing emotional intelligence within the framework of the ability model:

1. The actual ability discussed within the model must be assessed and not the existence of personal qualities such as optimism and motivation. These traits assist emotional intelligence but cannot be regarded as components of emotional intelligence.

2. The assessment must assess the actual application of the ability and not simply provide a self-description of how emotionally intelligent a person is. Asking a person to solve a problem offers a more valid sample of behaviour for study.

3. The assessment should aim at connecting the various abilities discussed in Salovey and Mayer’s model (Salovey & Schutte 1997:10) to each another.

Ciarrochi, Forgas and Mayer (2001:30) distinguish between self-report measurements and performance-based assessments. The following distinctions are made:

- Performance tests are able to measure ‘actual’ EI whereas self-report measures assess ‘perceived’ EI.

- Performance measures are usually more time consuming to administer than self-report measures since a trained professional would need to administer a performance test.

- Self-report assessments require a certain level of personal insight. Many people may not have this insight and might not be able to answer the questions accurately.

- People are also able to distort their responses in order to provide favoured responses instead of truthful ones in self-report measures.

- Self-report measures tend to be closely related to personality factors such as the ‘Big Five’: neuroticism, extroversion, openness, agreeableness and conscientiousness.
Performance assessments, on the other hand, are more related to traditional intelligence measures, which means they are related to cognitive functioning. The MEIS (Multifactor Emotional Intelligence Scale) and the more updated MSCEIT (Mayer-Salovey-Caruso Emotional Intelligence Test) both follow the Mayer & Salovey model of emotional intelligence (Salovey & Sluyter 1997:10) and can be considered as performance tests. Mayer, Caruso & Salovey (Bar-On & Parker 2000:332) maintain that these assessments are providing relevant information about the measurement of emotional intelligence as an ability and what it is able to predict. These assessments are however still under considerable scrutiny from the scientific community.

A major obstacle facing researchers who want to design a performance-based assessment tool for emotional intelligence is determining which responses are correct. It is difficult to determine an objective set of responses, as this assumes that “someone” has the ‘correct’ answer. Emotional responses will possess a personal quality and it is often difficult to determine the accuracy of individual responses. There are three possible options for the scoring of sub-tests (Ciarrochi et al. 2001:31):

1. The favoured option, known as consensus scoring, involves determining how closely a participant’s answer matches a consensus answer. The consensus answer is based on how most people respond to the question. This requires that the assessment has been completed by a diverse and vast sample population.

2. Expert opinion is based on the judgements made by a panel of experts, for instance a group of psychologists. Respondents who answer the same way as the experts are regarded as providing an acceptable response.

3. Target criterion is the third option and is based on how accurately the respondent can guess how the person was feeling at the time of the activity. The correct answer is then provided by the stimulus person participating in the test.

The criticism that EQ assessments cannot provide definite responses and are therefore not scientifically sound is counter-argued by Mayer et al (2001: 236). They point out that IQ tests may have some objectively scored sub-tests, such as “digits forward or backward,” but they also contain tests which are subjectively scored, such as the comprehension subtest which is composed of a variety of “possible responses” which have been collected using “consensus scoring” or “expert opinion.” Assessment procedures still need to be
refined in order for emotional intelligence to comfortably fulfil a position as a separate form of intelligence. Currently only the MEIS has satisfied the three criteria for EI to qualify as a true form of intelligence, namely, (1) reflect performance rather than preferred ways of behaving, (2) correlate, but not too highly, with established IQ measures and (3) improve during childhood to middle adulthood (Ciarrochi et al. 2001:44). Despite this encouraging initial evidence much research is still necessary to improve the validity of measures (Ciarrochi et al. 2001:45).

The next criterion that needs to be fulfilled before EI may be regarded as an independent form of intelligence, is its ability to prove its independence or partial independence from other forms of intelligence.

EMOTIONAL INTELLIGENCE AS A SEPARATE CONSTRUCT

For emotional intelligence to be regarded as a separate form of intelligence, it must be able to prove that it is structurally independent from other forms of cognitive ability (Zeidner, Matthews & Roberts 2001:265). If two types of intelligence correlate too highly, then they are regarded as representing the same form of intelligence, which would make the newly considered intelligence unnecessary. If the two forms of intelligence do not correlate then it would seem that the new form of intelligence is so different from other forms of intelligence that it cannot be considered an “intelligence” at all. The ideal correlation between two forms of intelligence is a low-moderate correlation (Salovey & Sluyter 1997:6). Emotional intelligence can indeed be correlated with certain other forms of intelligence (Ciarrochi et al.2001:188-191). Using the MEIS, (Multifactor Emotional Intelligence Scale) there was some overlap but not a high correlation with measures of verbal intelligence. This would be expected, as a person’s ability to express himself would relate to his competence in emotional intelligence. Much research is still needed to confirm that emotional intelligence is in fact a separate construct, compared to other forms of intelligence which can provide valuable but separate information with regards to an individual’s functioning. It is pleasing to note that much of the research thus far indicates that EI does differ both conceptually and statistically from other IQ measures (Ciarrochi et al. 2001:190).

Finally, the predictive value of the concept of emotional intelligence needs to be explained. In order for emotional intelligence to be regarded as a separate intelligence, it
must be proved that it both is related to real life criteria and is able to contribute towards an individual’s optimal functioning.

**PREDICTIVE VALUE OF EMOTIONAL INTELLIGENCE**

As emotional intelligence is a relatively new construct, researchers caution against proposing that emotional intelligence significantly contributes to success in life (Cobb & Mayer 2000:17. Salovey & Sluyter 1997:17). Current research does nonetheless indicate that emotional intelligence positively influences individual performance.

Lam and Kirby (2002:140) investigated how an individual’s ability to perceive, understand and regulate emotions is related to performance. While general intelligence still made a significant contribution to an individual’s performance, they found that when emotions were recognised by the cognitive systems of the brain, emotional regulation played an important role. The ability both to guard against distracting emotions and to build on enhancing emotions facilitated individual task performance as well as team performance. Cobb and Mayer (2000: 17) quote preliminary research from unpublished studies and dissertations. The conclusions from the research indicate that higher levels of emotional intelligence predict lower incidences of ‘bad’ behaviour. The research indicates that, using the Multifactor Emotional Intelligence Scale (MEIS), high scores in emotional intelligence moderately predicted lowered levels of adult ‘bad’ behaviour such as getting into fights, drinking and smoking. Another study indicated that higher emotional intelligence was inversely related to teacher and peer ratings of aggression amongst students.

This concludes the discussion of the ability-based model in emotional intelligence. Thus far the literature study has:

- Explained the skills included in an ability-based conception of emotional intelligence.
- Indicated the measurement difficulties associated with assessing emotional intelligence.
- Ascertained thus far that emotional intelligence can be considered as a separate construct.
- Explored the predictive value of emotional intelligence.
The following section provides a summary of the emotional development of children in middle childhood. A better understanding of this topic will assist the researcher in designing an assessment tool that is relevant and appropriate for this age group.

1.2 CONCEPT OF META-COGNITION

“Meta-cognition” is one of the latest buzz words in educational psychology, but what exactly is meta-cognition? The length and abstract nature of the word makes it sound intimidating, yet it is not as daunting a concept as it might seem. We engage in meta-cognitive activities everyday. Meta-cognition enables us to be successful learners and has been associated with intelligence (e.g., Borkowski, Carr, & Pressley, 1987; Sternberg, 1984). Meta-cognition refers to higher order thinking which involves active control over the cognitive processes engaged in learning. Activities such as planning how to approach a given learning task, monitoring comprehension and evaluating progress toward the completion of a task are meta-cognitive in nature. Because meta-cognition plays a critical role in successful learning, it is important to study meta-cognitive activity and development to determine how students can be taught to better apply their cognitive resources through meta-cognitive control.

“Meta-cognition” is often simply defined as “thinking about thinking.” In actuality, defining meta-cognition is not that simple. Although the term has been part of the vocabulary of educational psychologists for the last couple of decades and the concept for as long as humans have been able to reflect on their cognitive experiences, there is much debate over exactly what meta-cognition is. One reason for this confusion is the fact that there are several terms currently used to describe the same basic phenomenon (e.g., self-regulation, executive control), or an aspect of that phenomenon (e.g., meta-memory) and these terms are often used interchangeably in the literature. While there are some distinctions between definitions (see Van Zile-Tamsen, 1994, 1996 for a full discussion), all emphasize the role of executive processes in the overseeing and regulation of cognitive processes.

The term “meta-cognition” is most often associated with John Flavell, (1979). According to Flavell (1979, 1987), meta-cognition consists of both meta-cognitive knowledge and meta-cognitive experiences or regulation. Meta-cognitive knowledge refers to acquired knowledge about cognitive processes, knowledge that can be used to
control cognitive processes. Flavell further divides meta-cognitive knowledge into three categories: knowledge of person variables, task variables and strategy variables. It has been over 30 years since the notion of meta-cognition was introduced into the field of psychology by John Flavell in 1979. Research activity in meta-cognition began with John Flavell, who is considered to be the 'father of the field' and thereafter a considerable amount of empirical and theoretical research dealing with meta-cognition can be registered.

There are three main areas of research in which meta-cognition have prominent role: developmental psychology, with emphasis on theory of mind; experimental psychology, focusing mainly on meta-memory; and educational psychology, with emphasis on self-regulated learning. However, there is also significant work in neuropsychology that connects meta-cognition with executive functions and pre-frontal brain areas. Another line of research connects meta-cognition with social cognition, as well as with co-regulation and other regulation of behaviour and cognition. More recent developments include the study of meta-cognition in clinical psychology.

The variety of areas and perspectives through which meta-cognition is being studied is due to the fact that meta-cognition is inextricably woven with awareness of mental states and with consciousness. In humans, it is at the roots of every day memory and of scientific thinking, as well as of social interactions that require awareness of one's and others' thinking.

Distinction in meta-cognition is executive management and strategic knowledge. Executive management processes involve planning, monitoring, evaluating and revising one's own thinking processes and products. Strategic knowledge involves knowing what (factual or declarative knowledge), knowing when and why (conditional or contextual knowledge) and knowing how (procedural or methodological knowledge). Both executive management and strategic knowledge meta-cognition are needed to self-regulate one's own thinking and learning (Hartman, 2001).

Finally, there is a distinction between domain general and domain-specific meta-cognition. Domain general refers to meta-cognition which transcends particular subject or content areas, such as setting goals. Domain specific refers to meta-cognition which is
applied in particular subject or content areas, such as editing an essay or verifying one's answer to a mathematics problem.

1.2.1 Concept of Meta-cognition

Meta-cognition is a concept that has been used to refer to variety of epistemological processes. Meta-cognition essentially means cognition about cognition; that is, it refers to second order cognitions: thoughts about thoughts, knowledge about knowledge, or reflections about actions. So if cognition involves perceiving, understanding, remembering and so forth, then meta-cognition involves thinking about one's own perceiving, understanding, remembering etc. these various cognitions about cognitions can be labeled 'meta perception', 'meta-comprehension' and 'meta memory' with 'meta-cognition' remaining the super ordinate term.

Nelson (as cited in Efklides, 2008) defined, “Meta-cognition as a model of cognition that functions at a meta level; meta-cognition represents the object level, that is cognition.” This definition underscore the functioning of meta-cognition at a “meta” level, which means that meta-cognition is a representation of cognition and that meta-cognition and cognition are connected through the monitoring and control functions.

According to Brown (1987), “Meta-cognition refers loosely to one's knowledge and control of own cognitive system.”

Schraw & Sperling-Dennison (1994) defined, “Meta-cognition as the ability to reflect upon, understand and control one's learning.”

Flavell (1979) defined meta-cognition as, “Knowledge and cognition about cognitive phenomena.” Refined this definition by specifying classes of phenomena that constitute monitoring and control of cognition, such as meta-cognitive knowledge and meta-cognitive experiences.

Baker & Brown (1984) defined meta-cognition as, “the knowledge and control a child has over his or her own thinking and learning activities, including reading.”

Gradually, the concept has been broadened to include anything psychological, rather than just anything cognitive. For instance, if one has knowledge or cognition about one's own emotions or motives concerning a cognitive enterprise (e.g. being aware of his anxiety while solving a problem in an exam paper), this can be considered meta-cognitive. In fact, the recent literature completes the term, by adding to its cognitive
domain, the emotional one - referring to the emotions that accompany the cognitive processes and the person's ability to monitor them, as well as the domain of cognitive habits.

Similarly, Flavell (1979), when trying to define the concept of meta-cognition, refers to all those conscious cognitive or affective experiences that accompany and pertain to an intellectual enterprise. Although the term itself may seem mysterious, Meta-cognitive acts are common. For instance, take some time to answer two questions. First, when was the last time you failed to recall someone's name, but were you absolutely sure that you knew the name? These frustrating events called tip-of-the-tongue states happen a lot and may increase in frequency, as we grow older. They are Meta-cognitive in nature because you are having a thought (I am sure I know the person's name) about cognition (in this case, your thought is “that the person's name is in your memory”).

Second, when was the last time you decided to write down lengthy directions, or perhaps even brief ones and how often do you make a list of groceries to buy at the market? In such circumstances, you may realize that there is little chance of remembering important information, so you naturally rely on external aids for examples, lists, Palm pilots or even other people to ensure that you won't forget.

Understanding the limits of your own memory also is a form of Meta-cognition because it concerns your beliefs and knowledge about memory.

1.2.2 Components of Meta-cognition

Although meta-cognition may have sometimes-indistinct boundaries, key distinctions can be made. First, we can distinguish between knowledge and skills – between “knowing that” and “knowing how”, the old distinction between theory and practice, between competence and performance. One may “know that” he/she should distinguish relevant from irrelevant information in a problem and another has the ability to do this in practice, perceiving what is relevant in a “noisy” environment. Similarly, one may know that different strategies can be applied in different problems and another has the ability to select the suitable strategy, when needed, to resolve a problem. Ann Brown (1987) distinguishes between knowledge about cognition and regulation of cognition. Knowledge about cognition can be “stable, stable but fallible or late developing.” information that human thinkers have about their own cognitive processes, which usually
remains relatively consistent within individuals. Regulation, on the other hand, can be “relatively unstable, rarely stable and age independent”. Brown (1987), Regulation of cognition refers to the activities used to regulate and oversee learning. One may show self-regulatory behavior in one situation but not another and a child may show self-regulatory behavior where an adult does not. Regulation may be also affected by patterns of arousal (anxiety, fear, interest) and self-concept (self-esteem, self-efficacy). These processes include planning activities (predicting outcomes, scheduling strategies and various forms of vicarious trial and error, etc.) prior to undertaking a problem; monitoring activities (monitoring, testing, revising and re-scheduling one's strategies for learning) during learning; and checking outcomes (evaluating the outcome of any strategic actions against criteria of efficiency and effectiveness) at the end. Kluwe (as cited in Louca, 2003) brought further definition to the concept of 'meta-cognition' describing activities referred to as 'meta-cognitive': (a) the thinking subject has some knowledge about his own thinking and that of other persons; (b) the thinking subject may monitor and regulate the course of his own thinking, i.e. may act as the causal agent of his own thinking”. Moreover, Kluwe uses the term 'executive processes' to denote both monitoring and regulating strategies. Executive monitoring processes involve one's decisions that help: (a) to identify the task on which one is currently working, (b) to check on current progress of that work, (c) to evaluate that progress and (d) to predict what the outcome of that progress will be. Executive regulation processes are those that are “directed at the regulation of the course of one's own thinking.” They involve one's decisions that help (a) to allocate his or her resources to the current task, (b) to determine the order steps to be taken to complete the task and (c) to set the intensity or (d) the speed at which one should work the task. Flavell (1987) tried to classify part of the domain of meta-cognition. The key concepts in the taxonomy are meta-cognitive knowledge and meta-cognitive experience.

“Meta-cognitive knowledge refers to the part of one's acquired word knowledge that has to do with cognition or perhaps better, psychological matters”. Meta-cognitive knowledge can be sub divided into three categories: knowledge of person variables, task variables and strategy variables.
Meta-cognitive experiences are conscious experiences that are cognitive and affective. What makes them meta-cognitive experiences rather than experiences of another kind is that they have to do with some cognitive endeavour or enterprise, most frequently a current, ongoing one. For example, if one suddenly has the anxious feeling that one is not understanding something and wants and needs to understand it, that feeling would be a meta-cognitive experience.

Schraw & Sperling-Dennison (1994) distinguished meta-cognition into two major components, including knowledge about cognition and regulation of cognition. Knowledge about cognition includes three sub processes that facilitate the reflective aspect of meta-cognition; namely declarative knowledge, (i.e., knowledge about self and about strategies), procedural knowledge (i.e., knowledge about how to use strategies) and conditional knowledge (i.e., knowledge about when and why to use strategies.) Regulation of cognition includes a number of sub-processes that facilitate the control aspect of learning. These five component skills of regulation are planning, information management strategies, comprehension monitoring, debugging strategies and evaluation.


Nelson & Narens (1990) proposed a theoretical mechanism to represent a meta-cognitive system consisting of two structures, an 'object-level' and a 'meta-level', the latter containing a model of the former. The mechanism incorporates two relations in terms of flow of information from one level to the other comprising 'control' and 'monitoring' functions. 'Control', which is the information flowing from the meta-level to the object-level, affects the object level processes by initiation, continuing or terminating an action. 'Monitoring', on the contrary, lies on the assumption that the meta-level is informed by the object-level, a process that results in changing the state of the meta-level's model.

On the other hand Efklides (2008) suggested, “Three different facets of meta-cognition; namely, Meta-cognitive knowledge, Meta-cognitive Experiences and Meta-cognitive Skills”.

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Meta-cognitive knowledge is declarative knowledge stored in memory and comprises models of cognitive processes, such as language, memory and so forth. It also encompasses information regarding persons, tasks, strategies and goals. Meta-cognitive Experiences are what the person is aware of and what she or he feels when coming across a task and processing the information related to it. They take the form of meta-cognitive feelings, meta-cognitive judgements and online-task specific knowledge. Meta-cognitive Skills refer to the deliberate use of strategies in order to control cognition. Meta-cognitive skills comprise orientation strategies, planning strategies, strategies for regulation of cognitive processing, strategies for monitoring the execution of planned action and strategies for the evaluation of the outcome of the task processing.

In the present study the term Meta-cognition refers to the “Knowledge and Control of own cognitive system which is composite of two main components Meta-cognitive Knowledge and Meta-cognitive Regulation. The Meta-cognitive Knowledge includes three sub processes that facilitate the reflective aspect of meta-cognition; namely declarative knowledge, (i.e., knowledge about self and about strategies), procedural knowledge (i.e., knowledge about how to use strategies) and conditional knowledge (i.e., knowledge about when and why to use strategies.) Meta-cognitive Regulation includes a number of sub processes that facilitate the control aspect of learning. These Four component skills of regulation are planning, monitoring, self-control and self-evaluation.

1.2.3 Relationship between Meta-cognition and Cognition

Recall that meta-cognition is referred to as “thinking about thinking” and involves overseeing whether a cognitive goal has been met. This should be the defining criterion for determining what is meta-cognitive. Cognitive strategies are used to help an individual achieve a particular goal (e.g., understanding a text) while meta-cognitive strategies are used to ensure that the goal has been reached (e.g., quizzing oneself to evaluate one's understanding of that text). Meta-cognitive experiences usually precede or follow a cognitive activity. They often occur when cognitions fail, such as the recognition that one did not understand what one just read. Such an impasse is believed to activate meta-cognitive processes as the learner attempts to rectify the situation (Roberts & Erdos, 1993).
Meta-cognitive and cognitive strategies may overlap in that the same strategy, such as questioning, could be regarded as either a cognitive or a meta-cognitive strategy depending on what the purpose for using that strategy may be. For example, you may use a self-questioning strategy while reading as a means of obtaining knowledge (cognitive), or as a way of monitoring what you have read (meta-cognitive). Because cognitive and meta-cognitive strategies are closely intertwined and dependent upon each other, any attempt to examine one without acknowledging the other would not provide an adequate picture. Knowledge is considered to be meta-cognitive if it is actively used in a strategic manner to ensure that a goal is met. For example, a student may use knowledge in planning how to approach a math exam: “I know that I (person variable) have difficulty with word problems (task variable), so I will answer the computational problems first and save the word problems for last (strategy variable).” Simply possessing knowledge about one's cognitive strengths or weaknesses and the nature of the task without actively utilizing this information to oversee learning is not meta-cognitive.

Most conceptualizations of meta-cognition have in common that they take the perspective of “higher-order cognition about cognition.” There is a higher order agent overlooking and governing the cognitive system, while simultaneously being part of it. This is the classical homunculus problem or Comte's paradox: One cannot split one's self in two, of whom one thinks whilst the other observes him thinking. The issue whether cognition and meta-cognition can be disentangled is not merely an academic one. In fact, meta-cognition draws on cognition. It is very hard to have adequate meta-cognitive knowledge of one's competencies in a domain without substantial (cognitive) domain-specific knowledge, such as knowledge about relevant concepts and theories in a domain, about intrinsic difficulties of a domain and about what is irrelevant. In terms of meta-cognitive skills, one cannot engage in planning without carrying out cognitive activities, such as generating problem-solving steps and sequencing those steps. Similarly, one cannot check one's outcome of a calculation without comparing the outcome with an estimation of it, or recalculating the outcome in another way. If meta-cognition is conceived as (knowledge of) a set of self instructions for regulating task performance, then cognition is the vehicle of those self-instructions. These cognitive activities in turn are subject to meta-cognition, for instance, to ongoing monitoring and evaluation.
processes. This circular process of meta-cognitive and cognitive activities makes it hard to disentangle them in the assessment of meta-cognition. Occasionally, meta-cognition can be observed in students' verbalized self instructions, such as “this is difficult for me, let's do it step-by-step" or “wait, I don't know what this word means." Meta-cognition, however, is not always explicitly heard or seen during task performance. Instead, it has often to be inferred from certain cognitive activities. For instance, doing things step-by-step may be indicative of planned behavior, although self-instructions for planning are not explicitly verbalized. Future research has to differentiate far more precisely between explicitly verbalized meta-cognitive knowledge and self-instructions, cognitive activities that are indicative of meta-cognition and purely cognitive activity.

1.2.4 Meta-cognition and Intelligence

Meta-cognition, or the ability to control one's cognitive processes (self-regulation) has been linked to intelligence (Borkowski et al., 1987; Brown, 1987; Sternberg, 1984, 1986a, 1986b). Sternberg refers to these executive processes as “metacomponents” in his triarchic theory of intelligence (Sternberg, 1984, 1986a, 1986b). Metacomponents are executive processes that control other cognitive components as well as receive feedback from these components. According to Sternberg, metacomponents are responsible for “figuring out how to do a particular task or set of tasks and then making sure that the task or set of tasks are done correctly” (Sternberg, 1986b, p. 24). These executive processes involve planning, evaluating and monitoring problem-solving activities. Sternberg maintains that the ability to appropriately allocate cognitive resources, such as deciding how and when a given task should be accomplished, is central to intelligence.

1.2.5 Meta-cognition and Cognitive Strategy Instruction

Although most individuals of normal intelligence engage in meta-cognitive regulation when confronted with an effortful cognitive task, some are more meta-cognitive than others. Those with greater meta-cognitive abilities tend to be more successful in their cognitive endeavors. The good news is that individuals can learn how to better regulate their cognitive activities. Most often, meta-cognitive instruction occurs within Cognitive Strategy Instruction programs.

Cognitive Strategy Instruction (CSI) is an instructional approach which emphasizes the development of thinking skills and processes as a means to enhance
learning. The objective of CSI is to enable all students to become more strategic, self-reliant, flexible and productive in their learning endeavours (Scheid, 1993). CSI is based on the assumption that there are identifiable cognitive strategies, previously believed to be utilized by only the best and the brightest students, which can be taught to most students (Halpern, 1996). Use of these strategies have been associated with successful learning (Borkowski, Carr, & Pressley, 1987; Garner, 1990).

Meta-cognition enables students to benefit from instruction (Carr, Kurtz, Schneider, Turner & Borkowski, 1989; Van Zile-Tamsen, 1996) and influences the use and maintenance of cognitive strategies. While there are several approaches to meta-cognitive instruction, the most effective involve providing the learner with both knowledge of cognitive processes and strategies (to be used as meta-cognitive knowledge) and experience or practice in using both cognitive and meta-cognitive strategies and evaluating the outcomes of their efforts (develops meta-cognitive regulation). Simply providing knowledge without experience or vice versa does not seem to be sufficient for the development of meta-cognitive control (Livingston, 1996).

The study of meta-cognition has provided educational psychologists with insight about the cognitive processes involved in learning and what differentiates successful students from their less successful peers. It also holds several implications for instructional interventions, such as teaching students how to be more aware of their learning processes and products as well as how to regulate those processes for more effective learning.

1.2.6 Historical Roots of Meta-cognition

Although the term “Meta-cognition” has been part of the vocabulary of educational psychologists for the last three decades, but the concept exists for as long as humans have been able to reflect on their cognitive experiences.

“Know Thyself”
- Inscription at the Oracle of Apollo in Delphi, Greece
“The Life which is Unexamined is not Worth Living”
- Socrates rebuttal when found guilty of heresy

These famous quotes herald the importance of self-reflection and self awareness, which place Meta-cognition at the pinnacle of personal growth. And even though many
people may not make time to seriously reflect on their lives, except perhaps on a birthday or an occasional New Year's Eve, almost everyday of our lives, we do rely on our meta-cognition. When we do, meta-cognition is typically used as a tool to deal with everyday problems such as turning off a cell phone when traffic is extra heavy, or writing a note when it is absolutely essential to remember something. The importance of using meta-cognition to improve our daily lives is not all limited to our contemporary world, but extends back to antiquity. In fact, according Dunlosky & Metcalfe (2009) the first documented success at controlling the mind to improve memory begins with a gruesome tale involving the poet Simonides (557-468 BCE) which was later told by Cicero in his De Oratore. Accordingly to the Cicero it was Simonides who created the method of “Loci”, which is a powerful mnemonic strategy that is used to improve memory. He discovered that order is what most brings light to our memory. And he concluded that “those who would like to employ this part of their abilities should choose localities, then from mental images of the things they wanted to store in their memory and place these in the localities.”

**Comte's Paradox and Turn-of-the-20th-Century Introspection**

“Introspection”, a technique used by early psychologists to find answers to psychological questions, was also a first sign of interest in meta-cognitive processes. The definition of ‘introspection’ as 'the reflection on one's own conscious experience' makes such connections all too obvious.

August Comte (as cited in Dunlosky & Metcalfe, 2009), a French philosopher who founded positivism, argued that “as for observing…intellectual phenomena while they are taking place, this is clearly impossible. The thinking subject cannot divide himself into two parts, one of which would reason, while the other would observe its reasoning. In this instance, the observing and the observed organ being identical, how could observation take place? The very principle upon which (the introspection) is based, therefore, is invalid. Nelson (1996) referred to this argument as Comte's paradox. Without a resolution to Comte's paradox, it would seem that meta-cognitive monitoring or self evaluation is a mere illusion and potentially not privy to scientific enquiry.
According to Woodworth (as cited in Dunlosky & Metcalfe, 2009), “Introspection is the observation by an individual of his own conscious action…Notice that it is a form of observation and not speculation or reasoning from past experience. It is a direct observation of fact.” Wilhelm Wundt (1832-1920) was perhaps the most famous advocate of this introspective method. He argued that the subject of psychological science is immediate experience, which cannot be separated from the introspective method.

According to Nelson (1996), “The immediate experiencing” or Concurrent introspection advocated by Wundt and others entirely sidestepped Comte's paradox, because it involved an introspector who indirectly and passively observed the mind “out of the corner of the mental eye”

Accordingly, Comte's paradox - that introspection could not occur because the observing organ and the observed organ were identical - was not a paradox at all, because for concurrent introspection to occur, just a portion of the mental organ was needed to look back upon itself. Furthermore, Neuroscientific research gives answer to Comte's Paradox. According to neuroscientific research, different systems of the brain are responsible for self-reflection and memory retrieval. At a molar level, the pre frontal cortex apparently plays a critical role in self reflection, whereas the medial temporal lobe is critical for memory itself. So, a failure to retrieve the labels for some lobes of the brain that is based on disrupted medial temporal lobe dysfunction can still be reflected by intact functioning of the prefrontal cortex. Of course, the neurological analysis of self reflection and memory is much more complex. Nevertheless, other psychologists of the era believed that even if concurrent introspectionism was possible, it would be inadequate and misleading. Franz Brentano (1838-1917) argued that concurrent introspections are inadequate because people cannot observe intense emotions as they arise in the heat of the moment and they are misleading because the act of observing inner processes may change them. For Brentano, concurrent introspection was out. Instead of concurrent introspection, he advocated retrospective introspection, in which one observes a mental process by recalling the events stored in memory that arose from that process. At the turn of the 20th century Comte's paradox was not considered to present a real problem and concurrent and retrospective introspection were commonly used to investigate the mind. Nevertheless, even though turn of the century introspectionism relied heavily on meta-
cognitive monitoring, it fell well short of producing a theory of human thought and action that relied on modern principles of meta-cognition.

Perhaps the most important problem with introspection is that scientists of the era used introspection as a tool to discover the structure or functions of the mind. That is, these scientists were less interested in investigating people's introspections per se; instead, they used introspection as a tool—a virtual window into the mind. How introspection was used as a methodological tool is what undermined its ultimate success at providing a valid or even consistent description of the mind.

First, introspection was often believed to produce an accurate picture of the mind. That is, by using introspection in an appropriate manner, introspector presumably reported accurately and completely about how their minds operated, such as reporting on the sensations produced by a stimulus or about the ongoing functions of an underlying mental process. Woodworth's (1921) definition reveals the received view at the time that introspection involved the direct observation of fact and even Brentano (as cited in Dunlosky & Metcalf, 2009) assumed that when done retrospectively, such 'inner perception is infallible and does not admit of doubt'. Even if introspection were infallible and did not admit of doubt, it might still be largely inadequate if the mental processes that an experimenter wants to investigate do not produce mental images or sensations that are available to introspection. That is, the sensations and mental processes that are the focus of introspection must produce mental images that the introspector could perceive. If images are not always produced, then introspection could at best produce an incomplete and hence not entirely accurate depiction of thought.

In a study by Karl Marbe, reported in 1901, participants lifted two weights and were instructed to decide which one was the heaviest—a standard task of psychophysics. The participants also used introspection to report what thoughts were in their minds immediately before they made this decision. Participants judged the weights but often failed in their introspections the decision of which weight was heaviest seemed to mysteriously arise from nowhere. Kulpe, one of the Wundt's students and Kulpe's students, conducted similar experiments and they repeatedly found that many thought processes were not accompanied by images. The repeated demonstration of such imageless thoughts suggested that either form of introspection either concurrent or
retrospective was limited in what it could reveal about how the human mind operated. A second pitfall of the introspective method was that this method does not produce the reliable results. Introspection was not sufficiently reliable; many scientists began to question its worth as a scientific method. The most well known and outspoken critic of introspection was John B. Watson, who defined behaviorism and established it as a prominent school of psychology. Watson argued strongly that consciousness could not be experimentally studied, so there was no need for introspective techniques, which he criticized as being a defective method. In the 1920s, behaviourism grew in its influence. Many prominent psychologists continued to explore mental processes throughout the mid 1900s, but behaviourism eventually would become the dominant school of American psychology, fueled by the innovative and influential work by Clark Hull, B.F. Skinner and Edward Tolman among many others. In fact, modern meta-cognitive research had to wait the 1960s, which saw a resurgence in psychologists' interest in the mind and ultimately what is now considered the cognitive revolution.

1.2.7 The Cognitive Revival

Behaviourism had a strangle hold on psychology for nearly 40 years and produced a wealth of data and theory relevant to how both human and nonhuman animals behave. In 1960s many psychologists desert behaviourism, because of two factors: growing dissatisfaction with behaviourism as providing an adequate explanation for animal behaviour and a new approach to how to think about behaviour in terms of mental processes. The behaviourists strangle hold was gradually loosened by the discovery of many instances in which behaviour could not be explained solely by stimulus-response connections. It was not until the 1960s that a large number of eminent psychologists turned from behaviourism toward a non-apologetic study of cognition, but troubling discoveries for behaviourism were readily available even in the 1920s. In 1932, E.C. Tolman advocated that not all behaviour could be explained by strict stimulus-response behaviourism. According to Tolman, animal behaviour is also influenced by motivational factors, such as the animal's drive to obtain reward and their incentive to do so. Although Tolman's views were certainly well regarded, they had little immediate influence in converting behaviourists into would be cognitive psychologists. Nevertheless, many other demonstrations throughout the mid 20th century would uncover
chinks in the armor of behaviourism and lead to its downfall as the dominant school of psychology. With a new model to guide the reemerging field, articles began to appear in the late 1950s and through the 1960s that would clearly mark the beginning of the cognitive renaissance. To name a few, Broadbent (1958) published his now-classic book on the bottleneck model of attention, Paivio (1969) investigated imaginable processes and Mandler (1967) explored organizational processes in memory. Textbooks emerged that focused on exploring mental life, such as Miller's (1962) psychology: The Science of Mental Life and Ubric Neisser's (1967) cognitive psychology. The latter volume was highly influential in fostering interest in cognition among teachers and would be cognitive psychologists. In their book, Plans and the structure of Behaviour (1960), Miller, Galanter and Pribram sought to replace stimulus response descriptions of humans with a conception based on the relationships between internal images and the construction and use of plans in the control of behaviour.

Miller et al. had given a basic unit of analysis, which was to supplant the behaviourists' stimulus response reflex. Illustrated in the figure below, their test-operate-test-exist (TOTE) unit is a feed back loop in which the outcome of a test informs (a) whether the desired state being tested for is present (congruity), in which case the loop is exited and the relevant operation is terminated or (b) whether the desired state being tested for is not present (incongruity), in which case the operation continues. The TOTE is intentionally general and depending on what flows across the arrows, such as neural energy or information, the TOTE can reflect the operation of a simple neural reflex or the operation of information driven mechanism. The generality of the TOTE mechanism allows it to apply equally well in analyzing any human activity, including meta-cognitive ones. The general meta-cognition model introduced by Nelson and Narens (1990) was inspired by the TOTE mechanism. For the meta-cognitive model, some process of the mind is monitored, which for the TOTE mechanism is analogous to testing an outcome. The outcome of such monitoring can then serve to control one's thought by either terminating that process or by continuing until some goal has been achieved. Some other models have also played their role in controlling human behaviour and thought. Here, two other models are discussed that will help illustrate meta-cognitive process involved in other forms of cognition, human memory and problem solving. In 1968, Atkinson and
Shiffrin proposed that human memory is a system composed of a series of stores. Information from the environment is copied into a sensory store and when attended, is then transferred to a short-term store, which is limited in capacity. Once information resides in the short-term store, we can then operate on it by using a variety of control processes, such as rehearsing the information repeatedly or elaborating on the information in the meaningful fashion. These control processes are meta-cognitive in nature. The information in the short-term store is an object level cognition and meta-level processing acts upon it is in this case by applying control processes that increase the likelihood the information is transferred to the long term store.

In Human Problem Solving, Newell and Simon (as cited in Dunlosky & Metcalfe, 2009) argue that problem solving can be understood as “a collection of information processes that combine a series of means to attain an end” and these means in general include choosing a goal for a problem, selecting a method to generate a solution and evaluating the results of that method. These problem-solving processes are recursive in nature, so, for instance, if one realizes that a method has not produced the desired result, a new method may be chosen and applied to the problem. These processes are meta-cognitive in nature, because they involve evaluating progress and using the outcome of such evaluations to make decisions about how to solve problems. Despite these obvious references to meta-cognitive processes in early and influential theories of cognition, the overwhelming response of cognitive scientists was to investigate the cognitive components embedded in these models, such as by exploring the structure of the short-term store or by describing how people represent problems as they solve them. In contrast, an exploration of the meta-cognitive processes, such as how people monitor and control these processes, was largely ignored.

1.2.8 Rise of the Meta-cognitive School of Psychology

Lieberman (1979) eloquently argued for a limited return to introspection in the analysis of human thought and action. Instead of rejecting introspection as totally unreliable and invalid, he argued that introspective data could produce invaluable evidence about how human think so that we cannot reject introspection. Seemingly at odds with Lieberman (1979), Nisbett and Wilson (1977) argued that verbal reports also known as “introspections”-are largely invalid because people cannot observe their
cognitive processes. The answer of the contradictory conclusions, offered by Lieberman (1979) and Nisbett and Wilson (1977), was given by Ericsson and Simon (1980) in their classic article, “Verbal Reports as Data”. They propose a theory of introspective reports, or verbal reports, that explains when introspections will be valid and when they will not. According to Ericsson and Simon's theory, people's introspections will be valid when they focus on information that is currently in short-term store. In contrast, when people are asked to introspect about information not currently in the short-term store, the validity of their introspections may be hampered because they may no longer have access to the sought-after information never resided in the short-term store. The model predicts people's introspections will be largely invalid, unless of course they make a correct guess about what was going on in their minds. By demonstrating how introspective techniques can validly reveal at least some aspects of cognition, Ericsson and Simon (1980, 1984) provided a cornerstone that was essential for the growth of a new meta-cognitive school.

Even with this cornerstone laid, others were still needed before scientists would adopt a meta-cognitive perspective as a means to further understand human thought and behaviour. J.T.Hart's (1965) doctoral dissertation reported that people have surprisingly good knowledge of which memory items they would be able to recognize, even if they cannot recall them. In Hart's recall-judgment-recognition (RJR) experimental paradigm, subjects were given common-knowledge questions. Where recall failed, they rated the likelihood that they would be able to recognize the item in a multiple-choice task. Their judgments about this were largely accurate. Thus, this research is also fundamental research in the field of meta-cognition because this paper predates the rise of contemporary meta-cognition research. Hart introduced an innovative method to empirically test the accuracy of people's meta-cognitive experiences.

Arguably, the most influential advocate for meta-cognition during its infancy was John H. Flavell, who coined the term “meta-memory” in 1970. In this decade, the term “meta” began to arise in articles and conference papers and much groundbreaking research in the area was conducted. This growing interest in meta-cognition set the stage for Flavell's (1979) American Psychologist article, called “Meta-cognition and Cognitive Monitoring: A New Area of Cognitive Developmental Inquiry”. Flavell (1979) defined meta-cognition as “Knowledge and cognition about cognitive phenomena” and refined
this definition by specifying classes of phenomena that constitute monitoring and control of cognition, such as meta-cognitive knowledge and meta-cognitive experiences. Although Flavell and his colleagues, most notably Henry Wellman, began to champion a meta-cognitive approach in the 1970s, the beginning of this approach can be traced back to the 1960s, when Flavell (1963) was assimilating Jean Piaget's theory on child development in the landmark book, The Developmental Psychology of Jean Piaget. It was the theoretical work of Jean Piaget and his colleagues that the notions of children having thoughts about thoughts clearly arouse. These “Thoughts about thoughts” were considered a pinnacle of child development in that they signified the presence of formal operations, which Flavell (1963) eloquently describes as “the crowning achievement of intellectual development, the final equilibrium state toward which intellectual evaluation has been moving since infancy”. Flavell goes on to emphasize that, “the most important general property of formal operational thought, the one from which Piaget derives all others, concerns the real versus the possible….Formal thinking is above all propositional thinking. The important entities which the adolescent manipulates in his reasoning are no longer the raw reality data themselves but assertions or statements-propositions which contain these data”.

It seems likely that the theorizing by Piaget and his colleagues was directly responsible for inspiring Flavell to further consider the importance of “thoughts about thoughts” for early child development. Thus, the 1970s saw the rise of the meta-cognitive school of psychology mainly from empirical research and theory construction in developmental psychology. Psychologists like Brown, Flavell and Kluwe etc. continued to refine what counted as meta-cognition. Since then, a meta-cognitive approach has been adopted by researchers in many domains of psychology, including social, cognitive, educational, child and adult developments and clinical. The growth of meta-cognitive research within each of these domains has its own history. Some of these histories are lengthy, such as for cognitive and educational psychology, which began near the rise of the Meta-cognitive School of Psychology. In other domains, systematic exploration of meta-cognitive processes is just now catching on.

The story of meta-cognition can be traced to antiquity, with Simonides heralding the power of his method of Loci to control memory. Meta-cognitive processes played an
especially important role for late-19th and early-20th century psychologists, who used introspection as a tool to discover the inner workings of the mind. Unfortunately, at the turn of the 20th century, introspective techniques were found to be somewhat inadequate and misleading the finding did not always replicate across laboratories and many inner processes could not be revealed by introspection because they did not produce mental images. With much vigor, Watson banished introspection from psychology and the study of consciousness as the pursuit of psychological inquiry and he offered behaviourism as a replacement. Several decades later, many psychologists in turn found behaviorism inadequate and they began to develop models of behaviour that once again relied on mental processes. Even the earliest models of cognition included meta-cognitive processes. Nevertheless, meta-cognition itself did not become the object of systematic investigation until the late 1960s and early 1970s, when Joseph Hart gave us methods to investigate the validity of people's introspections and John Flavell persuasively argued that meta-cognitive processes were vital to child development and to human behaviour in general.

1.2.9 Meta-cognition and Knowledge

To increase their meta-cognitive abilities, students need to possess and be aware of three kinds of content knowledge: declarative, procedural and conditional. Declarative knowledge is the factual information that one knows; it can be declared—spoken or written. An example is knowing the formula for calculating momentum in a physics class (momentum = mass times velocity). Procedural knowledge is knowledge of how to do something, of how to perform the steps in a process; for example, knowing the mass of an object and its rate of speed and how to do the calculation. Conditional knowledge is knowledge about when to use a procedure, skill, or strategy and when not to use it; why a procedure works and under what conditions; and why one procedure is better than another. For example, students need to recognize that an exam word problem requires the calculation of momentum as part of its solution.

This notion of three kinds of knowledge applies to learning strategies as well as course content. When they study, students need the declarative knowledge that (1) all reading assignments are not alike; for example, which a history textbook chapter with factual information differs from a primary historical document, which is different from an
article interpreting or analyzing that document. They need to know that stories and novels differ from arguments. Furthermore they need to know that there are different kinds of note taking strategies useful for annotating these different types of texts. And (2) students need to know how to actually write different kinds of notes (procedural knowledge) and (3) they need to know when to apply these kinds of notes when they study (conditional knowledge). Knowledge of study strategies is among the kinds of meta-cognitive knowledge and it too requires awareness of all three kinds of knowledge.

1.2.10 Meta-cognition and Study Strategies

Research shows that explicitly teaching study strategies in content courses improves learning. (Commander & Valeri-Gold, 2001; Ramp & Guffey, 1999; Chiang, 1998; El-Hindi, 1997; McKeachie, 1988). Research also shows that few instructors explicitly teach study strategies; they seem to assume that students have already learned them in high school—but they haven’t. (McKeachie, 1988). Rote memorization is the usual learning strategy—and often the only strategy—employed by high school students when they go to college (Nist, 1993).

Study strategies are diverse and don’t work in every context. For example, reading for information acquisition won’t work in a literature course and won’t work if students are supposed to critically evaluate an article. But students who have learned only the strategy of reading to pass a quiz on the information will not go beyond this strategy. Study strategies don’t necessarily transfer into other domains. Students need to know they have choices about which strategies to employ in different contexts. And students who learn study skills in one course need to apply study strategies in other contexts than where they first learned it. Students need to monitor their application of study strategies. Meta-cognitive awareness of their learning processes is as important as their monitoring of their learning of the course content. Meta-cognition includes goal setting, monitoring, self-assessing and regulating during thinking and writing processes; that is, when they’re studying and doing homework. An essential component of meta-cognition is employing study strategies to reach a goal, self-assessing one’s effectiveness in reaching that goal and then self-regulating in response to the self-assessment.
Monitoring Problems with Learning: When students monitor their learning, they can become aware of potential problems. Nickerson, Perkins and Smith (1985) in The Teaching of Thinking have categorized several types of problems with learning.

Problems with Process; Making errors in encoding, operations and goals:

A. Errors in Encoding

Missing important data or not separating relevant from irrelevant data. For example, some literature students will base their interpretation of a poem on just the first stanza.

B. Errors in Operations

Failing to select the right sub-skills to apply. For example, when proofreading, some students will just read to see if it sounds right, rather than making separate passes that check for fragments, subject-verb mis-agreement and other errors they have learned from experience they are likely to make. Failing to divide a task into subparts. For example, some math students will jump right to what they think is the final calculation to get the desired answer.

C. Errors in Goal Seeking

Misrepresenting the task. For example, students in a speech communication class instead of doing the assigned task of analyzing and classifying group communication strategies used in their group discussions will just write a narrative of who said what. Not understanding the criteria to apply. For example, when asked to evaluate the support provided for the major claim of an article, students will explain why they liked the article rather than apply appropriate evaluative criteria.

D. Problems with Cognitive Load

Many sub-skills are necessary to do a task. For example, some students might have not yet learned how to carry out all the steps in a complex nursing procedure. Not enough automatic, internalized sub-skills. For example, students in an argument and persuasion class might have to check their notes on how to analyze persuasive strategies because they have not internalized the procedure.

E. Problems with Abilities
Lacking the level of needed mental abilities. For example, students are asked to think abstractly about general concepts and issues, but they can only think concretely about specific situations. A good way to discover what kind of errors students are making in their thinking processes is to get them to unpack their thinking, to tell you step by step how they are going about the task. By listening to how they are doing the cognitive task, an instructor can detect where the student is going wrong. Asking students to describe their thinking processes also develops their meta-cognitive abilities—a very necessary skill to improve thinking.

1.2.11 Meta-cognition and Motivation

Meta-cognition affects motivation because it affects attribution and self-efficacy. When students get results on tests and grades on assignments (especially unexpected results such as failures), they perform a mental causal search to explain to themselves why the results happened. When they achieve good results, students tend to attribute the result to two internal factors: their own ability and effort. When they fail, they might attribute the cause to these same internal factors or they might, in a self-protective rationalization, distance themselves from a sense of personal failure by blaming external causes, such as an overly difficult task, an instructor’s perverse testing habits, or bad luck. This tendency to attribute success to ability and effort promotes future success because it develops confidence in one’s ability to solve future unfamiliar and challenging tasks. The converse is also true. Attributing failure to a lack of ability reduces self-confidence and reduces the student’s summoning of intellectual and emotional abilities to the next challenging tasks; attribution theory also explains why such students will be unwilling to seek help from tutors and other support services: they believe it would not be worth their effort. In addition to blaming failure on external causes, underachievers often “self-handicap” themselves by deliberately putting little effort into an academic task; they thereby protect themselves from attributing their failure to a painful lack of ability by attributing their failure to lack of effort (Stage et al, 1998)

1.2.12 Models of Meta-cognition

Flavell’s Classical Model (1979): A model of Cognitive Monitoring John Flavell of Stanford University is regarded as a foundation researcher in meta-cognition. He was influenced by the work of Jean Piaget.
According to Flavell (1979), the monitoring of a wide variety of cognitive enterprises occurs through the actions and interactions among four classes of phenomena: a) Meta-cognitive knowledge b) Meta-cognitive experiences c) Goals (or tasks) and d) Actions (or strategies). Meta-cognitive knowledge is that segment of a child's or an adult's stored word knowledge that has to do with people as cognitive creatures and with their diverse cognitive tasks, goals, actions and experiences. An example would be a child's acquired belief that unlike many or her friends, she is better at arithmetic than at spelling. Meta-cognitive experiences are any conscious cognitive or affective experiences that accompany and pertain to any intellectual enterprise. An example would be the sudden feeling that you do not understand something another person just said. Flavell assumed that meta-cognitive knowledge and meta-cognitive experiences differ from other kinds only in their content and functions, not in their form or quality. Goals (or tasks) refer to the objectives of a cognitive enterprise, while actions (or strategies) refer to the cognitions or other behaviors employed to achieve them.

(A) Meta-cognitive Knowledge: This refers to the segment of acquired world knowledge that has to do with cognitive matters. It is the knowledge or beliefs accumulated through experience and stored in long-term memory that concern the human mind and its doings. Some of this stored knowledge is declarative ('knowing that') and other procedural ('knowing how'). For example, your declarative knowledge is knowing how and when to supplement your poor memory by the use of shopping lists and other external memory aids. One's knowledge of any given meta-cognitive item could be both declarative and procedural. For example, one might both know as a verbalizable fact that writing a shopping list is a good memory strategy and also 'know to' write them on appropriate occasions. Meta-cognitive knowledge consists primarily of knowledge or beliefs about what factors or variables act and interact to affect the course and outcome of cognitive enterprises. These factors or variables fall into three major categories: person, task and strategy.

Stated very briefly, knowledge of person variables refers to general knowledge about how human beings learn and process information, as well as individual knowledge of one's own learning processes. For example, you may be aware that your study session will be more productive if you work in the quiet library rather than at home where there
are many distractions. Knowledge of task variables include knowledge about the nature of the task as well as the type of processing demands that it will place upon the individual. For example, you may be aware that it will take more time for you to read and comprehend a science text than it would for you to read and comprehend a novel.

(B) **Meta-cognitive Experiences**: The other major conceptual entity in the taxonomy is meta-cognitive experiences. Meta-cognitive experiences can be fully or less fully conscious and verbalizable, brief or lengthy, simple or complex in context. What makes them meta-cognitive experiences rather than experiences of another kind is that they have to do with some cognitive (and often affective) endeavour or enterprise, most frequently a current, ongoing one. For example, if one suddenly has the anxious feeling that he/she does not understand something and wants and needs to understand it, that feeling would be a meta-cognitive experience. One is having a meta-cognitive experience whenever he/she has the feeling that something is hard to perceive, comprehend, remember or solve; if there is a feeling that he/she is far from the cognitive goal. Meta-cognitive experiences are especially likely to occur in situations that stimulate a lot of careful, highly conscious thinking and provide many opportunities for thoughts and feelings about your own thinking to arise. They may also occur at any time before, during or after a cognitive endeavor; may be more apt to occur when the cognitive situation is something between completely novel and completely familiar; and when attentional and mnemonic resources are not wholly preempted by more urgent subjective experiences, such as pain, anxiety, or depression. Thus, a meta-cognitive experience can be any kind of affective or cognitive conscious experience that is pertinent to conduct in an ongoing cognitive situation or enterprise. Meta-cognitive experiences can have very important effects on cognitive goals or tasks, meta-cognitive knowledge and cognitive actions or strategies. First, they can lead somebody to establish new goals or revise old ones. Experiences of puzzlement or failure, for example, can have any of these effects. Second, meta-cognitive experiences can affect one's meta-cognitive knowledge store by adding to it, deleting from it, or revising it, as in Piaget's model of assimilation and accommodation. Finally, meta-cognitive experiences can activate strategies aimed at either cognitive or meta-cognitive goals. As an example of the former, one senses (meta-cognitive experience) that he/she does not yet know a certain chapter in a text well
enough to pass tomorrow's exam, so he/she reads it through once more (the cognitive goal here, to improve his/her knowledge). As an example of the latter, one wonders (meta-cognitive experience) whether he/she understands the chapter well enough to pass tomorrow's exam, so he/she tries to find out by asking oneself questions about it and noting how well he/she is able to answer them (the meta-cognitive goal, here, is to assess one's own knowledge).

(C) **Meta-cognitive goals and tasks:** Meta-cognitive goals and tasks are the desired outcomes or objectives of a cognitive venture. This was Flavell's third major category. Goals and tasks include comprehension, committing facts to memory, or producing something, such as a written document or an answer to a math problem, or of simply improving one's knowledge about something. Achievement of a goal draws heavily on both meta-cognitive knowledge and meta-cognitive experience for its successful completion.

(D) **Meta-cognitive strategies:** Meta-cognitive strategies are designed to monitor cognitive progress. Meta-cognitive strategies are ordered processes used to control one's own cognitive activities and to ensure that a cognitive goal (for example, solving a math problem, writing an effective sentence and understanding reading material) has been met. A person with good meta-cognitive skills and awareness uses these processes to oversee his own learning process, plan and monitor ongoing cognitive activities and to compare cognitive outcomes with internal or external standards. Further more, a single strategy could be invoked for either cognitive or meta-cognitive purposes and to move toward goals in the cognitive or meta-cognitive domains. He gave the example of asking oneself questions at the end of a learning unit with the aim of improving knowledge of the content, or to monitor comprehension and assessment of the new knowledge.

**Gregory Schraw Model (1998)**

According to the model presented by Schraw (1998) the meta-cognition is a multidimensional phenomenon and it is domain-general in nature and meta-cognitive knowledge and regulation can be improved using a variety of instructional strategies. Gregory Schraw makes a distinction between two components of meta-cognition, knowledge of cognition and regulation of cognition.
(A) **Knowledge of cognition:** Knowledge of cognition refers to what individuals know about their own cognition or about cognition in general. It includes at least three different kinds of meta-cognitive awareness: declarative, procedural and conditional knowledge. Declarative knowledge refers to knowing “about” things. Procedural knowledge refers to knowing “how” to do things. Conditional knowledge refers to knowing the “why” and “when” aspects of cognition.

**Components of Meta-cognition**

- Declarative Knowledge
- Procedural Knowledge
- Conditional Knowledge
- Planning
- Monitoring
- Evaluation
- Regulation of Cognition
- Knowledge of Cognition

**Declarative knowledge:** Declarative knowledge includes knowledge about oneself as a learner and about what factors influence one's performance.

**Procedural knowledge:** Procedural knowledge refers to knowledge about doing things. Much of this knowledge is represented as heuristics and strategies. Individuals with a high degree of procedural knowledge perform tasks more automatically, are more likely to possess a larger repertoire of strategies, to sequence strategies effectively and use qualitatively different strategies to solve problems. Typical examples include how to chunk and categorize new information.

**Conditional knowledge:** Conditional knowledge refers to knowing when and why to use declarative and procedural knowledge. For example, effective learners know when and what information to rehearse. Conditional knowledge is important because it helps students selectively allocate their resources and use strategies more effectively. Conditional knowledge also enables students to adjust to the changing situational demands of each learning task.

**Regulation of cognition:** Regulation of cognition refers to a set of activities that help students control their learning. Research supports the assumption that meta-cognitive
regulation improves performance in a number of ways, including better use of attentional resources, better use of existing strategies and a greater awareness of comprehension breakdowns. Although a number of regulatory skills have been described in the literature, for example according to Schraw & Dennison (1994) regulation is divided into planning, information management, monitoring, debugging and evaluation; three essential skills are included in all accounts: planning, monitoring and evaluation.

**Planning:** Planning involves the selection of appropriate strategies and the allocation of resources that affect performance. Examples include making predictions before reading, strategy sequencing and allocating time or attention selectively before beginning a task.

**Monitoring:** Monitoring refers to one's on-line awareness of comprehension and task performance. The ability to engage in periodic self-testing while learning is a good example.

**Evaluating:** Evaluating refers to appraising the products and efficiency of one's learning. Typical examples include re-evaluating one's goals and conclusions. There are two main points to emphasize about knowledge of cognition and regulation of cognition. The first is that the two are related to one another. The second is that both components appear to span a wide variety of subject areas and domains - that is, they are domain-general in nature.

In summary, meta-cognition consists of knowledge and regulatory skills that are used to control one's cognition. While meta-cognition is used in a general sense to subsume a number of individual components, all of these components are inter-correlated and two general components corresponding to knowledge about cognition and regulation of cognition. Preliminary evidence suggests these two components are inter correlated somewhere in the $r = 0.50$ range.

**Nelson & Naren Model (1990)**

Nelson & Narens (1990) suggest an alternative model of meta-cognition and the 'control' - 'monitoring' processes. In this model, there are two critical features: the first is the splitting of cognitive processes into two or more specifically interrelated levels. This model shows a simple meta-cognitive system containing two interrelated levels that Nelson and Narens' call the “Meta-level” and the “Object-level”. The second critical feature of a meta-cognitive system is also a kind of dominance relation, defined in terms
of the direction of the flow of information. This flow gives rise to a distinction between what thy call “Control” versus “Monitoring”. The object level can be viewed as the ongoing cognitive process of interest, such as attention, learning, language processing, problem solving and so forth. The meta-level also contains a model that is a person's understanding of the task they are performing and the on going cognitive processes that are engaged while thy complete the task. This model is partly informed by people's monitoring of their progress on task, but it also may be informed by their meta-cognitive knowledge.

Two general flows of information between both levels are postulated. Information about the state of the object level is conveyed to the meta-level through monitoring processes, while instructions from the meta-level are transmitted to the object level through control processes. Thus, if errors occur on the object level, monitoring processes will give notice of it to the meta-level and control process will be activated to resolve the problem. This seems an elegant and simple mode, including both meta-cognitive knowledge and skills.

Meta-cognitive Knowledge: Meta-cognitive Knowledge (MK) is a declarative knowledge stored in memory and comprises models of cognitive processes, such as language, memory and so forth. It also encompasses information regarding person, as well as information about tasks, strategies and goals. More specifically, meta-cognitive knowledge regarding person involves the self and the others as cognitive beings, that is, how we or other people process various tasks and how good are on them, what was felt during a specific task processing. Meta-cognitive task knowledge involves task categories and their features, relations between tasks, as well as the ways they are processed. Meta-cognitive strategy knowledge involves knowledge of multiple strategies as well as the conditions for their use. Finally, meta-cognitive goal knowledge involves knowledge of what sort of goals people pursue when confronted with specific tasks or situations.

Meta-cognitive knowledge gets continuously enriched, updated and differentiated by integrating information coming from the monitoring of cognition at a conscious level through observation of one's and others' behavioural actions and their outcomes when dealing with specific tasks in various contexts, through awareness of our meta-cognitive experiences as well as through communication and interaction with others.
**Meta-cognitive Experiences**: Meta-cognitive experiences (ME) are what the person is aware of and what she or he feels when coming across a task and processing the information related to it. They are the interface between the person and the task, the awareness the person has of task features, of the fluency of cognitive processing, of the progress toward the goal set, of the effort exerted on cognitive processing and of the outcome of processing. They take the form of meta-cognitive feelings, meta-cognitive judgments/estimates and online task-specific knowledge.

Feeling of knowing, feeling of familiarity and feeling of confidence are some indicative meta-cognitive feelings extensively studied in Metamemory research. Also, there are feelings studied in the context of problem solving, such as feeling of difficulty, that are crucial for the self-regulation of effort. Meta-cognitive judgments/estimates include judgment of learning, estimate of effort expenditure, estimate of time needed or spent, but also estimate of solution correctness and so forth, that make clusters with feelings of difficulty and confidence. The online task-specific knowledge comprises task information that we are attending to and ideas or thoughts that we are aware of as we deal with a task (e.g., cognitive procedures we are applying). It also comprises MK that we retrieve from memory in order to process the task; for example, MK about tasks and procedures that we used in the past, comparison of the current with other tasks about their similarities or differences and so forth.

**Meta-cognitive Regulation**: Meta-cognitive experiences involve the use of meta-cognitive strategies or meta-cognitive regulation (Brown, 1987). Meta-cognitive strategies are sequential processes that one uses to control cognitive activities and to ensure that a cognitive goal (e.g., understanding a text) has been met. These processes help to regulate and oversee learning and consist of planning and monitoring cognitive activities, as well as checking the outcomes of those activities.

For example, after reading a paragraph in a text a learner may question herself about the concepts discussed in the paragraph. Her cognitive goal is to understand the text. Self-questioning is a common meta-cognitive comprehension monitoring strategy. If she finds that she cannot answer her own questions, or that she does not understand the material discussed, she must then determine what needs to be done to ensure that she meets the cognitive goal of understanding the text. She may decide to go back and re-read
the paragraph with the goal of being able to answer the questions she had generated. If, after re-reading through the text she can now answer the questions, she may determine that she understands the material. Thus, the meta-cognitive strategy of self-questioning is used to ensure that the cognitive goal of comprehension is met.

**Meta-cognitive Skills**: Meta-cognitive skills (MS) refer to the deliberate use of strategies (i.e., procedural knowledge) in order to control cognition. Brown (1987) identified the control of cognition with executive control. Executive control involves selective attention and working memory, as well as planning, conflict resolution, error detection and inhibitory control and therefore, is related to meta-cognitive regulation; that is, to both monitoring and control. However, MS have characteristics that are distinct from MK and ME, which are products of different processes in the monitoring of cognition, as already discussed. Meta-cognitive skills comprise orientation strategies, planning strategies, strategies for regulation of cognitive processing, strategies for monitoring the execution of planned action and strategies for the evaluation of the outcome of task processing. Such a conceptualization of MS implies that they are operating on cognition through the cognitive regulatory loop and that they can call in cognitive strategies - such as rehearsal, elaboration and so forth – to regulate cognition, as well as strategies to analyze task requirements and evaluate the response. In this direction, MS make use of online task-specific knowledge, as well as of MK. Moreover, for MS to be activated, there needs to be awareness of the fluency of cognitive processing and awareness that a conflict or error has occurred. The latter information is conveyed by ME, such as feelings of familiarity, of difficulty, or of confidence. Thus, ME provide the input that triggers control decisions (e.g., regulation of effort) or MS, either directly or indirectly through MK.

In conclusion, there is evidence as well as theoretical reasons to support the claim that meta-cognition is a multifaceted phenomenon and that ME, MK and MS are three distinct facets of meta-cognition, despite their close interrelations. These facets serve different functions in the self-regulation process, with ME and MK involved in the monitoring function that informs selfawareness as well as awareness of cognition and MS involved in strategy use for the control of cognition. Also, MK (being declarative knowledge of self and others) along with meta-cognitive judgments about other persons'
current cognitive processing, are instrumental for the co-regulation and other regulation of cognition and behavior. Finally, MS can also contribute to the co-regulation and other regulation of cognition, possibly through the control of one's own cognition following feedback from the other persons or through the guidance given to the other person.

**Multifaceted and Multilevel Model of Meta-cognition**

This tentative model posits that the object level comprises processes involved in cognition as well as in emotions/affect. It functions at a non-conscious level and involves two separate regulatory systems based on non-conscious monitoring and control processes. Products of each of the two regulatory systems, as well as of their interactions, along with perceptions of their behavioral outcomes, are represented at the personal awareness level. Emotions, thoughts, ideas, desires, perceptions and so forth - as well as ME, MK and MS - are the components of self-awareness at this level. Also, at this level, integration of the person's explicit representation of the situation and of its demands with the action/behavior ensued is accomplished.

Note: ME = Meta-cognitive Experience, MK = Meta-cognitive Knowledge MS = Meta-cognitive Skills, MJ = Meta-cognitive Judgements = Monitoring, = Control

What is worth noting is that at the personal-awareness level, meta-cognition is not cold (i.e., purely cognitive) as the nature of MK would suggest; it is hot, because affect is integrated with the monitoring of cognition in the case of meta-cognitive feelings. Moreover, having represented at the same forum - that is, in conscious awareness - cognition, affect and meta-cognition, the self-regulation process is facilitated because the person is informed of what is subjectively significant and of the progress toward one's goal. In the case of control being needed, then ME and MK can activate MS and through them the cognitive regulatory loop. However, meta-cognitive feelings can also activate the affective regulatory loop, directly through their affective quality, or indirectly through MK and MS; in the latter case, there is cognitive control of emotion. At the same time, the personal-awareness level informs the meta-meta level that represents the social level of meta-cognition. This level comprises only meta-cognitive judgments about the one's and others' ME, MK and MS; it is informed by self-awareness at the personal level, as well as by information received from the ongoing interaction with others. Monitoring at this level is explicit and can take the form of reflection. It leads to a socially shared and
negotiated representation of the person-in context. Control at this level is exercised in a
conscious analytic mode and its access to one's own and others' cognition and affect at
the object level is through the personal- awareness level of the interacting persons.

1.2.13 Assessment of Meta-cognition

Assessment of meta-cognition is a highly problematic task. The study of meta-
cognition is heavily dependent on the development of valid measuring instruments and
specifically appropriate tasks to measure meta-cognitive ability. The complexity of this
task arises from two main sources, first the lack of a generally accepted conceptualization
of what really the construct means and second the fact that the meta-cognition is an inner
awareness or process rather than an overt behaviour and consequently individuals
themselves are often not aware of these processes. However, many methods for the
assessment of meta-cognition are being used as mention below.

1. Questionnaires
2. Interviews
3. The analysis of think aloud protocols
4. Systematic observations
5. Stimulated Recall
6. On-Line Computer Log file registration
7. Eye-movement registration
8. Reflect when prompted
9. Multi-method assessment

All these assessment methods have their pros and cons. For instance, Questionnaires
are easy to administer to large groups while scores on these questionnaires hardly correspond to actual behavioral measures during task performance. Results obtained through oral interviews have been questioned. Brown (1980) suggested that there is often a gap between what children say they know and how they perform. The think aloud protocols require individual assessments. In this method participants are asked to talk aloud during thinking, problem solving and/or learning and these verbal protocols are analyzed by means of coding schemes. This method has two problems. The first one refers to the question of the reactivity of the method: Is the process of thinking altered throughout the method of think aloud because thinking aloud needs resources of
the cognitive system that could otherwise be used for the primary task? The second problem refers to the completeness of the verbal protocols: Are the protocols obtained by think aloud procedures complete or is any information about the cognitive processes missing? Systematic observational methods have three advantages. First, such methods record what learners actually do, rather than what they recall or believe they do. Second, they allow links to be established between learners' behaviours and the context of the task. Finally, particularly crucial for young children, they do not depend on the verbal abilities of the participants. However, observational method contains methodological difficulties. It requires coding framework to identify verbal and non-verbal indicators from the videotaped events. When assessing meta-cognitive skills during hypermedia learning, concurrent assessment could be conducted with systematic observation via log file or eye movement analysis or verbalization methods. Data from the recording of eye movements lie somewhere in between, because they indicate what part of the screen the person is looking at, similarly to log-files, the data render no information about what comes to the mind of the person while looking at the information presented on that part of the screen. So that, data from log-file and eye movement register methods need more interpretation by the researcher.

Thus, each method has its own advantages and disadvantages. One clear distinction in assessment methods pertains to off-line versus on-line methods. Off-line methods are presented either before or after task performance, whereas on-line assessments are obtained during task performance. On-line methods appear to be more predictive of learning performance relative to off-line methods, even when the latter are administered retrospectively to task performance. In order to measure meta-cognition more accurately it has been suggested that researchers should use Multiple Methods that do not share the same source of error.

1.3 ACADEMIC ACHIEVEMENT

Academic achievement has always been one of the most complex and controversial issues in education. It has always been the crucial point and the focus of numerous researchers and the topic of many government reports not only in our country but in most of the developed and developing countries of the world also. In India, Kulkarni (1970) conducted the first major study on achievement survey in mathematics
covering the three levels of education, viz., end of primary (grade V), end of middle (grade VIII) and end of secondary stage (grade X.) in 15 states. Dave (1988) and his colleagues conducted an evaluation of achievement of primary school children studying in classes I to IV in 22 states/union territories in India. The Fourth Survey of Researches in Education in India, 1983-88 (Buch, 1991) reported a few studies addressed to the achievement at the primary stage. Most of these (83 per cent) were doctoral studies. Besides, all were based on small samples and confining to a limited geographical area. The same pattern of researches continued as indicated in Fifth Survey of Educational Researches (Dave and Murthy, 1993). Shukla (1994) conducted another study to find out the level of attainment of primary school children in various states in India. In the common terminology, academic achievement refers to the level of attainment in various subjects as indicated by marks or grade points. It may be the attained ability to perform school tests. Thus, academic achievement refers to marks or grades obtained in subject taught in school after an examination, be it written or oral. It is universally accepted that marks serve the basis of classification and certification, motivation and measurement of educational performance. Academic achievement also means the attained level of students functioning in the school task such as languages, mathematics, science etc. as shown by school marks.

Achievement in the educational situation has frequently been referred to as academic achievement or academic attainment. The term academic achievement signifies various aspects of learning as “Ability to learn” (Titlon 1949), “Academic aptitude” (Traverse, 1949), “Measures of motivation” (McCleland 1953), “Level of aspiration” (Sawrey, 1958) and “Creative capacity” (Torrence, 1964). Dictionary of Psychology (Chaplin, 1965) defines educational or academic achievement as specified level of attainment proficiency in academic work as evaluated by the teacher, by standardized tests or by combination of both. According to Dictionary of Education (Carter 1959), “Academic achievement means the knowledge attained or skills developed in school subjects, usually determined by test scores or by marks assigned by teachers or both.”

Academic achievement is related to the acquisition of principles and generalizations and the capacity to perform efficiently. Assessment of academic
performance has been largely confined to the evaluation in terms of information, knowledge and understanding, certain manipulations of objects, symbols and ideas. Academic achievement is employed as a customary criterion to measure the level of knowledge, understanding and acquisition of skill. Yet, in spite of this one is still far from reaching an understanding of the actual process of academic achievement. With the result, current level of understanding the complexities of school achievement, especially at high school stage, falls far short of what is desirable.

There is no gain saying the fact that learning is not limited to mere acquisition of information, it also includes attitudes, interests, values, etc. Therefore, the acquisition of desirable characteristics is as much an achievement, as is knowledge of the principles of science or facts, world history or language and literature. Although achievement is used in this broad sense yet it is customary for schools and colleges to be concerned to a great extent with the development of knowledge, understanding and acquisition of skills (Narayana Rao, 1980). In other words, the learning which educational intimations concern them with is predominantly intellectual. This may be in part owing to the fact that in the intellectual field the teacher can be relatively more certain of achieving the objectives he had set for himself than in other areas or domains.

The teacher or the institution has certain objectives which are often stated as the development of desirable characteristics of personality. Though this is undoubtedly a worthy goal, it is doubtful whether anything beyond the most superficial change could be obtained with the small number of contact hours between the teacher and the taught in the school. Thus in practice, the objectives are necessarily restricted to the imparting of various types of subject-matter knowledge.

Teachers have always endeavored to measure the programme of their pupils towards desired education goals and objectives. The realization of the objectives is the touchstone for any system. If the achievement corresponds to the objectives, the system has justified its existence. Achievement tests in educational system are designed to assess the educational objectives. Such assessment reveals how far the objectives specified have been achieved. In this situation, when the focus is on the achievement of
objectives, teacher’s main concern is with the average students to increase the academic achievement of the students. The reason behind this is the cut throat competition in every sphere of life. Parents want that their wards to climb the ladder of achievement to as high a level as possible. This desire for a high level for achievement exerts a lot of pressure on the part of students, teachers, schools and the education system in whole. It seems that the whole system of education revolves round the academic achievement of students. Since the primary aim of an educational institution is to ensure that all its learners acquire the desired skills and knowledge (Aggarwal 2000), the quality of a school can be estimated by the extent to which students have acquired knowledge, skills, values and attitudes which refer to the actual learning outcomes. As academic performance is the scale of status of schools, so a lot of effort and time, of the schools are used for helping students to achieve high in academic endeavors. Therefore, in schools great emphasis is laid on academic achievement, right from the beginning of formal education. Thus, academic achievement holds a cardinal place in the field of education and is considered as the outstanding inducement for the progress of individuals. Academic achievement is the unique responsibility of all educational institutions to promote a wholesome academic development of the students. It helps the students to understand the hierarchy based on academic achievement. It is the most desirable outcome of school life. All the activities of school revolve around the academic achievement of the students. Administrators, educators, curriculum planners, teachers and students work to make teaching-learning process feasible for academic excellence. Academic achievement is an index of success of students’ performance, teachers’ efforts and significance of curriculum and educational objectives.

Since the 1960’s students’ academic performance is being assessed on a regular basis in developed countries. In India, however assessment of learning achievements has only recently begun. Learning can be measured along important dimensions related to the curriculum, either through classroom assessments-examinations, assignments etc. or through standardized achievement tests. Assessments by teachers are fraught with difficulties, since results may vary depending on teachers’ judgments. Thus standardized
achievement tests based on predefined standards are proved to be useful in assessing the skills and competencies acquired by pupils (Aggarwal 2000).

Though the goal of all educational programmes of every country is envisaged as maximizing the achievement of students, experience reveals that students do not attain the same level of success. With due recognition to individual differences in ability, interest and aptitude, it is evident that all children are not capable of reaching the same educational standard although all of them are quite capable of being improved upon. Consequently, attention is being increasingly focused by educators upon the causes that underlie variations in achievement. So, it is necessary to take a programme of quality improvement. In order to chalk out any meaningful programme of quality improvement, we shall have to first identify determinants of quality of academic achievement.

Academic achievement, as a matter of fact, is a very complex variable. It is the resultant of diverse factors acting and interacting in a variety of ways. The variables like career maturity, achievement motivation, self-concept, socio-economic status, intelligence, aptitude etc. are considered to be the significant determinants of the academic achievement of the adolescents. Various other organic and environment factors like gender, locality, type of institution, home environment, birth order etc. also determine the academic achievement of students. These cognitive and non-cognitive variables though basically and inevitably being a personal matter cannot be studied in isolation.

Heads of the institutions, curriculum planners, teachers and others who are involved in the task of helping students to achieve better would like to have knowledge of the extent of the influence, these correlates exert on achievement. Further, a synoptic view of the researches done would be of utmost importance to the educational researcher to enable him to explore greater depths in this, rather important area of achievement (Anand and Padma, 1989). Thus, in the present study an attempt is made in the direction of exploring the impact of emotional intelligence and meta-cognitive skills on the academic achievement of adolescent students for the present investigation.
1.4 JUSTIFICATION OF THE STUDY

There is a great need of educated persons in a country like India where government doing all his efforts to make it a developed country as soon as possible. And without proper education and achievement students cannot go a long. For this purpose the school can make a direct and vitally important contribution by raising the standard of achievement of students and reducing the problem of wastage and stagnation. So, there is a need to pay proper attention to the secondary school students specially. This is the period in which a child gets physical, emotional and mental maturity. About this time, there appears a sense of self dependence accompanied by a feeling of responsibilities among them. Thus we need to channelize their energies to attain the goal of education system.

Thus, academic achievement holds a central place in the field of education and is considered as the outstanding inducement for the progress of individuals. It is the unique responsibility of all educational institutions to promote a wholesome academic development of the students. It is the most desirable outcome of school life. All the activities of school revolve around the academic achievement of the students. Administrators, educators, curriculum planners, teachers and students work to make teaching-learning process feasible for academic excellence. academic achievement is an index of success of students’ performance, teachers’ efforts and significance of curriculum and educational objectives. Moreover emotional intelligence is an elevator of the academic achievement of the adolescents as it opens the avenues of better occupation and job opportunities. It has also been noticed that the performance of a student in the classroom is significantly correlated with meta cognitive skills.

Though the goal of all educational programmes of every country is envisaged as maximizing the achievement of students, experience reveals that students do not attain the same level of success. With due recognition to individual differences in ability, interest and aptitude, it is evident that all children are not capable of reaching the same educational standard although all of them are quite capable of being improved upon. Thus there is a need to know the factors which contribute towards high achievement and the factors which act as barriers to it. In the present study an attempt has been made to see
the effect of variables namely emotional intelligence and meta cognitive skills on the academic achievement of secondary school students.

The novelty and validity of the present problem for study justify with the time to study and explore the unknown so that progress of the secondary school students as well as of the nation can be accelerated. It will be helpful in producing their interest about their occupations and careers. Therefore, the investigator due to her interest in exploring the various factors responsible for the low achievement and high achievement of secondary school students considered it worthwhile to study the emotional intelligence and meta cognitive skills as determinants of academic achievement of secondary school students for the present investigation

1.5 STATEMENT OF THE PROBLEM

The problem may, therefore be stated as under:

“EMOTIONAL INTELLIGENCE AND META COGNITIVE SKILLS AS DETERMINANTS OF ACADEMIC ACHIEVEMENT OF SECONDARY SCHOOL STUDENTS”.

1.6 OBJECTIVES OF THE STUDY

Objectives Related to Emotional Intelligence

1. To study the effect of emotional intelligence of adolescents on their academic achievement.
2. To study the effect of emotional intelligence of male adolescents on their academic achievement.
3. To study the effect of emotional intelligence of female adolescents on their academic achievement.
4. To study the effect of emotional intelligence on the academic achievement of secondary school students belonging to rural area.
5. To study the effect of emotional intelligence on the academic achievement of secondary school students belonging to urban area.
6. To study the effect of emotional intelligence on the academic achievement of secondary school students studying in government schools.
7. To study the effect of emotional intelligence on the academic achievement of secondary school students studying in private schools.

B. Objectives Related to Meta-cognitive Skills

8. To study the effect of meta-cognitive skills of secondary school students on their academic achievement.
9. To study the effect of meta-cognitive skills of male secondary school students on their academic achievement.
10. To study the effect of meta-cognitive skills of female secondary school students on their academic achievement.
11. To study the effect of meta-cognitive skills on the academic achievement of secondary school students belonging to rural area.
12. To study the effect of meta-cognitive skills on the academic achievement of belonging secondary school students to urban area.
13. To study the effect of meta-cognitive skills on the academic achievement of secondary school students studying in government schools.
14. To study the effect of meta-cognitive skills on the academic achievement of secondary school students studying in Private schools.

C. Objectives related to Interaction effect of Emotional Intelligence, Meta-cognitive Skills and Academic Achievement

15. To see the interaction effect of emotional intelligence and meta-cognitive skills on academic achievement of secondary school students.

1.7 HYPOTHESES OF THE STUDY

Based upon the above mentioned objectives, the following hypotheses are formulated.

A. Hypotheses Related to Emotional Intelligence

H_{01} There exists no significant difference in academic achievement among secondary school students with high and low level of emotional intelligence.
Ho2 There exists no significant difference in academic achievement among male secondary school students with high and low level of emotional intelligence.

Ho3 There exists no significant difference in academic achievement among female secondary school students with high and low level of emotional intelligence.

Ho4 There exists no significant difference in academic achievement among secondary school students of rural area with high and low level of emotional intelligence.

Ho5 There exists no significant difference in academic achievement among secondary school students of urban area with high and low level of emotional intelligence.

Ho6 There exists no significant difference in academic achievement among secondary school students of government schools with high and low level of emotional intelligence.

Ho7 There exists no significant difference in academic achievement among secondary school students of private schools with high and low level of emotional intelligence.

B. Hypotheses Related to Meta-cognitive Skills

Ho8 There exists no significant difference in academic achievement among secondary school students with high and low meta-cognitive skills.

Ho9 There exists no significant difference in academic achievement among male secondary school students with high and low meta-cognitive skills.

Ho10 There exists no significant difference in academic achievement among female secondary school students with high and low meta-cognitive skills.

Ho11 There exists no significant difference in academic achievement among secondary school students of rural area with high and low meta-cognitive skills.
H_{012} \There exists no significant difference in academic achievement among secondary school students of urban area with high and low meta-cognitive skills.

H_{013} \There exists no significant difference in academic achievement among secondary school students of government schools with high and low meta-cognitive skills.

H_{014} \There exists no significant difference in academic achievement among secondary school students of private schools with high and low meta-cognitive skills.

C. \Hypotheses related to Interaction Effect of Emotional Intelligence, Meta-cognitive Skills and Academic Achievement

H^{015} \There is no significant interaction effect of emotional intelligence and meta-cognitive skills on academic achievement of secondary school students.

1.8 \OPERATIONAL DEFINITION OF KEY TERMS

Emotional Intelligence: Emotional intelligence (EI) is the ability to identify, assess, and control the emotions of oneself, of others, and of groups.

Meta-cognitive skills: Meta-cognitive skills may be defined as the skills of a student in terms of: (1) Self-planning; (2) Self-problem-solving; (3) Self-regulation; (4) Self-awareness; (5) Self-monitoring; (6) Self-evaluation; and (7) Self-reflection.

Secondary School Students: Students studying in class IX are considered as secondary school students.

Academic Achievement: The marks obtained by the students of class IX in the achievement test based on the IX class science syllabus are considered as their academic achievement in science.

1.9 \DELIMITATIONS OF THE STUDY

This study includes following delimitations:

1. The students of IX classes will be included in the study.

2. Only IX class students of secondary schools in Panipat district will be taken up.
3. The study will be delimited to four components of Meta Cognitive skills i.e. self-awareness, self problem-solving, self regulation, and self-evaluation.

4. The study will also be delimited to the academic achievement of science subject only.

5. The study will include the relationship as well as comparison of emotional Intelligence, meta-cognitive skills and academic achievement in science.

1.10 CHAPTERISATION SCHEME

Out of six chapters, Chapter I is Introduction, which includes Need of the study, Variables involved, Objectives, Hypotheses and delimitations of the study. Chapter II is devoted to the Review of the Related Literature. In Chapter III, the Design of the Study, Sample, Tools, Procedure and Statistical Techniques have been presented. Chapter IV deals with the Analysis and Interpretation of data along with the Discussion of Results. In Chapter V, the Findings, Educational Implications of the study and Suggestions for Further Research have been given. Chapter VI is devoted to the Summary of the study.