Chapter 3

REVIEW OF RELATED LITERATURE

3.1 LITERATURE RELATED TO APPROACHES TO STUDYING

3.2 LITERATURE RELATED TO STRATEGIES THAT PROMOTE DEEP LEARNING
INTRODUCTION

The review of related literature plays a significant role in any piece of research work. Mouly (1964) in his work ‘The Science of Educational Research’, mentions the study of related literature as a crucial step which invariably minimizes the risk of dead ends, rejected topics, watershed efforts and trial and error activities engaged in by previous investigators. Related literature has a vital role in planning and preparing the research materials. John W. Best (1995) remarked: “A brief summary of previous research and the writings of recognized experts provide evidence that the researcher is familiar with what is already known and what is still unknown and untested.”

According to Good, Barr and Scates (1954), review of related literature serves the following important functions:

1. To know whether the evidence already available solves the problem adequately without further investigation, and thus to avoid the risk of duplication.
2. To provide ideas, theories, explanations or hypotheses that are valuable for the formulation of the problem.
3. To suggest methods of research appropriate to the problem.
4. To locate comparative data useful for the interpretation of results.
5. To contribute to the general scholarship of the investigator.
Thus, the review of related literature provides the researcher a firm platform for conceptualising the research design and method for the conduct of the study. It helps the researcher to know about the tools and techniques that proved to be useful and promising in the previous studies. The related literature also has the advantage of providing insight into statistical methods. The researcher can also avoid unfruitful and useless problem areas and select those areas in which positive findings are very likely to add to knowledge in a meaningful way. It is of no use to replicate a study when the stability and validity of its results have been clearly established.

The importance of the review of related literature is to know about the recommendations of previous researchers for further research, which they have listed in their studies. The investigator referred the Encyclopaedia of Education, Educational Surveys, Journals of Education, Educational Yearbooks, Dissertations, and Research Abstracts to make a review of the literature related to the present study. The literature reviewed are organised and presented under the following sections.

3.1 Literature related to Approaches to Studying
3.2 Literature related to Strategies that promote Deep Learning

The details of the literature reviewed follow.
3.1 LITERATURE RELATED TO APPROACHES TO STUDYING

Approaches to study extend our understanding about how students learn the academic material in the classroom. Children may vary not only in their capacities for learning but also in the ways in which they approach the given task. In simple terms, approaches to studying are the ways in which individuals approach a learning material. It is based on a motive or intention that provides the general direction.

Kevin (2010) studied the effect of engagement and perception of course value on Deep and Surface learning strategies. It was concluded that Surface learning strategies occur when the students’ perception of course value is low, and that Deep learning strategies occur when the students’ perception of the course content is high.

Robertson (2010) conducted a study to test the integration of multimedia assessment activity in a diploma of events. The results of the study indicate that multimedia assessment promote Deep learning.

Marshall (2009) conducted a study on Deep and Surface learning approaches. The findings of the study lead to the conclusion that high workload, unclear goals, and a focus on examinations promote Surface learning approach, whereas support, structure cohesion focus on Metacognitive development and independent learning are likely to promote a Deep leaning approach.
Mimirinis, Bhattacharya and Madhumita (2007) in their design of Virtual Learning Environment (VLE) for Deep learning reveal that the relationship between approaches to learning and perception of use of VLE is higher in education. The results of the study show that there is a significant relationship between approaches to learning and the use of VLE.

Hay and David (2007) conducted a study on using concept maps to measure deep surface and non-learning outcomes. The study reports the use of concept mapping to reveal patterns of students learning or non-learning in the course of masters level teaching for research methods. The results show that deep, surface and non-learning are tangible measures of learning that can be observed directly as a consequence of concept mapping.

Wilding and Andrews (2006) found that students employ either deep or surface strategies depending on the demands of the tasks. The study shows that consistent relations are associated with altruistic life goals and the surface approach associated with wealth and status in life as goals.

Aharony (2006) studied the use of deep and surface learning strategies among students learning English as foreign language in Internet environment. The sample consisted of 140 Israeli students. The results show that the students of medium to high socio
economic status use both learning strategies more frequently than those of low economic status.

**Biggs (2003)** conducted a study on Learner Centred Learning (LCL), Deep and Surface learning and reported that Surface approach to learning comes with minimum trouble while appearing to meet course requirements. It was also reported that Deep approach to learning comes from a felt need to engage the task appropriately and meaningfully, which results in students’ use of the most appropriate cognitive activities for handling it.

**Pimparyon et al. (2000)** examined the relationship among students’ approaches to learning, their perception of the educational environment and their academic achievement using the Approaches to Studying Questionnaire [ASQ] and the Medical Education Environment Measure [MEEM]. The study reports the usefulness of using these two instruments as diagnostic measurement tools. It was also found that learning outcomes were enhanced at a health care professional institute.

**Richardson et al. (1999)** investigated study approaches of students in upper-division distance learning courses at British Open University. It was found that study approaches of upper division students were affected by background variables and these variables were more closely related to the aims of higher education
than to those found among lower division distance-education students.

**Kumar (1997)** investigated the difference in approaches to studying and learning style between high achievers and low achievers in secondary school biology students. The sample comprised 350 IXth standard students and the results reveal that significant differences exist between high and low achievers based on their approaches to studying. **In 1998, Kumar** studied the impact of approaches to studying and cognitive style on achievement in biology of 700 secondary school pupils. The results indicate that approaches to studying have significant effect on achievement in biology.

**Fogarty and Taylor (1997)** administered the Approaches to Studying Inventory to 503 adult students most of whom returned to study after a gap of many years. The results of the study suggest that learning is fundamental and unidentifiable in students to study after long absence.

**Provost and Bond (1997)** administered a short version of the Approaches to Studying Inventory to 169 college students of psychology department. The findings reveal that scores for meaning orientation did not predict academic performance in any way, whereas there was a very small negative correlation between reproducing orientation and academic achievement.
Jones and Jones (1996) investigated the relationship between teaching method and approaches to study (surface, deep and achieving) of 46 college students. The results indicated that while students preferred the conventional lecture method, it did not correlate with their study approach. Besides none of the methods were found to be more effective.

Kember (1996) also examined the interrelationship between workload, study time, learning approaches and academic outcomes. The sample consisted of 174 mechanical engineering students at Hong Kong University. The findings indicate that the variables were weakly interrelated.

Pillai and Kumar (1996) explored the casual relationship of intelligence, cognitive style, approaches to studying and achievement in secondary school biology students. The sample consisted of 700 IXth standard students. The findings of the study indicate that approaches to studying have a direct effect on achievement in biology. Another study conducted by Rehna (1996) on the interaction effect of learning and approaches to studying on achievement in biology of 700 IXth standard students shows that the effect of learning style on achievement in biology was significant. But none of the F-value in either dimensions of Approaches to studying turned out to be significant.
Abouseire (1995) in a study of 135 undergraduate students suggested that student personality traits, in general, and their self-esteem and achievement motivation, in particular, have a substantial influence on their approaches to study and levels of knowledge processing.

Bolen et al. (1995) assessed the factorial structure of Study Process Questionnaire [SPQ] with 532 U.S. students and found that surface approach, like deep approach, was goal-oriented but attempted to get it with minimum work.

Pillai (1995) conducted a study on the influence of cognitive style and approaches to studying on process outcomes in physics of 500 students of standard IX. The effect of cognitive style and approaches to studying on process outcomes in physics was found significant.

Prasad (1995) investigated the interaction of approaches to studying and achievement motivation on process outcome in physics of 480 secondary school pupils and found that the effect due to approaches to studying on process outcomes in physics was not significant.

Kember (1995) investigated the study habits and approaches to study of 34 mechanical engineering students. It was found that use
of a surface approach to learning was positively correlated with higher attendance and greater study time.

Richardson (1995) conducted a study by comparing the study skill of 38 adult and 60 lower division students in the same course. It was found that older students had significantly higher scores on meaning orientation and lower scores on reproducing orientation and educational attainment of the lower division students. He also found that study approaches of adult students were affected by background variables and were more closely related to the aims of higher education than to those found among lower division students.

Asmali and Anilkumar (1992) examined the Studying Approach of science and Socio-economic Status of 700 secondary school pupils. The study revealed that significant sex difference and locale difference exist in science studying approach.

Ekins (1992) examined the Skills and Approaches to Study of 549 undergraduates from Hong Kong using Biggs Study Process Questionnaire (SPQ). In the study, Ekins revealed that there are three dimensions to students’ Approaches to Study, viz. Surface, Deep and Achieving. The study concluded on the note that deep motivation was a key to success.

Emilia and Mutholland (1992) used the Lancaster Approaches to Studying Inventory in a Factor Analytic study. They found strong
resemblance in the factor of meaning and reproducing orientation. There were differences in strategic and non-academic orientation factors.

**Mayer and Dunne (1992)** compared the Approaches to Learning of 45 failing and 221 achieving college students by examining related contextual and approach variables. The results revealed that the Approaches to study of failing students were found difficult to interpret. It was concluded that the combined set of contextual variables explain significantly more of the variations in study approaches than the set of conventional variables.

**Scheck and Brenstein (1992)** investigated qualitative and quantitative cognitive functioning, which affect student learning in terms of their Approaches to study. The findings suggest that the origin of different styles or approaches show how perceptions and motivation interact to shape experience.

**Tooth et al. (1992)** studied the relationship between Study Approaches and Performance of medical students. The findings indicate that medical students do not use Surface approach but increasingly use Deep and Strategic approaches. They concluded that as Surface learning was correlated with poor performance, it would result in poor sectionals examination performance.
Wong (1992) conducted a survey of 89 on-campus and 50 teleconferencing students and the report of the study showed that external students had higher scores since they used deep approach, intrinsic motivation and interrelating ideas whereas, internal students scored low due to fear of failure, surface approach and extrinsic motivation.

Boujaude and Giliano (1991) explored the relationship between the approaches to studying and formal reasoning ability, prior knowledge, gender and achievement in chemistry of 199 students in New York State. The results showed that meaning orientation accounted for 32 percent of the variance on the final scores.

Trigwell and Prosser (1991) studied the relationship between Approaches to Studying and Quality of learning outcomes. One hundred and twenty two final year nursing students were chosen as subjects. The correlation and factor analysis of the results indicate a positive relationship between the variables.

Duckwall (1990) surveyed 100 fishermen University students using the Lancaster Approaches to studying Inventory to study the effect of different Approaches to Learning and their success. Analysis of results revealed that there was some relationship between Approaches to Learning and Academic success.
**Beina (1989)** examined the influence of Science Learning Environment and Science Learning Approach in predicting Achievement in Biology on 675 class IX students. The results indicated a significant positive correlation between Science Learning Approach and Achievement in Biology.

**Naseema (1989), Majeedu (1990) and Jayasheelan (1992)** conducted studies on the effect of science learning approach and achievement in Science. Naseema’s and Jayaseelan’s study show a positive relationship between science learning approach and achievement in Science whereas Majeedu’s study revealed that there is significant difference between science knowledge and learning Approaches.

**Entwistle, Waterston and Brown (1988)** investigated approaches to studying and levels of processing in 117 science and 101 art students at the university level. Results revealed that there was greater correlation between Surface approach and Elaborative processing. While interpreting the factor analysis from the Approaches to Studying Inventory, Waterston and Brown reported that students who score high have a Deep level outcome.

**Hattie and Watkins (1988)** explored the Preferred Classroom Environment and Approaches to Learning of 1266 Australian secondary school students. Results indicate a relationship between Approaches to Studying and learning outcomes. They also
examined the approaches to learning of secondary school students and reported a positive correlation between the subjects’ learning levels of self-esteem and their perceptions on the learning environment as related to both Deep and Achieving approaches to Learning. Subjects with more versatile learning Strategies were also more academically successful.

**Uzhunnan (1988)** conducted a comparative study of Science Learning Approach and Science Learning Environment among High, Average and Low creative groups of 600 pupils of standard IX. The results indicate the existence of significant difference in Science Learning Approach among these groups.

**Watkins et al. (1986)** examined the learning processes of 212 male and 213 female Filipino students. The findings revealed that a deep level, competitive and well-organized approach was related to academic success. It also reports a positive correlation between the subjects’ level of self-esteem and their perceptions of the learning environment as related to Deep approach to learning. Subjects with more versatile learning strategies were also more academically successful.

**Biggs and Collis (1982)** in their study on learning outcome, has developed a classification scheme called the SOLO [Structure of Learning Outcome] – a taxonomy to assess the quality of learning outcomes of students by using a predetermined set of five categories, viz. pre-structural, uni-structural, multi-structural,
relational and extended abstracts. This categorization is made taking into account the quality of thinking and levels of understanding.

**Biggs (1979)** in his study regarding ‘Approaches to Learning’ attempted to find out the students’ approach towards their academic studies. His research findings showed that individual differences occur in learning approaches and that approaches to learning can be reduced into two, namely Deep and Surface. Biggs also developed a Study Process Questionnaire [SPQ] that was widely used in Australia and elsewhere to measure students’ approaches to learning. It included 10 uni-dimensional scales to assess the study processes of higher education students. These dimensions are Academic Motivation, Neuroticism, Pragmatism, Internality, Study Skills, Rote Learning, Meaningful Learning, Test Anxiety, Openness and Class Dependence. When the factors were analysed, the SPQ showed a stable second order structure consisting of three dimensions, viz. Reproducing, Internalising and Achieving.

**Entwistle and Robinson (1979)** conducted a study on the approaches to learning and they conceptualised that, each of the two approaches are sub-divided into two, depending on the degree of attention and involvement shown by the student. Thus, they concluded that four categories could be described such as deep active, deep passive, surface active, and surface passive. They also
developed a scale of A S I consisting of 30 items and included 6 components in the scale such as Achieving orientation, Reproducing orientation, Comprehension learning, Operation learning, Improvidence and Globetrotting.

Schameck’s (1977) study concentrated on approaches to learning. He distinguished between Deep and Surface levels of study processing. He discovered that elaborate processing is equivalent to Deep approach and that retention of facts is similar to Surface approach. He also developed an Inventory consisting of 62 items relating to Learning Process [ILP]. It was a self-reporting inventory derived from the theoretical basis of cognitive psychology to assess individual difference in learning process. It categorizes four main factors, viz. surface processing, disorganized study method, fact retention and elaborate processing.

Marton (1976) and Svensson (1977) were concerned about how students learn the day-to-day task of reading. In their studies, they focused on the reading process of the students and its relation to the levels of understanding reached. They examined the differences in the type of understanding reflected in pupils and their approaches towards the learning materials. They concluded that phenomenography is the description of student’s experiences of learning and the various processes were categorised and then grouped together as clusters of similar ways of teaching or learning task.
**Pask (1976)** in his study regarding learning process, identified that a potential danger may probably occur when learners resort to any of the styles of learning such as serialising. When the learner engages in the learning process adapting any of the suitable styles of learning, two phenomena may occur as a dangerous sub-product of learning, viz. jumping into unsubstantiated conclusions readily and/or over cautiousness about the minor aspects in the learning materials. He concludes that both of these phenomena are dangerous in the sense that they will decrease the quality of understanding derived by the learner.

**Kelly and Freire (1970)** highlighted the difference in individual perception and response to events. According to them events and concepts are only meaningful when viewed from an individual perceptive, and learners have a personal perception of the world, so that their personal meaning and construction can only be comprehended in their unique personal and social contexts.

### 3.2 LITERATURE RELATED TO STRATEGIES THAT PROMOTE DEEP LEARNING

The literature reviewed in this section pertains to five learning strategies that promote Deep Learning, which are presented under relevant sub sections.
A. Literature Related to Cognitive and Metacognitive Strategies

**Andrew (2010)** conducted a study on the influence of Cognitive and Metacognitive strategies on Deep learning and concluded that Metacognitive Strategies help children of all ages to develop highly critical cognitive functioning ability, which results in Deep understanding and develops problem solving abilities.

**Shun (2010)** conducted a study on the task and self-regulated pathways to Deep learning and also on the mediating role of achievement goals, classroom attentiveness, and group participation. The sample comprised 1,476 ninth grade students from 39 schools in Singapore. The study concluded that the task and self regulated pathways on the basis of Metacognitive strategy promote students to learn.

**Myrtle (2009)** studied the effect of Metacognitive Cooperative Learning Approach on Mathematics Achievement of 65 Higher Secondary School students. The results of the study show that there is a positive effect on the Metacognitive Cooperative Learning Approach is significantly more effective than traditional method on the Achievement in Mathematics with respect to low Achievers.

**Darling et al. (2008)** conducted a study on the effectiveness of Metacognitive strategies on student learning by
a) predicting outcome which helps students to understand how to solve a problem successfully.

b) evaluating work which help to determine where their strengths and where their weaknesses lie when they study.

c) questioning by teachers also helps to rethink their learning.

It was concluded that the first two could be used in higher classes.

**Estell (2008)** conducted a study to understand the relationship between peer discussions and self-regulated learning. Eighty-eight first year high school students answered questions from the Motivated Strategies for Learning Questionnaire and reported the perceived frequency of discussions with peers both inside and outside the classroom regarding self-regulated learning. The results of the study suggest that differences exist between the frequency of self-regulation discussions with peers from inside and outside the classroom, especially for discussions concerning motivation.

**Martin and Alexander (2008)** investigated the relationship between Deep learning and the use of self-regulated learning. Biology students (n = 25) and humanities students (n = 26) were used as sample. The results of the study indicate that students do metacognitively calibrate their learning process to the complexity of the presented learning material, e.g. by processing more complex
deeper-level modes longer. Furthermore, these calibration processes were significantly related.

**Nelson and Conner (2008)** conducted a study to investigate the influence of Metacognition on various stages of learning. It was concluded that the main struggles that the students face in trying to develop an understanding of Metacognition is the lack of awareness to their learning process. Students even at the rudimentary level, have some basic understanding of their own knowledge and thinking.

**Lorenzo and Catherine (2008)** conducted a study to develop Metacognitive skills through collaborative model. Through their study, they provided a platform for constructing common vocabulary and shared understandings. They, then, introduced the model of Metacognitive skill and described difficulties in learning and executing the skill. Based on this model, they also proposed a learning support environment where learners develop their Metacognitive skills through collaborative learning.

**Christopher (2007)** conducted a research on Metacognition which points out the crucial role of on-line methods when endeavouring to conduct valid assessments of metacognitive skills. Presently, different on-line methods are used in the study. Thus, the aim of this study is to quasi-experimentally analyse the effects of two on-line verbalisation methods on learning performance. By means of
the thinking-aloud method, students in one experimental group
(n=24) was used as a sample. The study concluded the crucial
role of on-line methods in developing metacognition.

Marcantonio (2006) conducted a study on “Metacognition as a
mediator of the effect of test anxiety on surface approach to
studying. This study investigated the role of Metacognition as a
mediator of the effect anxiety on surface approach to studying”.
The following scales were completed by 109 undergraduate social
science students: Approaches and study skills Inventories,
Metacognition Questionnaire, and Test anxiety scale were developed
for this study, and it was observed that there is a positive
correlation between test anxiety and surface approach. Significant
correlations were also found between four of the five dimensions of
Metacognition and a surface approach to studying.

Lajoie and Azevedo (2006) conducted a study to see “how
computer learning promotes Metacognition”. The study reveals that
Computers and technology-rich environments afford the learner
richer opportunities for the type of interactions that would support
Metacognition, self-regulation and self-regulated learning. The
digital environment may stimulate the mind by scaffolding learning.
Technology-rich environments can be designed with cognitive tools
that model human behaviour or provide complex simulations that
learners can attend to and learn.
Ponnusamy (2005) investigates the impact of Metacognitive strategies among lower achievers in secondary schools. A research was conducted using a quasi-experimental design with pre- and post-tests. A total of 90 students were selected and they were divided into three groups. The first experimental group was taught Metacognitive and problem-solving strategies while the second experimental group received only Metacognitive strategy. The control group was taught using traditional strategies. Two teachers were trained by the researcher to teach Metacognitive and problem solving strategies for a period of one month. The experiment was carried out for 15 weeks. The aim of the research was to investigate whether Metacognitive strategies have an impact on teaching and learning. The results revealed that the group which received Metacognitive and problem solving strategies out-performed the other two groups in objective, subjective and essay tests, reported higher Metacognitive awareness, used more Metacognitive strategies during problem solving, attained higher Metacognitive knowledge and could answer more higher level cognitive questions. With regard to attitude, both the experimental groups showed more positive attitude towards the learning of History compared to the control group. The study showed that Metacognitive and problem solving strategies could have a significant impact on learning, Metacognitive awareness and Metacognitive knowledge. Also, the
ability to use and reflect on Metacognitive strategies during problem solving can bring about a positive attitude towards the learning of History and the ability to answer higher-level cognitive questions.

Mark (2005) after conducting a study on Metacognition concludes that Self-regulated learning involves learning strategies and mental processes that learners deliberately engage into help themselves learn and perform better academically. The results of this study provide empirical support for the theoretical relationships among cognitive evaluation theory, achievement goal theory, and self-regulated learning strategies in the context of the classroom. Superficial learning strategies were linked to extrinsic motivation, while intrinsic motivation determined deep cognitive and Metacognitive strategy usage. Findings suggest that active application oriented experience delivered by enthusiastic faculty, who provide high interaction, supportive feedback, and clear goals will increase intrinsic motivation and the use of self-regulated learning strategies.

Martin (2005) in the study on the ‘Use of cognitive strategies by high school social studies students’ reveals that cognitive strategy increases the student’s knowledge and motivation. Furthermore, it suggests that teachers need to stress the relevance of cognitive strategies to students and require more high level thinking on class work and exams.
Steven (2005) conducted a study on “Using Metacognitive Strategies and Learning Styles to Create Self-Directed Learners”. After analysing the data from student lab journals and Metacognitive forms, four themes were apparent and included the connection between learning styles, Metacognitive strategies, self-assessment, and student motivation. Firstly, the connections between student’s learning styles and preferred metacognitive strategies were determined. Finally, the concept of motivation, related to Metacognition and the self-directed learner were determined.

Tracey et al. (2005) aimed to find out “the influence of Metacognitive activities in the development of deep learning approach, reduction in surface approach, and enhancement of individual learning self-efficacy”. Method Participants were first-year medical students (N = 213). A pre-test, post-test design was implemented with intervention and control cohorts, students experiencing a program of Metacognitive activities within their PBL tutorials of at least 20 weeks duration. All students completed the Medical Course Learning Questionnaire at the commencement on the completion of the study. Results show that there was a statistically significant association between high self-efficacy and deep learning approach, with older students over-represented in the group of efficacious deep learners. But the first-year medical
students lost self-efficacy and moved away from deep-strategic learning approaches and hence, on them the program of Metacognitive activities failed.

**Peirce (2003)** conducted a study on Metacognition and concluded that Metacognition affects a student’s motivation to learn because it directly affects attribution and self-efficacy.

**Anderson (2002)** in his study finds out that, developing Metacognitive awareness will lead to the development of stronger cognitive skills, and proposed five main components for Metacognition. These include preparing and planning, selecting and using learning strategies, monitoring, orchestrating various strategies, evaluating the strategy and learning.

**James (2001)** examined the relationship between mastery goals, performance goals, Metacognition, and academic success. Regression analyses revealed a partial mediation effect in the relationship between mastery goals and academic performance. Performance goals were unrelated to academic performance. This study supports research findings suggesting that students with mastery goals reap the rewards of academic success.

**Lin (2001)** in a study on Metacognition investigates two main approaches, which promote Metacognition:
➢ Strategy training, and

➢ The creation of a supportive social environment for Metacognition.

**Zhang (2001)** has adopted an approach and investigated second language learners' Metacognition or Metacognitive knowledge. In addition to exploring the relationships between learner Metacognition and performance, he was also interested in knowing the effects of Metacognitive oriented strategic instruction on reading comprehension. He concludes that by using Metacognitive strategy the students reach a deeper level on reading comprehension.

**Cennamo and Ross (2000)** investigated techniques for supporting college students Metacognition within a core course in child development. The course incorporated web-based instructional elements as ancillary instruction. Nine Metacognition strategies were the focus for the development of the web page. This study revealed that students wanted the site to include the capacity to monitor grades online, a goal checklist and elaborate feedback in listing situations. Students’ self-efficacy and self-regulating increased and anxiety decreased overtime.

**Dawn Rickey and Angelica (2000)** conducted a study on the role of Metacognition in the learning of chemistry. Their study discusses Metacognition, as thinking about one’s own thinking, and
further suggests the role in conceptual change and problem solving in chemistry. It also shows that promoting Metacognition in the science classroom prompts students to refine their ideas about scientific concepts and improves their problem-solving capacity.

Shimamura (2000) conducted a study on Metacognition and concluded that Metacognition is knowledge (i.e. awareness) of one's cognitive processes and the efficient use of this self-awareness to self-regulate these cognitive processes. It is traditionally defined as the knowledge and experiences we have about our own cognitive processes.

Stallworth-clark et al. (2000) investigated the association between college students’ engagement at learning strategies and their academic performance in a freshman psychology course. The risk students who received cognitive strategy instruction earned grades similar to regularly admitted students. All students graded in psychology course had a high positive correlation with levels of self-efficacy for academic learning in college; the linked and regularly admitted students, graded in the course had a high positive correlation with levels of cognitive processing and efforts management.

Boekaert's (1999) in his research on metacognition investigates that Self-regulated Learning plays a major role in understanding classroom learning processes and facilitating the intellectual development of the child.
Schwartz and Bransford (1999) conducted a study on the influence of social environment in developing Metacognition. Further, they contended that monitoring and revising become more motivating when there is a public audience to evaluate and judge students' working and thinking. Thus, the study concluded that Metacognitive experience through supportive social discourse is regarded as an important aspect of Metacognitive development which leads one towards deeper level of understanding.

Dejong and Vanjoolingen (1998) conducted a study on the Metacognition and its importance in inquiry learning of software in which they investigated that Metacognition intended to offer the students an opportunity to engage in genuine, self-directed inquiry in software learning to find out what they think if they are to engage in meaningful inquiry.

Harackiwicz et al. (1998) made a study on Cognitive strategy upon high school students and reported that performance goals are positively associated with superficial, rote rehearsal strategies and are unrelated or negatively associated with deep level processing.

Graham’s (1997) research reveals that the use of Metacognitive strategy is important because they help us to recognise which strategies are the most effective in learning. He suggested that Metacognitive allow the students to plan, control and evaluate their learning, and play a central role in the improvement of learning.
Jones and Carr (1997) conducted a study to see the “Use of Metacognitive strategy in high school social studies students”. They discovered that metacognition could be recognised by its potential to improve and refine the educational process since it involves other processes, which help students’ performance at higher level of reasoning.

Halpern (1996) conducted a study on cognitive strategy Instruction and came to a conclusion that, CSI is based on the assumption that there are identifiable cognitive strategies, previously believed to be taught to most students but utilized by only the best and the brightest students.

Livingston (1996) conducted a study on Metacognitive strategy in which he points out that simply providing knowledge without experience or vice versa does not seem to be sufficient for the development of Metacognitive control.

Williams (1996) in his study identified some specific self- regulated learning strategies students’ use as they move toward higher academic achievement. In the study Williams discovered that a surprisingly similar pattern was uncovered in which ‘remembering information presented in class and text books’ and organising schoolwork uniformly affected achievement across content areas. The influential strategies uncovered here involve skills that may be amenable to further development through training and practice.
Bielaczyc and Brown (1995) used modeling to provide Metacognitive supports for college students to learn computer programming. They employed video technology to model effective learning strategies employed by the good problem solvers in the domain of LISP (list processing) programming. The interventions were carefully designed and structured so that students could use effective Metacognitive strategies to gain a deep understanding of the instructional materials before moving to the problem-solving stage. Students were exposed to specific Metacognitive strategies and received explicit training in their use. In the video, the good problem solvers modeled strategies, including explaining instructions to them, determining both the form and meaning of programming code, are monitoring positive states of comprehension, clarifying confusions, and taking action to address comprehension failures.

Dominowski and Rellinger (1995) conducted a study on the use of Metacognitive activities on high school students based on different levels of intelligence and discovered that when students are engaged in Metacognitive activities (e.g., self-assessment, self-explanation, monitoring, or revising), their learning is enhanced. Weaker students are found to benefit even more than stronger students from such activities. However, students do not spontaneously engage in Metacognitive thinking unless they are explicitly encouraged to do so through carefully designed instructional activities.
Garcia (1994) articulates self-regulation in terms of knowledge and beliefs, strategies used, and outcomes. Each of these is moderated by motivational and cognitive components such as personal beliefs and conceptual knowledge, motivational and cognitive strategies, and quantity and quality of effort. Common to both models is an integration of both affective and cognitive issues. The following figure represents a synthesis of the above frameworks. It not only accommodates the role of both affective and cognitive aspects of Self-Regulation, but also acknowledges the effects of external environmental factors upon an individual's ability to regulate his learning. Self-Regulation is viewed here as the intersection of self-awareness at both a rational and emotional level which is presented in Figure 3.1.

**Figure 3.1**

GARCIA’S MODEL OF SELF-REGULATION

→ Meta Cognition → Self Concept
→ Self Monitoring → Motivation
→ Volition Control
Gertz (1994) conducted a study on the effectiveness of cognitive and Metacognitive strategy on middle school, junior school and high school students. In his study, he suggests that strategies are important in reading to learn and can be applied to enhance text processing. Common studying strategies include underlining, outlining, note taking, summarizing (cognitive strategy) and self-questioning (Metacognitive strategy). Many of these strategies are complex and best handled by older and more experienced readers. The study further concludes that the performance of the students of middle school, junior school and high school are trained to use specific studying strategies.

Roberts and Erods (1993) conducted a study on Cognitive and Metacognitive strategy to see the college students’ engagement of these strategies, in which they point out those Metacognitive experiences usually, precede or follow a cognitive activity. Moreover, students use Metacognitive strategy when cognitions fail, such as the recognition that one did not understand what one just read. Such an impasse is believed to activate Metacognitive processes as the learner attempts to rectify the situation.

Schmitt and Hopkins (1993) conducted a study on approaches of teachers towards teaching Metacognitive skills. The study reveals that the decision a teacher makes about teaching Metacognitive skills is based on what serves his or her students best. Applying some of the
strategies suggests that it may be appropriate when working with younger, inexperienced readers. The study describes how to incorporate comprehension strategies into basal reading instruction to promote Metacognition before, during and after reading.

**Scheid (1993)** conducted a study on the relevance of cognitive strategy instruction on the high school students and came to the conclusion that 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 strategic, self-reliant, flexible, and productive in their learning endeavours.

**Carter (1992)** studied the relationship between learning strategies and academic achievement and reported that partially improved academic achievement would be facilitated by using self regulated (Metacognitive) learning strategy.

**Garcia and Pintrich (1992)** conducted a study on “Critical thinking and its relationship to motivation learning strategies, and classroom experience”. In their study they concluded that critical thinking, intrinsic goal orientation, rehearsal, elaboration and Metacognitive self regulatory strategies are positively correlated with one another.

**Ridley et al. (1992)** conducted a study regarding Metacognitive skills, concluded that Metacognitive skills include taking conscious control
of learning, planning and selecting strategies, monitoring the progress of learning, correcting errors, analysing the effectiveness of learning strategies, changing learning behaviours, and leads one towards deeper level of understanding.

**Harrison (1991)** investigated three basic types of awareness, related to metacognitive knowledge which effects the students learning. First is an awareness of knowledge, second is an awareness of thinking and third is awareness of thinking strategies which describes an understanding of approaches to directed learning.

**Young et al. (1991)** conducted a study on “Motivational orientational and cognitive strategy in four academic domains of teenage students” and suggested that within each subject the student holds distinct learning and ability focused goal orientation under surface level learning, whereas under deeper level the learning focused and ability focused were similar under various subjects.

**Blakey and Spence (1990)** conducted a study on Metacognition and summaries the following strategies for developing Metacognitive behaviour:

- Identifying “what you know” and “what you don’t know”.
- Talking about thinking
- Keeping a thinking journal
- Planning and Self-Regulation
Debriefing the thinking process

Self-evaluation

Brown (1990) conducted a study on high school students to see the relevance of Metacognitive strategies in cognitive learning. In his study he concluded that Metacognition is a sequential processes that one uses to control cognitive activities, and to ensure that cognitive goal (e.g., understanding a text) has been met. These process help to regulate and oversee learning, and consist of planning and monitoring cognitive activities, as well as checking the outcomes of those activities.

O’Malley and Chamot (1990) conducted a study to find out the effectiveness in association of cognitive and Metacognitive strategies in college students and concluded that, using a combination of strategies often has more impact than single strategies.

Pintrich and De Groot (1990) conducted a study on “Critical thinking and its relationship to motivation, learning strategies, and classroom experience” in which they used both quantitative and qualitative methods, looked at the relationship between students intrinsic value beliefs and use of cognitive and self regulatory strategies in three subject matter areas: English, social studies, and science. The results of the quantitative analysis indicate very few subject differences. However, the qualitative data elicited quite a
different picture, which shows that Maths seems to stand out as being very different from the other subjects.

**Zimmerman (1990)** argues that self-regulated learners are Metacognitive, and behaviourally active participants in their own learning. Self-regulated learners set goals and self-evaluate their acquisition of knowledge and this will allow them to be aware and decisive in their approach to learning. Zimmerman further finds the Relationship Between Motivation, Environment and Effort believes that the two most important determinants of self-regulation are self-motivation and the effective use of learning strategies.

**Carrel (1989)** conducted a study to compare the Metacognitive development of bilingual and monolingual students. It indicates that Metacognition has a positive impact on second language learning in bilingual students than monolinguals.

**Garner and Alaxander (1989)** conducted a study on Metacognition, and found out that Metacognition can be taught as an executive routine which allows learners to behave in a reflective, planned and self-corrective way.

**Flavell (1987)** conducted a study to find out the engagement of Metacognitive strategy by high school students. In his study, he observes that metacognition consists of both Metacognitive knowledge and Metacognitive experiences or regulation. Metacognitive knowledge
refers to acquired knowledge about cognitive processes, knowledge that can be used to control cognitive processes. Flavell divides Metacognitive knowledge into three categories: knowledge of person variables, task variables and strategy variables. He further concludes that high average students mostly use Metacognitive strategy.

**Borkowsk and Preesely (1987)** studied the relationship between the cognitive strategy and academic achievement. In this study, they concluded that Cognitive strategy is instructional approach, which emphasise the development of thinking skills and processes as a mean to enhance learning. Only the best and bright students utilize the objective of cognitive strategy. Thus, uses of the strategies are found to be associated with deep learning.

**Brown (1987)** divides Metacognition into two broad categories. The first category is related to knowledge of cognition, which involves the reflection of cognitive abilities and activities. This involves the conscious reflection of ones’ cognitive activities during the accomplishment of a task. The second component of Metacognition is related to self-regulatory mechanisms employed during an on going attempt to learn or solve problems. According to Brown, the knowledge of cognition and the regulation of cognition are closely related to each other. The knowledge about cognition is stable, fallible and often late developing in human thinkers and learners. In the beginning, metacognition was considered to be ‘knowing about
knowing’. Whereas, regulation of cognition consisted of activities used to regulate and control learning activities. These processes included planning activities, monitoring activities and evaluating activities. Brown feels that Deep learners are normally equipped with a high degree of Metacognitive awareness and are able to monitor and evaluate their learning activities strategically. The following figure explains the components of Metacognition proposed by Brown.

**Figure 3.2**

**BROWN’S MODEL OF METACOGNITION**
Cooking (1987) in his study about cognitive strategy concludes that there are five activities as essential features of what constitute the higher order cognitive skills of planning, defining, setting the bounds on task, analysing the requirements on components that comprise the tasks, establishing a performance protocol, setting the standard and evaluating the quality of the results.

Marzano et al. (1987) tried to find out the technique for self-regulation of high school students to develop Metacognition. The study concluded that the more students are aware of their thinking processes as they learn, the more they can control such matters as goals, dispositions, and attention. Self-awareness promotes self-regulation further concluded that if the students are aware of how committed (or uncommitted) they are to reaching goals, of how strong (or weak) is their disposition to persist, and of how focused (or wandering) is their attention to a thinking or writing task, they can regulate their commitment, disposition, and attention. The study gives a list of various types of knowledge that helps to develop metacognition such as: (a) executive control, which evaluates current state of knowledge; (b) declarative knowledge, which is being conscious of the facts surrounding a situation; (c) conditional knowledge which describes why a strategy works and (d) procedural knowledge, which has to do with various actions performed in a task. However, knowing when, how and why to use a particular strategy in
an objective, factual sense does not guarantee that it will be used. This knowledge only counts as metacognitive knowledge when it is spontaneously integrated with awareness of our thinking on a specific task and when we use this awareness to control what we are doing.

Pressley and Schneider (1987) in their study regarding Metacognitive strategy concluded that Learners with good Metacognitive skills are able to monitor and direct their own learning processes. When learning a Metacognitive skill, learners typically go through the following steps.

1. They establish a motivation to learn a Metacognitive process. This occurs when either they themselves or someone else gives them reason to believe that there would be some benefit in knowing how to apply the process.

2. They focus their attention on what they or someone else does in Metacognition to make it useful.

Selmes (1987) conducted a study on students in Scotland, and concluded that Metacognitive strategy is beyond the reach of most elementary and high school students and found that students are sensitive to contextual differences among school tasks and vary their approach to studying.

Nickerson and Smith (1985) conducted a study to find the effect of cognitive strategies and the problems in learning. They have
concluded that students face potential problems in thinking and categorized three types of problems with learning. 1) Errors in encoding, 2) Errors in operations and 3) Errors in goal seeking.

Tei and Stewart (1985) conducted a study on college students which revealed that Metacognition was used by students who make an appropriate use of cognitive process. Thus it involves both the conscious awareness and the conscious control of one's learning. In this study, the implications of Metacognition will be related to deep learning.

Ames and Archer (1986) conducted a study on cognitive strategy and opined that deep learners use cognitive strategies such as monitoring, comprehension, connecting new information with prior knowledge and discriminating important from unimportant information. On the other hand ability focused students tend to use surface level cognitive processing strategies such as rote and rehearsal strategy.

Snowman (1986) conducted a study on college students and investigated that learning strategy consists of six components: Metacognition, analysis, planning, implementation of the plan, monitoring of progress, and modification.

Sternberg (1984) in his study linked cognitive process to intelligence and termed them as metacomponents and concluded that
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.

**Weinstein et al. (1983)** conducted a study on how to use learning strategy in classroom. They divided cognitive strategy into rehearsal, elaboration, organisation, comprehension, and affective strategies as emotional activities of students.

In his work, **Flavell (1976)** proposed that our Metacognitive knowledge base consists of what we have learned, through experience, about cognitive activities. He further mentioned that it could be subdivided into three distinct and highly interactive knowledge variables: personal variables, task variables, and strategy variables. Flavell suggested that a strong Metacognitive knowledge base is critical to successful learning and a good learner is one who has ample Metacognitive knowledge about the self, as a learner about the nature of the cognitive task at hand, and about appropriate strategies for achieving academic goals. Figure 3.3 depicts the components of Metacognition as stated by Flavell.
B. Literature Related to Social Strategy

Marjolein (2010) conducted a study on “the influence of Social Strategy on Deep learning”. The sample comprised of 239 medical students and concluded that deep information processing is positively influenced by group activities.

Mohd (2009) conducted a study on the “Effects of Social Strategy on deep learning” and concluded that the experimental group showed outstanding performance than the control group in the
post-test which confirms the positive effects of social strategy in deep learning.

**Coffield (2008)** in his study on the influence of social strategy on deep learning, concluded that learners deep learning can be enhanced by social strategy by way of

- Strengthening self esteem
- Enhancing attitudes to learning
- Developing stronger sense of membership
- Developing new skill for learning.

**Mujis (2007)** conducted a study “To find out the relation between deep learning and social strategy”, in which he concluded that with the correct support/scaffolding, learners would begin to recognise that learning is more rewarding when they seek personal meaning by transforming information and ideas in terms of their own previous knowledge and experience.

**Paul (2006)** in his study on “social bases of cognition” suggests that a team is more than a group of people in the same space, physical or virtual. This study further investigates when and how teams in collaborative learning environment engage in building and maintaining mutually shared cognition, leading to increased perceived performance. In doing so, this research looks for discourse practices managing the co-construction of mutually
shared cognition and reveals conditions in the interpersonal context that contribute to engagement in these knowledge-building practices. A comprehensive theoretical framework was developed and tested. The constructs in the model were measured with the Team Learning Beliefs and Behaviour Questionnaire and analyzed using regression and path analysis methodology. Results showed that both interpersonal and socio cognitive processes have to be taken into account to understand the formation of mutually shared cognition, resulting in higher perceived team performance.

**Gholson and Craig (2004)** reported on a study undertaken by “the influence of social strategy in computer assisted instruction”. In their study they explored several ways in which social strategy can be designed to support computer assisted instruction and how it promotes deep leaning and discovered that vicarious learning and deep learning can be promoted by social activities.

**Littlewood (2001)** examined learner attitudes towards classroom learning of English with particular focus on collectivism versus individualism, attitude towards authority, and type of achievement motivation. Data were collected from eight Asian and three European countries. Although many attitudinal differences occur between individual countries, striking similarities are found across cultures.
Kukla (2001) conducted a study on social strategy in which he concluded that reality is constructed by our own activities and that people, together as members of a society, invent the properties of the world and say that learners compare their version of truth with that of the instructor and fellow learners in order to get to a new socially tested version of truth.

Flowers et al. (2000) investigated the impact of teachers’ instructional strategies on students achievement motivation to learn. Students in social group, regardless of conceptual level, were more motivated than students in the direct instructional group.

Johnston et al. (2000) conducted a study on social strategy, concluded that sharing and clarifying ideas in pairs or small groups increases the interest in studies and enhances critical thinking and interpersonal skills. Collaborative problem solving is thought to promote 'deep learning', which enables students to apply critical thinking skills in other contexts, and improves knowledge retention.

Mahamood (2000) conducted a “study on Cooperative learning in teaching pedagogy of social studies”. It was an experiemntal study with pre-test /post-test equivalent group design. The results indicate that co-operative learning strategies are more effective than traditional methods in teaching pedagogy of social studies.
Derry (1999) conducted a study on social strategy and summarises that in order to fully engage and challenge the learner, the task and the learning environment should reflect the complexity of the environment that the learner should be able to function in at the end of learning. Learners not only have deep learning of the problem-solving process, but of the problem itself.

Wertsch (1997) who made a study on social constructivism concludes that under social constructivism each learner is a unique individual with unique needs and backgrounds. Social constructivism not only acknowledges the uniqueness and complexity of the learner, but actually encourages, utilizes and rewards it as an integral part of the learning process.

Christopher (1995) at Washington University in St. Louis conducted a study on school students to see the relationship of social strategy with other extraneous variables such as self-confidence, comfort etc. The study shows that collaborative activities result in the improvement of students working with one another, along with strong correlations to gain self-confidence, comfort, in being oneself, and expressing one’s opinions.

Gergen (1995) in his study on social constructivism reported that, teachers are coordinators, facilitators, resource advisors, tutors or coaches. The role of the teacher in the constructivist classroom
Review of Related Literature

provides a useful vantage to help the students to reach a deeper level of understanding.

**Glasersfeld (1995)** in his study on social constructivism concludes that the teachers play the role of a "midwife in the birth of understanding" as opposed to being "mechanics of knowledge transfer". Their role is not to dispense knowledge but to provide students with opportunities and incentives to arrive at deeper understanding.

**Duffy and Jonassen (1992)** having conducted a study on social strategy, concludes that the collaboration among learners, directly result in progress in the learning approach.

**Pessin (1992)** investigated the use of an interactive learning strategies programme on sixth grade students and found positive changes in their learning behaviour as a result of the interactive Learning Strategies.

**Mattingly et al. (1991)** conducted a study about cooperative learning and achievement in social studies, which indicated that superior academic achievement, had obtained through co-operative learning than traditional instructional process.

**Sadker et al. (1991)** in their study analysed the cross-gender performance in social strategy technique. The result of the study revealed that the implementation of cooperative learning groups
Review of Related Literature

does not necessarily lead to a more equitable and effective learning environment for females and minorities.

**Totten and Russ (1991)** conducted a study to see the effectiveness of social strategy to develop higher order cognitive thinking in students of high school. They concluded that using social strategy fosters the development of critical thinking through discussion, clarification of ideas, and evaluation of others ideas, encouraging the practice of higher level cognitive thinking skill.

**Dolen et al. (1990)** reported on a study undertaken by Abercombie that compared cooperative learning with individualistic learning. Cooperative learning not only increased the ability of generating the ‘reading-thinking’ skills gained in group discussion situations, but it also brought improvement in objectivity and flexibility of thinking. They also reported the following results of the study.

- The ability to discriminate between facts and opinions.
- The ability to contemplate and resist false conclusions.
- The ability to generate and consider alternative solutions to problems.
- The ability to regard each problem as if it were new, and to be less adversely influenced by previous experience which was now inappropriate to tackling the problem on hand.
**Glasrsfeld (1989)** conducted a study on the importance of social strategy by comparing the traditional strategy with social strategy. It concludes that the learner actively involved in the learning process when compared to the traditional educational system where the responsibility rested with the instructor to teach and where the learner played a passive receptive role.

**Marzano et al. (1988)** conducted a study on “the Metacognitive influence on constructivist learning of high school students of coastal area. The study summarises that within social constructivist perspective Metacognitive skill and Metacognitive knowledge develop through social interaction.

**Johnson and Johnson (1986)** conducted a study to see the relationship between social strategy and thinking of college students. The result of the study shows that cooperative teams achieve higher levels of thought and retain information longer than students who work quietly as individuals. Shared learning gives students an opportunity to engage in discussion, take responsibility for their own learning, and thus encourage critical thinking.

**Bruner (1985)** made a study on high school students to see the effectiveness of social strategy to develop critical thinking in students. The study revealed that social strategy improves the capacity for problem solving. He concludes that the peer support system makes it possible for the learner to internalize both external
knowledge and critical thinking skills and to convert them into intellectual functioning.

**Sanders et al. (1972)** studied the differences in the rate of successive acquisition of 4 concepts as a result of two-presentation condition and their interaction with the learners’ preferred strategies i.e., the use of social strategy. The result showed that those who manifested a systematic strategy, benefited by the blocked presentation. Mixed presentation made slower learners.

### C. Literature Related to Macro Strategy

**Angel (2010)** conducted a study on intrinsic motivation, achievement goals and study strategies of Hong Kong Chinese students. The findings of the study point out that motivational orientation influences the study Approaches and subsequently influence Academic Achievement. The sample consisted of 786 male and 595 female students.

**Marjolein (2010)** investigated the influence of deep learning, internal motivation and need for cognition and preparation time on open and closed-book test performance. Students with high need for cognition performed better due to the influence of internal motivation.

**Lena (2009)** investigated the effect of factors ie. scholastic level, and pupil gender on primary school children’s intrinsic motivation to
engage in schoolwork. The results showed that a teacher orientation towards autonomy enhanced the intrinsic motivation of girls on two out of three-motivation dimension assessed and that of boys on one dimension. Girls were more intrinsic than boys’ classroom curiosity and pupils in the higher class tended to be less intrinsically motivated than younger children.

Phan (2009) conducted a research that focused on deep processing strategies, critical thinking, and motivation as three constructs. It reveals that deep processing strategies process positive effects on students’ academic performance and internal motivation. Furthermore, an examination of relationship between these three constructs may provide relevant information that could discern the process of learning and motivation. In contrast, surface processing strategies and habitual action and understanding are more likely to exert negative effects on academic performance and motivation.

Martin et al. (2008) conducted a study that sought to understand the relationship between peer discussions and deep learning. Eighty-eight first year high school students answered questions from the motivated Strategies for Learning Questionnaire and reported the perceived frequency of discussions with peers both inside and outside the classroom regarding deep learning. Results suggest that differences exist between the frequency of deep discussions with peers from inside and outside the classroom.
Kaplan and Hafner (2007) conducted a study on “Intrinsic Motivation system for Autonomous mental development”. They concluded that intrinsic motivation system is that which pushes a robot towards a situation in which it maximizes its learning progress. This robot focuses on situations, which are neither too predictable nor too unpredictable, thus permitting autonomous mental development.

Midgely (2006) in the studies on Hong Kong students, found that junior secondary students showed more intrinsic motivation than students in senior secondary classes. It was found that secondary students perceived learning as less interesting as they progressed to higher class.

Atherton (2005) conducted a study on the “factors influencing deep learning”. The result of his study shows that deep learners also relates theoretical ideas to everyday experience and are self-motivated.

KitYi (2005) reports the study of the relationship among intrinsic motivation, achievement goals, study strategies and achievement. The participants were 786 male and 595 female students from Hong Kong. The results showed that the three subscales of intrinsic motivation were all positively and significantly related with deep strategy but not with surface strategy. Performance approach goal and performance avoidance goal were significantly and positively
related to both deep and surface strategy while mastery goal was significantly related with deep strategy only. Academic achievement was positively and significantly related with deep but not surface strategy. Results of multivariate analysis showed significant differences in gender and level of study for the three variables under study. The results were discussed in relation to the Chinese cultural context and implications were drawn for enhancing motivation to learn.

**Poyilal and Kwokwaichan (2005)** conducted a study on Hong Kong Chinese Higher secondary students and pointed out that motivational orientations influence the study strategies of students and subsequently influence academic achievement. While achievement goals emphasize the ways in which students think about themselves in learning, intrinsic motivation reflects students’ engagement in learning for its own sake. Both have impact on learning strategy and achievement.

**Tran et al. (2005)** in their study examine the link between emotion with surface and deep learning in the context of the international business curriculum. It was discovered that critical thinking skills and empathy were reflected in deep learning and students need to thrive in their environment and the impact that emotion has on learning may bridge the gap between surface and deep learning.
Lacante (2004) demonstrated that students with intrinsic motivation processed reading material more deeply, and showed more persistence than students with extrinsic motivation.

Matos (2004) conducted a study on intrinsic motivation and deep learning on high school students and highlights that students with intrinsic motivation processed the learning material more deeply, achieved higher grades, and showed more persistence than students with extrinsic motivation.

Recio (2004) conducted a study on “the Approaches to studying of distance education which reveals that there are, mainly, two approaches to learning, deep approach and surface approach”. Deep approach is consistent with intrinsic motivation and transforming knowledge. Characteristics of deep approach are: an intention to understand material for oneself, vigorous and critical interaction with knowledge content, relating ideas to one’s previous knowledge and experience. Surface approach is consistent with extrinsic motivation and information reproducing.

Vansteenkiste and Lens (2004) conducted a study on the “Influence of intrinsic motivation in deep learning”. Their study reported that, intrinsic motivation generally consists of an internal desire to learn about a specific topic. Those students with intrinsic motivation processed reading material more deeply, achieved higher grades, and showed more persistence than students with extrinsic motivation.
Caraway (2003) conducted a study on college students, which revealed that three factors act together to determine the effects of motivation on higher classes a) development of achievement goals b) a person’s self perceived ability level c) and the achievement behaviour of the individual.

Atherton (2002) conducted a study on the relationship between approaches to studying, motivation and Metacognition and discovers that, surface learning is related to passive processing that lacks reflection, uses low-level meta-cognitive skills and is extrinsically motivated. By contrast, deep learning is a product of active processing that is intrinsically motivated, reflective, and uses higher-level meta-cognitive strategies.

Accordino et al. (2000) examine the relationship of achievement motivation and mental health aspects of depression and self-esteem in high school students. Results indicate that student’s personal standards were significant predictors of academic achievement and academic motivation.

Pintrich et al. (2001) verified the relationships between motivational orientation, self-regulated learning, and classroom academic performance for 173 seventh graders from eight science and seven English classes. Results show that Self-efficacy and intrinsic value were positively related to cognitive engagement and performance. Regression analyses revealed that, depending on the
outcome measure, self-regulation, self-efficacy, and test anxiety emerged as the best predictors of performance. Intrinsic value did not have a direct influence on performance but was strongly related to self-regulation and cognitive strategy.

**Accordino et al. (2000)** examine the relationship of achievement motivation and mental health aspects of depression and self-esteem in high school students. Results indicate that student’s personal standards were significant predictors of academic achievement and academic motivation.

**Brown (2000)** conducted a study on “The influence of Macro strategy in M.B.A students”. The study suggests that the emotion felt by the students are expressed through the appraisal process. He further concluded that the students would reach at the deeper level of learning if they were emotionally engaged.

**Schpiro and Livingston (2000)** conducted a study on college students to see the influence of Active learning strategies and critical thinking on emotional factors. The study reflects that by using active learning Strategies the students develop qualities such as curiosity, enthusiasm, willingness to take risk and persistence.

**Seo (2000)** conducted a study on the motivational construct in mathematics learning using structural equation modelling. The sample consisted of 178 fourth graders from 2 Korean schools. This
study showed that a good mediational model could be modified and successfully applied to the context of Korean elementary school mathematics class. Student’s performances goal orientations directly influenced deep learning. Student’s mathematics attitude has indirect effect on learning strategies.

**Deci and Ryan (1999)** having conducted a study on “The Influence of extrinsic and intrinsic motivation on learning” conclude that too much emphasis on grades and rewards could destroy a student’s interest in learning. Further suggests that External motivators, such as grades and rewards, can undermine intrinsic motivation for a task thus proving that Grades are not the best motivation for student’s learning.

**Kuh (1999)** in his study on the “Influence of Motivation, Environment and Effort on deep learning in inside and outside the classroom” reports that students with high expectations and motivation choose to spend their time in the ways that positively affect their performance and reach towards deeper level of understanding.

**Lawson and White (1998)** conducted a study regarding the effectiveness of Internet in developing deep learning. Moreover, it concludes that Internet learning can engender deep learning if they are emotionally engaged. At deeper levels, learning can entail a
significant change in individual’s values, ideas, beliefs and habits about themselves and their world that can create self-doubts.

**Anderman and Midgely (1996)** made a study that attempted to verify the findings on developmental differences of secondary students with respect to intrinsic motivation of Hong Kong students; it was found that junior secondary students showed more academic initiation than students in senior secondary classes. It was found that secondary students perceived learning as less interesting as they progressed to higher classes.

**Chalmers and Fuller (1996)** made a study on the influence of emotional factors on approaches to studying and concluded that surface learning is generally associated with anxiety, fear of failure and low self-esteem.

**Huang and Waxman (1996)** conducted a study on Emotional conditions, academic achievement and motivation. Multivariate analysis and post hoc test of student responses showed that high achieving students had significantly higher perception of involvement, affiliation, satisfaction, academic self-concept and achievement motivation.

**Cain and Dweck (1995)** assessed the beliefs of first, third and fifth graders about their ability, achievement and their motivational responses to challenging puzzles. Results suggested that individual
difference in children cognition about ability and achievement are related to their motivational responses throughout the school years.

**Kong and Hau (1995)** conducted a study and reported significant positive correlations between the deep-processing strategies with the intrinsic motivation, and negative correlation between surface-level processing and performance goal. The relationship among intrinsic motivation, learning strategies and academic achievement was widely related.

**Barrington (1994)** in his study found that when a supportive learning environment was non-existent such as boring classes, overload pressures and the exam system, it encouraged surface approaches even with students who were highly intrinsically motivated and interested.

**Kirkpatrick (1993)** in a study regarding the maintenance of self-esteem reported that first year university students lowered their expectation of academic performance and their perceptions after feedback from earlier assessments.

**Pekrun (1992)** in his study on the “Influence of learning emotions on achievement of students of higher and lower classes” postulates that the effect of emotion on learning is mediated by cognitive and motivational mechanisms; he further concluded that the effect of
learning is positive for positive emotion e.g. (enjoyment) and negative for negative emotion e.g. (anxiety).

Ryan (1992) in his study on the “influence of extrinsic and intrinsic motivation on learning” concluded that a student learns because of curiosity rather than external rewards. Intrinsic motivation is often reflected in students’ taking initiative in engaging in learning activities rather than being pushed along by the teachers. Further it pointed out the importance of intrinsic motivation in academic setting, it is important, as it is associated with increased attention, persistence and study skills.

Pintrich and Zimmerman (1991) conducted a study on “Influence of achievement and goal orientation of higher and lower classes” and concluded that cognitive self regulation makes the student of higher classes actively engage in their learning which includes the demand of school assignments, planning for and mobilizing their resources to meet these demands and monitoring their progress towards completion of assignments but have lower effects on lower classes.

Csikszentmihalyi and Nakamura (1989) conducted a study regarding extrinsic and intrinsic motivation, which reveals that intrinsic motivation is highly desirable in most of the activities in which teachers, students and others engage and are most directly influenced by extrinsic rather than intrinsic motivation.
**Entwistle (1988)** in his study on deep learning investigated that intrinsic motivation has been related to deep learning behaviour, extrinsic motivation has been shown to be associated with surface study behaviour.

**Lepper (1988)** conducted a study on the “Relationship of students learning and intrinsic motivation”; the study reveals that the main problem with determining a student’s learning is the motivation level. A student who is intrinsically motivated undertakes an activity for his own sake, for his accomplishment. Thus, he concluded that learning and intrinsic motivation has a positive relation.

**Haynes et al. (1988)** assessed study behavior, cognitive skills and motivation of 148 high, average and low achieving high school students. The study indicated that among the low achieving group cognitive skills, study habits and motivation was the powerful discriminating factor compared with high and average groups.

**Ahluwalia (1985)** conducted on a study in order to determine the factors affecting achievement motivation on a sample of 200 children of 8-12 years of age. The study has established that Approaches to learning is positively and significantly related to achievement motivation. The birth order and size of the family do not show any significant relationship with achievement motivation.
**Shunk and Gunn (1984)** conducted an experiment and explored how to incorporate the importance of task strategy and positive achievement on cognitive modelling, self-efficiency and skill acquisition. The results showed that using task strategies led to the highest self-efficiency.

**Lynn (1982)** estimated the relationship of achievement motivation in different award systems with grade point, gender and locus of control of senior high school students. The study concluded that highly motivated students of both genders received most awards.

**Rajeeva (1982)** conducted a correlative study of motivation and performance among grade IX students of Bangalore city. Results show that a significant difference between the scorers of high and low achievement motivated students.

**Gopinathan (1981)** in a study on affective variables of high achievers in Malayalam showed that motivation could differentiate high achievers from low achievers. Some theorists in other studies *(Combs, 1982; Purkey and Schmidt, 1991)* proposed that there is only a single kind of motivation, which can be described as an intrinsic motivation to engage in activities that enhance or maintain a person's self-concept.

**Harter (1981)** in his study on intrinsic motivation and its effects on learning of high school students identified three components of
intrinsic motivation, which are challenge, curiosity and independent mastery. It was maintained that students who were intrinsically motivated were more likely to choose new and difficult tasks, like to learn new things and exercise great independence on learning rather than relying on the teachers.

Rivera (1977) in his study on emotion and its influence on approaches to studying reported that emotion is a psychological state and has a direct influence on approaches to studying. Emotion is generally viewed as a motivation for human endeavours.

Svensson (1977) conducted a study to find out the relationship between the studying hours and intrinsic motivation on deep learning. The study reveals that more than three hours of study are associated with a deep approach. Further it suggests that those who are intrinsically motivated are deep learners. Thus the study concludes that deep learning is correlated with intrinsic motivation and longer study hours.

D. Literature Related to Resource Management Strategy

Nijhuis (2010) studied the influence of Learning Environment and Learning Strategies. The study concluded that the new learning environment positively influence on deep learning and further concluded that more advanced staff development, curricular assessment system positively influence learning strategies.
Burnett (2009) conducted a research that hypothesised relationship between high school students’ conceptions of learning, their perception of classroom environment and their approach to studying. Results suggested that association exist between conceptions of learning and approaches to studying. Students who reported qualitative conception and experiemental conception were likely to use deep approaches to learning where as students who had quantitative conception of learning tendencies were likely to use surface approach.

Cope (2009) conducted a study, which proposes the projects to integrate learning technologies into higher education learning environments to see the improvement in the quality of students’ learning outcomes. The findings of the student learning research suggest that improvement is possible only if technologies are used as part of learning environments, which encourages deep learning approaches.

Tinto (2009) in a study reports that involvement in classroom learning often leads to greater effort and enhanced learning, and those who are more involved in the college classroom show higher levels of intellectual development and deep learning.

Becta (2008) Conducted a study to see how “ICT-supported environment promote deep learning” concluded that ICT-is a key motivator for the majority of 14 to 19 year-olds. The opportunity to
collaborate with their peers, to create their own material and to personalize and reflect upon their learning, leads them to engage more effectively.

**Kuh and Gayles (2007)** conducted a study on the “influence of environmental factors on deep learning”. Reported that the students are interested to think analytically, speak and write effectively, synthesize ideas, and learn on their own. When students are comfortable in their environment, they are cognitively and physically more willing to concentrate their efforts on positive academic activities.

**Wilcote Winkel (2006)** made a study that aimed at stimulating students to attain a deeper level of learning. There were two groups, experimental and control. The experimental group was provided with diverse learning material and supported with enough time. The mean of study times and achievement scores of problem-based courses were calculated. Results showed that, having been provided with diverse learning material and enough learning time, the experimental group attained a deeper level.

**Yuen-Yee et al. (2005)** conducted a study based on the responses of 180 Form 3 Hong Kong secondary students to preferred and actual forms of Chinese versions of the Classroom Environment Scale (Moos & Trickett 1974) and Learning Process Questionnaire (Biggs 1987) with reference to their Science classes. The data
tended to support qualitative research indicating that Hong Kong secondary school students perceive their classroom to be relatively deep level and teacher controlled and encouraging surface learning. The students tended to prefer a friendlier atmosphere where students and teachers collaborated to provide a greater variety of interesting but challenging activities. The students indicated that such a learning environment would tend to promote deep learning.

**Joanna Crossman (2004)** in his study on Factors Influencing the Assessment Perceptions of Approaches to learning concluded that student perceptions of assessment were clearly influenced by past experiences. Other factors were also identified, including student-teacher relationships, anxiety, student notions of relevance which decide the students’ approaches to learning.

**Urdan (2004)** conducted a study on the influence of environmental factors on approaches to studying. There are certain educational policies and practices at the classroom level that could foster growth for deep learning; for example, when teachers emphasize and evaluate individual growth of each student, thereby creating a mastery-learning environment.

According to **Nijhuis (2003)**, in a society, there is a growing need for graduates who possess competencies consistent with deep learning. The goals of this research were to determine if students, firstly, perceived the redesigned course as being more challenging and,
secondly, adjusted their learning strategies towards deeper learning. Students’ perceptions of the learning environment and their learning strategies were measured by using the Ramsden Course Experiences Questionnaire and the Biggs Study Processes Questionnaire. The results indicated that the students from the redesigned course showed a higher degree of surface learning and a lower level of deep learning than the students from the assignment-based learning course.

**Van and Paas (2003)** conducted a study in “the learning environment and how it promotes deep learning”. In their study they summarise that the term ‘powerful learning environment’ has been used to describe an environment that seeks to develop complex and higher order cognitive skills, deeper conceptual understanding and Metacognitive skills such as the ability to self-regulate one’s own learning.

**Standage and Treasure (2002)** conducted a study with middle schools students, “On the influence of environmental factors influencing deep learning” and discovered that the perspective of motivation is intrinsically derived. It also points to the relationship between motivation and goal orientation i.e. students who are high in intrinsic motivation are more likely to be goal oriented and put forth more effort in their academic work and arrive at deep learning.
Cunningham (2000) found that her students were resourceful strategists in the classroom and appreciated the opportunity to discuss openly various Learning Strategies. She found a variety of strategies in use, namely, oriented strategies, resourcing strategies, strategies based on prior knowledge and experience; and repetition and loping strategies. She concluded that knowing about and understanding the learning strategies of the learners allow the teacher to make more informed decision about what instructional strategies are likely to be more effective.

Bhargavi (1999) explored the relationship between learning style and Classroom Climate. The sample consisted of 700 pupils of standard IX; findings reported a positive correlation between Classroom Climate and Learning Style.

Stensaker (1999) in his study on deep learning maintained that more attention should be paid to perceptions of relevance in assessment design and for good reason since assessments make relevant connections with the world of work and appear to have a positive influence on student learning and leads to deep learning.

Trigwell and Prosser (1999) conducted a study on “the influence of environment on deep learning” on college students and reported that learning climate which involves respect for students, freedom to learn and enthusiasm on the part of the teacher encourages a deep approach to learning, while departments with heavy work
loads, high assessment demands and lack of freedom encourages a surface approach to learning.

**Hudley (1998)** compared perceptions of classroom environment for African-American male students and similar students enrolled in the general education programme. Results reported that the strong positive relationship among affiliation, teacher support, classroom order and task orientation are consistent with African-American students.

**Yildrin et al. (1998)** conducted a study, which aims to identify student’s achievement, goal orientations, Learning Strategies and the relationship between goal orientation and Learning Strategies. Results indicate that the students are very close to mastery orientation and somewhat ego-social. As a whole, students use deep cognitive strategies often, while they use surface and Meta cognitive strategies sometimes.

**Fraser (1997)** conducted a study on high school students, and discovered that Deep learning is a key strategy by which students extract meaning and understanding from course materials and experiences. Because of the range and interconnectedness of environmental, social and economic issues, and the importance of interdisciplinary thinking and holistic insight, deep learning is particularly relevant in the context of education for sustainability. However, deep learning can be inhibited if the existing interests or
backgrounds of students have a strong disciplinary focus. This study reviews factors that influence deep learning and discusses some ways in which environmental educators can encourage students to use deep learning strategies. Such strategies are seen to be necessary to maximise the benefits from environmental courses and are likely to foster creative interdisciplinary approaches to sustainability beyond the institution.

**Jyothi (1996)** investigated the influence of attitude towards physics and classroom climate on learning the Physics. The results revealed that there exist a significant relationship between attitude towards learning of physics and classroom Climate.

**Narayanan (1996)** conducted a study about the classroom climate and Attitude towards science on Achievement in Biology of standard IX pupils of Kerala. 600 samples were selected for the study. It was found that the main effect of classroom Climate on Achievement in Biology was significant for the total sample as well as sub samples.

**Goh and Fraser (1995)** examined the nature and impact of Classroom Climate on Achievement in Mathematics of 512 elementary students in Singapore. Findings revealed the consistent association between classroom environment and students outcomes.

**Henderson (1995)** investigated Biology student’s perception of the classroom and the laboratory-learning environment. The outcomes
reported in the study indicate that certain aspects of the learning environment are associated with student’s learning.

**Yuen-Yee (1994)** examined Classroom Environment and approaches to learning. It was to investigate about the actual and preferred perception of Hong Kong secondary school pupils. Results showed that students perceived their classroom to be fairly competitive.

**Nummery (1993)** examined the effects of classroom climate on language achievement at the elementary level. A classroom Climate scale was administered to 942 students of 22 schools. Significant relationships were found among climate measures and students learning.

**Reymond and Jeffrey (1993)** made a character analysis of Science Classroom Climate of secondary schools under different managements. Findings disclosed that classroom Climate is positively associated with personality factors, which in turn is related to approaches to studying.

**Robbie and Fraser (1993)** investigated the association between student’s outcomes and classroom environment of high school students. The results indicated that the nature of the classroom environment accounted for an appreciable proportion of variance in
both cognitive and affective outcomes beyond those attributable to general ability.

**Padhi (1992)** examined the relationship between psychosocial characteristics of classroom environment, creative ability, academic self-concept and academic achievement. The subjects were secondary school pupils and found a significant and positive relation.

**Aulay (1990)** examined the class size and students achievement with special reference to elementary setting. The finding revealed that instructional settings is a necessary condition for maximizing their cognitive and affective outcome.

**Ramsden et al. (1989)** examined the school environment and sixth forum pupils approaches to learning. A key finding was that perceived school environment and pupils learning are related in a systematic way. School environment offering supportive teaching coherent structure, are associated with deep learning.


**Harper and Kember (1986)** conducted a study and found that mature-age students used deeper approach when compared to younger students.
Wright and Cowen (1982) conducted a study with a sample of 511, grades V and VI students and their 23 teachers in USA. It was found that teacher perceived involvement; affiliation, rule clarity and organization were related to more positive students’ mood and thereby greater learning.

Levin (1980) in his research on ‘classroom climate and its influence on learning’ studied Classroom climate as a criterion evaluation and perceived that individualized classrooms provided greater autonomy than students in traditional classroom.

Hirunval (1980) in his study of pupils Self-concept, Academic Motivation, Classroom climate and Academic performance found that classroom climate in urban schools was better than rural school.

Kelly (1980) reports a study of association between students perceived classroom environment and their learning on a sample of 41,057 students and found that it was significantly and positively related to the level of classroom exploration.

CONCLUSION

The above review of related literature enabled the investigator to gather extensive information on Approaches to Studying and certain Strategies that promote Deep Learning in various disciplines. The review also throws light on the relevance of this
study and capacitated the investigator to frame the research design, to formulate the hypotheses and objectives of the study, to select the method, to develop the tools for the present investigation and to conduct the study.