CHAPTER II

REVIEW OF RELATED LITERATURE

2.0 INTRODUCTION

The stated problem and objectives in chapter one, could be studied on the foundation of the existing knowledge in the literature. Research becomes valid if it is based upon the previous researches and established works in that particular area. Hence, a review of the literature was done by the researcher in the field of metacognition and other selected variables. This chapter presents the related literature on the relevant factors.

2.1 METACOGNITION

Lai (2011) observes that metacognition has received considerable attention in the educational psychology literature and educational psychologists have long promoted the importance of metacognition for regulating and supporting student learning. He further refers Nelson (1992) who cited a 1990 survey in the American Psychologist listing metacognition among the top 100 topics in cognitive and developmental psychology.

Koriat suggests that the topic of metacognition is able to pull researchers from traditionally disparate areas of investigation under one roof. The topic of
metacognition is producing synergy between different areas of investigation concerned with monitoring and self regulation (Koriat, 2007).

In the following sections research trends related to metacognition, academic self-concept, hemispheric dominance, learning styles and gender are discussed are reported.

The word metacognition has Greek origin. The Greek prefix ‘meta’ means ‘to transcend’. Hence, the construct ‘metacognition’ refers to thinking that transcends first level of thinking. It refers to second order knowledge or function (Biehler & Snowman, 1986). A commonly quoted definition of metacognition is given by Flavell (1976) who is considered as a pioneer in the field of metacognition. Flavell (1976) defines metacognition as “One’s knowledge concerning one's own cognitive processes and products or anything related to them. Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear.” (p.232).

Flavell (1979) classifies metacognitive knowledge of a person into three types: (a) “person” knowledge, is knowledge about the nature of human beings as cognitive processors; (b) “task” knowledge, is knowledge about the demands of different tasks; and (c) “strategy” knowledge, is knowledge about the types of strategies likely to be most useful. Flavell notes that these different types of knowledge can interact.

38
Literature review on metacognition reveals confusion over the meaning of the word, this is due to its origin from different disciplines like philosophy, developmental psychology and cognitive psychology. Flavell (1981, p.37), even considered metacognition as ‘fuzzy concept’. Moreover, the complexity and multifaceted nature of metacognition is another reason for its fuzziness and lack of unified conceptual theoretical structure.

Under this all-inclusive term ‘metacognition’ fall many interrelated areas of research like e.g. self-regulation, executive control, metamemory, and metalearning. It is often difficult to distinguish between what is meta and what is cognitive (Brown, 1987). However, we must note that these two processes operate at two different levels. The contents and functions of metacognition and cognition also differ.

Wilson & Clarke (2004) considers three functions of metacognition, i.e., metacognitive awareness, metacognitive evaluation and metacognitive regulation. They describe the three functions in the following way. Metacognitive awareness is one’s awareness of their cognitive or learning processes. Metacognitive evaluation involves evaluating one’s cognitive processes, capacities and limitations. Metacognitive regulation is involved whenever an individual uses his/ her metacognitive skills to direct their knowledge and thinking. Thus, in metacognitive thinking, learners not only reflect on their knowledge or thought processes, but also evaluate and/or regulate their own thinking. Wilson & Clarke(2004).
It is well accepted by many researchers that, basically metacognition includes two constituent parts: knowledge about cognition and monitoring of cognition (e.g., Flavell, 1979; Schraw & Moshman, 1995). Metacognitive knowledge involves awareness of and knowledge about one's own cognition (Pintrich, 2002). Jacobs and Paris (1987) further classified the knowledge component of metacognition into declarative, procedural, and conditional aspects of knowledge. They classified metacognitive control into three processes, i.e., planning, evaluation, and regulation.

Schraw and Moshman (1995) followed a different perspective of metacognition away from studying metacognition as a topic by itself. Instead they formulated theories about learners’ theories about their own cognition. Schraw and Moshman (1995) postulated that every individual has three types of metacognitive theories: tacit, informal, and formal metacognitive theories.

Assessment of metacognition proved to be a challenging task for a number of reasons. Some of the reasons pointed out by Lai, E. R. (2011) in his review of literature on assessment of metacognition are: (a) the complexity of the construct, (b) inaccessibility to direct observation, (c) it may be confounded with other relevant variables; and (d) decontextualized from in-school learning.

Veenman, et al. (2006), pointed out that many methods for the assessment of metacognition are being used, such as questionnaires, and all these assessment methods have their pros and cons. Many studies have used experimental approach to study different areas of metacognition like metamemory and ease of learning.
However, these experimental studies are conducted in artificial laboratory situations and are not connected to natural school learning situations, thus lacking ecological validity.

Many research studies used self-report questionnaires or rating scales for measuring metacognition. For example, Lai (2011) cites the study by Kramarski and Mevarech (2003), who used a metacognitive questionnaire, assessing both general metacognition and domain-specific metacognition. Cross and Paris (1988) used Reading Awareness Interview and strategy rating task. Sperling et al. (2002) used Junior Metacognitive Awareness Inventory in their study.

Shraw (1998) considers metacognition as a multidimensional phenomena with two aspects, knowledge of cognition and regulation of cognition. Schraw and Dennison (1994) developed the metacognitive awareness inventory as a quick and easy means to assess metacognitive awareness.

Phakiti (2003) investigated the relationship of cognitive and metacognitive strategy used to English as Foreign Language reading achievement test performance and found that a) the use of cognitive and metacognitive strategies had a positive relationship to the reading test performance; and b) highly successful test takers reported significantly higher metacognitive strategy use than the moderately successful ones.
Rysz (2004) while identifying metacognitive thoughts adult students had while learning elementary probability and statistics concepts, found that students can earn above average grades using limited or no metacognitive awareness. However, those who provided evidence of metacognitive awareness and self monitoring were better able to report an understanding of probability and statistics concepts.

Bigozzi & Vezzani (2005) investigated the effects of individual writing on metacognitive awareness concerning scientific concepts. They found that individual writing enhances the use of metacognitive terms and the frequency of use regarding terms, which distinguish appearance from reality.

Mason & Nadalon (2005) found that overall students’ metacognitive competence is significantly correlated with their achievement in subjects. Similarly, Coutinho (2006) concluded that students with good metacognition tend to be successful students. Students with poor metacognition tend to perform poorly. Thus from the review on metacognition it can be concluded that metacognition is very important component with respect to learning environment.

2.2 ACADEMIC SELF-CONCEPT

Arens, et.al. points out that students’ academic self-concept has received a lot of attention in educational research during the last two decades. They suggest that this is due to predictive power of academic self-concept for a broad scope of academic outcomes, such as interest, persistence, coursework selection, and academic achievement. High level of academic self-concept is assumed to be a
desirable outcome and mediator in favourable educational outcomes. (Arens, et.al., 2011).

Rosen et al. (2010) point out that academic self-concept is formed and developed through interactions with a student’s significant others (i.e., parents, teachers, or peers) and therefore is dynamic as a student progresses through schooling.

McGrew argues that, young children initially develop very positive but biased self-concepts when compared to external reference indicators. However, as they grow the self-concept becomes more differentiated, reality-based, less positive, and synchronous with external criteria of evaluation. The Big–Fish Little–Pond [BFLP] effect occurs when students compare their personal academic performance/ability with that of their peers (an external frame of reference). (McGrew, 2007).

Byrne (1986) informs that the construct ‘academic self-concept’ is studied from two perspectives: the dimensionality of the construct (within network relations) and its relation with other variables (between-network relations) referred as the nomological network of a construct. Within-network studies examine the structure of the academic self-concept construct itself often by means of exploratory and confirmatory factor analyses. Between–network studies aim at exploring the construct of self-concept onto a nomological network of other constructs that provide external validity criteria. Many researches are conducted on academic self concept and it’s relation with academic achievement in between-network investigations.
Areepattamannil & Freeman (2008) noted that, historically, self-concept emphasized global component of self-concept. In contrast, the recent models of academic self-concept by Shavelson, Hubner, and Stanton (1976) take the domain-specific perspective that supports a multidimensional view of self-concept.

Rosen, et. al. (2010) observed that the issue of causality—whether academic self-concept demonstrates a causal relationship to achievement or vice versa—is an often-studied and unsettled issue in academic self-concept research. They have discussed three popular models of causal relationships between self-concept and academic achievement: the skill-development model, the self-enhancement model, and the reciprocal effects model. In the skill-development model, academic self-concept is a consequence of prior academic achievement. In the self-enhancement model, prior self-concept is a strong determinant of academic achievement. The reciprocal effects model argues that prior self-concept predicts subsequent self-concept and subsequent academic achievement. Furthermore, prior academic achievement predicts subsequent self-concept, hence reciprocal effects. Rosen, et al., (2010) also mention that Marsh and his colleagues in a series of studies spanning nearly 10 years, consistently reported that there is reciprocal effect between academic self-concept and academic achievement.

Research has been conducted to study the relation between academic self concept and several other variables related to learning. For example, Hartman, Everson, Tobias & Gourgey (1991) investigated the relationship between academic self concept, metacognitive problem solving and ethnicity. The students responded
to questionnaires such as 1) Thinking About Problem Solving Scale. 2) Michigan State Self Concept of Ability Scale, an 8- item instrument assessing student general academic self concept 3) The version of the same instrument assessing self concept in 4 content areas; mathematics, Science, English & Social studies. The sample selected for the study was 214 pre- freshmen of summer program designed to improve their basic skills before starting their formal college experience. The study results showed zero order correlation when computed between metacognition measures, TAPS and different self concept indices indicating TAPS had moderately positive relationship with other variable. The strongest relationship were between general self concept and subject- specific self concepts.

Many studies were conducted to examine relation between academic self concept and academic achievement. Rosen, Glennie, Dalton, Lennon and Bozick (2010) reviewed 42 abstracts based on academic self concept. They analysed the correlational relationship between self- concept and academic outcomes and found it is overwhelmingly positive. Studies show that students feel more competent in academic areas in which they achieve well and global and academic domain- specific self- concept are positively related to academic achievement, measured by grades and test scores.

Arreepattamannil and Freeman (2008) has reported that there is a positive relationship between academic self- concept and academic achievement for both non-immigrant and immigrant adolescents of Canada.
Closely related to academic achievement is perception of engagement, membership and authenticity of students in classroom situation. Wengler (2009) found in his study there is a strong correlation between academic self-concept and student engagement. A strong positive correlation \((r (52) = .68, p < .001)\) was found between the dependent variable of academic self-concept and the independent variable of engagement for the entire population. When academic self-concept and student perceptions of membership was analyzed a moderately strong positive correlation \((r(52) = .45, p < .001)\) was found. This suggest that roles and membership have a magical effect on the students. A strong positive correlation \((r(52) = .46, p < .001)\) was also noted between Academic self-concept and student perception of Authenticity.

### 2.3 HEMISPHERIC DOMINANCE

Leng & Hoo (1997) point out that recent advances in neuroscience and cognitive psychology are providing a clearer understanding of the three pound human brain. According to them the newest element in cognition is hemisphericity which is another dimension of individual differences.

Claycomb presented a detailed discussion on hemisphericity. She cited the triune brain theory proposed by Mac Lean which explains the evolution of human brain and considers neocortex as the latest and most advanced structure. The neocortex is divided into right and left hemispheres. These two hemispheres follow a sort of division of labour, and are specialized in different cognitive functions. In such division of labour most verbal and structured cognitive functions are left hemisphere behaviours, whereas, perceptual and intuitive functions are right hemispheres (Claycomb, 1978).
To understand research on brain activity and its implications for educators, Claycomb (1978) conducted a critical analysis of research on human brain and its function. She concluded that theories of brain formation suggest that educating all areas of the brain must be the concern of educators. Researchers suggest that basic education must include informational, processing skills, nonlogical behaviour and artistic activities that form our creative life. Brain dysfunction may be the reason for many learning disabilities. Many social and emotional problems have their roots in brain dysfunction. Hence, teachers are required to deal with varied approaches to such students. Implicit in all research in the area of hemisphericity is that varied modalities must be used in instruction to match different learning styles.

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

Most importantly, Morton and Rafto (2006) provide neuroanatomical basis for the right or left brain orientation of individuals as assessed by four biophysical methods. They argue that such neuroanatomical correlates of behavioural laterality
were essentially to be congruent with the larger side of the ventral gyrus of the anterior cingulate cortex, as revealed by a 3 minute Magnetic Resonance Imaging [MRI] procedure [Morton and Rafto, unpublished, as cited in Morton and Rafto (2006). Further, this anatomically-defined executive structure is taken as the criterion to define an individual behavioural hemisphericity. In this context, hemisphericity is considered as measurable, dyadic cognitive and behavioural orientation differences. Moreover, these brain-orientations are due to the existence of an inherent unilateral executive system either in the right or left asymmetric cerebral hemispheres. In their study the conclusions drawn were, a) due to the unilateral nature of the executive system the existence of hemisphericity is inevitable, b) there are quantitative methods to assess any person in terms of their probable right or left brain orientation. c) Number of traits that separate the cognitive and behavioral styles of Right and Left- bops [brain-oriented persons] have been identified, most of which have no known ties to brain asymmetry as yet. The major contribution of their study is the identification of hemisphericity as second dyadic personal identifier in addition to gender.

Ali & Kor, (2006) investigated the difference in brain hemisphericity and learning styles on students confidence in using the Graphic calculator (GC) to learn mathematics. The sample size of the study was 44 and the analysis showed the subjects differ significantly in their hemispheric preferences and learning styles. Sequential- global and sensing intuitive learning styles were found to associated significantly with brain hemisphericity. However, no significant association was found with between hemisphericity and gender, race and program of study.
From the above discussion it can be said that brain hemisphericity is a quantifiable. Its association with several variables are mentioned in literature but very little research literature is available on relation between hemisphericity and metacognitive awareness.

2.4 LEARNING STYLES

‘Learning styles’ is a topic which is studied extensively by psychologists and educationists. Educators acknowledge that there are individual differences in learning methods of students and such differences in learning methods are referred to as learning styles. (Garg, 2011).

Vermunt (1996, p. 2) defines learning style as “a coherent whole of learning activities that students usually employ, their learning orientation and their mental model of learning”.

Learning Style Models

Coffield et.al., (2004) pointed out that research on learning style is extensive yet conceptually confusing. In their extensive review on learning during post-16 pedagogy, Coffield et.al., (2004) identified 71 learning styles models from learning styles literature [published during the period 1902 to 2002], and they organized these into five families of learning style models. They also evaluated 13 influential models. In their review they observed that many studies on learning style used Curry’s model as a basis of conceptual framework. In Curry’s Onion model (1983), the cognitive personality styles occupy inner layer which is more stable and less easily modifiable. The instructional aspects are placed in the outer layer which are easier to modify but not so important in learning process. As pointed out by Coeffield, et al. (2004) learning styles are placed by some in middle layer while few
place them in outer layer. This sort of situation exists due to lack of conceptual clarity in the field of learning styles.

A number of models are presented to explain learning styles, as well as many researches are conducted to understand learning styles in the context of different variables. However, in this Felder-Silverman Learning Styles Model [FSLSM] is taken as a theoretical base to study the learning styles. Hence a brief description of FSLSM is given. Felder-Silverman Learning Style Model (FSLSM) classifies students on the basis of their learning preferences or learning styles. These preferences are grouped into four dichotomic categories or dimensions. The learner’s prefer one or the category of learning style of the four dimensions proposed in FSLSM model.

The Index of Learning Styles (ILS) is an inventory developed to measure learning styles based on FSLSM model. The Index of Learning Styles (ILS) is a 44-questionnaire designed to assess learning style preferences of the four dimensions proposed in the Felder-Silverman model. It was developed in 1988 by Richard Felder and Linda Silverman with the aim of providing learning and teaching insights to Engineering faculty members. (Felder and Brent, 2005)

Severins, & Tendan, (1994) conducted a meta-analysis of several articles based on studies conducted after 1980 on gender difference in learning styles. Curry’s onion model was used to classify the definitions on learning styles and to reconstruct the theoretical frameworks. The extent to which learning style is considered stable or variable in different context determine its position in the model.
Narrative review was taken to review the articles as well as quantitative study was also used. According to Curry Model it was found out most of the theoretical framework fell in the middle or outer layer of the Model. This location indicates that strong influence of learning context on women’s and men’s learning styles. While there were difference between Learning styles, research design rarely included learning context. On Kolb’s instrument the results showed that men were more likely than women to prefer the abstract conceptualization mode of learning.

Wood, (2011) conducted a study to find the learning styles preference of English trainees mixed method is used for the study. Data was collected using Felder & Solomon (1994) Index of Learning Styles questionnaire and three phenomenological based interviews examining the learning journey of the English trainees and consider to what extent their learning styles preference impact on their learning and development as teachers. He concluded there are ‘typical’ and ‘atypical’ learning style preference for trainees in different subject disciplines. In particular, these can be seen in relation to the sensing- intuitive and visual- verbal learning styles dimensions of Index of learning styles. Qualitative analysis indicate that the Learning styles preference is apparent in their memories of prior education and learning, their evaluation of university and school based teacher training and their choice they make as teachers in the classroom. Where as Vawda, (2005) investigated the learning style of first year university student specifically to learn the learning style as per faculty and explore the relationship between learning style and academic performance for students in various faculties Explorative descriptive correlational research was conducted with quantitative framework. It was found out across the six faculties the Accommodator learning style was the most represented, followed by the
Diverger learning style. No significant relationship was found between learning styles and academic performance.

2.5 GENDER DIFFERENCES

Gender differences is an important area of study in the field of education as the gender of learner is an influencing factor in learning contexts. The purpose of research of Aydin and Coskun (2011) to analyze geography teacher candidates’ metacognitive awareness and to find out whether a significant difference exists according to gender and grade level. 84 students were in the study. The study demonstrated that geography teacher candidates have a medium – high level of metacognitive awareness and the result did not show significant difference according to gender and class level variable. Corine (1994) studied mathematical problem solving and the role of metacognition strategies and beliefs she found out there is no gender difference in any variable except in the high knowledge group. High knowledge group boys out performed girls in one problem. Rahaman et al (2010) investigated the impact of metacognition awareness on performance of students in chemistry. 900 was their sample and the finding indicated that metacognitive awareness significantly correlated with performance of students. The highly metacognitively aware science students performed well on the test. Results further indicated that there was no significant difference in the metacognitive awareness of male and female students. However the study of Sulaiman, Abdullah & Ali (2006) on a sample of 389 physics students in Johor Bahru showed that the gender differences for both metacognitive and problem-solving skills were significant ($\alpha= 0.05$) and in favour of female students in stage one. In stage two the sample was 816 and result indicated no significant difference in gender for both variables. However in stage
three with a sample of 1300 the result showed that female physics students generally had significantly higher level of metacognitive awareness than boys.

In light of Tatarintseva (2002) review on gender differences in learning styles it is plausible to conclude that males are more peer motivated, nonconformist. In light of this observations it is plausible to assume that males are more assessment oriented and tend use surface approaches towards learning. Whereas females being more conformists, self-motivated or adult-motivated, it is plausible to assume that females are knowledge-oriented and tend to use deep approaches towards learning. Deep approaches towards learning demand use of metacognitive skills and this could be one of the reasons for higher metacognitive awareness in females compared to males found in another study.

The impact of some students’ related factors on their metacognitive awareness was examined by Rahaman et.al (2011). 1800 students of grade X participated in the study. The sample was selected from 120 secondary schools. Metacognitive awareness was measured using metacognitive inventory. Results further indicated that there was no significant difference in the metacognitive awareness of male and female students.

Gender differences are also researched in connection with academic self concept. Belfi, Goos, Fraine & Damme, (2012) examined the effects of the composition of a secondary school’s class group in terms of students’ school well-being and academic self-concept, by comparing the findings of previous research. The independent variables selected are class composition by ability and class
composition by gender. The dependent variables selected were: school well being, Academic self concept. The results of this literature review indicate that ability grouping is beneficial for strong students’ school well being but rather detrimental for the school well being of weak students. Also single sex education is more favorable for girls’ non achievement outcomes than for boys’ non achievement outcomes. Class compositions can lead to differential effects as well as opposing effects within the same students. Hence grouping of students is a delicate practice and it must be handled with care to reduce delinquency and drop out.

Yukeselturk and Bulut (2009) analysed gender difference in self-regulated learning components, motivational beliefs and achievement in self-regulated online learning environment. The study revealed that there was no statistically significant mean difference among variables with respect to gender and also the amount of variance in male and female students’ achievement can be explained with several variables.

Choudhary, Dullo and Tandon (2011) in their study on gender differences in learning style preferences of first year medical students found both males and females preferred multimodal learning but in different degree. Significant variation between the genders were revealed \((p<0.05)\). 92.98% males and 76.27% females preferred information to reach them via multiple sensory modalities. There was a significant gender difference in the percentages of males and females who preferred multimodal or unimodal styles of information presentation\((p<0.05)\) where as there was no gender difference in the percentage of males and females who preferred bi- tri – or quadmodal styles of information presentation\((p<0.05)\). Cooper (2005) explored
metacognitive development in professional educator. Results indicated that metacognition improves significantly with age and with years of teaching experience. There was no significant difference between gender and metacognition.

From the above studies it can be noted that researchers have taken efforts to investigate gender differences in metacognitive awareness, academic self concept and other variables related to learning. However, the findings of the studies are mixed wherein a few are favouring females, a few favouring males and a few showing no gender differences.

2.6 DETAILED REVIEW OF RESEARCH RELATED TO THE VARIABLES

2.6.1 Review of Research Related to Metacognition


Objective: To assess the effect of ‘metacognitive’ instruction on reading comprehension.

Method: Meta analysis of 20 studies with a population of 1553 were compiled and quantitatively analysed.

Result: For 115 effect sizes or the contrast between control and experimental group the mean effect size was 0.71 which is quite high. In this meta analysis study the metacognitive instruction was quite effective for junior high students (7th and 8th grades). Among the metacognitive skills, awareness of textual inconsistency and self
questioning as both a monitoring and regulating strategy were most effective. Reinforcement was the most effective teaching strategy.


Objective: The focus of the study was to understand i) how do students perform metacognitive, cognitive, and affective learning functions. ii) how is the learning functions regulated by internal and external sources. iii) what learning styles can be discerned from the viewpoint of learning functions and regulation?

Method: The students were selected from an open distance university and a regular university. They were interviewed extensively about their learning strategies, mental models of learning, learning orientations and interpretations and appraisals of instructional measures. The interviews were analysed in a phenomenographic way.

Results: Indicated that there is a large difference among students in the manner in which they carry out learning functions and the difference are associated with internal and external sources. It was also found out that four qualitatively learning styles can be discerned; undirected, a reproduction directed, a meaning directed and application directed learning style. Mental models of learning and learning orientation are related to the way in which students interpret, appraise and use instructional measures to regulate their learning activities.


Objective: The study investigated the relationship between academic self concepts metacognitive problem solving and ethnicity
Method: The student responded to questionnaires such as 1) Thinking About Problem Solving Scale. 2) Michigan State self concept of Ability Scale. 3) An 8 item instrument assessing student general academic self concept 4) Version of the same instrument assessing self concept in 4 content areas; mathematics, science, English & social studies. The sample selected for the study was 214 pre-freshman summer program designed to improve their basic skills before starting their formal college experience.

Conclusion: The study results showed zero order correlation when computed between metacognition measures, TAPS and different self concept indices indicating TAPS had moderately positive relationship with other variable. The strongest relationship were between general self concept and subject-specific self concepts Ethnicity results showed that Asians had the strongest intercorrelation of metacognition and general self concept.


Objective: To examine whether monitoring is better characterised as a domain specific or a domain – general phenomenon.

Method: Two experiments were conducted on college students. experiment one 134 under graduate students along with their course took 4 option multiple choice questions for 7 domains. In experiment two 135 undergraduates attempted 5 multiple choice questions with a brief questionnaire.

Result: The result showed qualified support to the domain- general hypothesis which states that monitoring within a specific domain is governed by general metacognitive processes in addition to domain specific knowledge. The study shows that monitoring
experience within specific domain is gradually generalized until it become
metacognitive skill that spans all cognitive domain.

2.6.2 Review of Research Related to Academic Self-Concept

2.6.2.1 Wengler, T. J. (2009). Academic Self – Concept and its relationship to student
perceptions of engagement, membership, and authenticity in an alternative high
school setting.

Objective: The objective of the study was to determine if a correlation exists between
the academic self-concept of students at an alternative suburban high school and their
perceptions of engagement, membership, and authenticity within their learning
environment.

Method: Quantitative correlational study involving student responses to two distinct
survey instruments were used in the study. One instrument assessed students’
academic self-concepts, and the other determined students feelings of engagement, membership,
and authenticity within their learning environment. Pearson product-moment coefficient was calculated to find the correlation.

Conclusion: It was found out that there is a strong correlation between academic self
concept and student engagement. A strong positive correlation (r(52) =.68, p <
.001) was found between the dependent variable of academic self – concept and the
independent variable of engagement for the entire population. When academic self –
concept and student perceptions of membership was analyzed a moderately strong
positive correlation (r(52) = .45, p < .001) was found. This suggest that roles and
membership have a magical effect on the students. A strong positive correlation (r(52)
was also noted between Academic self concept and student perception of Authenticity.


**Objective:** The purpose of the study was to answer two questions: will the items in the ASCQ fit the Rasch model? Can academic self-concept be formed by two subscales: academic confidence and academic effort?

**Method:** The total sample comprise of 88 male and 32 female students and their age ranged from 9 years 5 months to 12 years 7 months with a mean age of 11 years 1 month. The instrument used was the Academic Self – Concept Questionnaire, students’ scores in the Primary Three Examination taken by all participants at the end of their 3rd year of primary schooling were used as the academic variable. Obtaining a mark in this exam between 85-100 percent was allocated to Band 1 mark range of 75-84 percent was allocated to Band 2, Band 3 had the mark range of 50-74 percent. Band 4 was below 50 percent. The data were analysed using Rasch(1980) measurement techniques.

**Conclusion:** The study used the Rasch model to assess the unidimensionality and item – person fit of the an academic self-concept Questionnaire(ASCQ) that is based on the Confucian Heritage Culture(CHC) perspective. The ASCQ largely satisfies the Rasch model for unidimensionality. But four items had poor infit statistics suggesting that they do not contribute significantly to the scale hierarchy. Rasch model also confirmed the unidimensionality of the two subscales- Academic Confidence and Academic Effort.

**Objective:** The objective of the present study is to examine the effects of the composition of a secondary school’s class group in terms of these two features on students’ school well-being and academic self-concept, by comparing the findings of previous research. The independent variables selected are class composition by ability and class composition by gender. The dependent variables selected were: school well-being, Academic self-concept.

**Method:** The study used 19 peer reviewed articles written in English after 2000. The sample was selected from secondary school. 10 publications examined are on the effect of class composition by ability and 9 publications studied the effect of class composition by gender on students’ school well-being and academic self-concept.

**Conclusion:** The results of this literature review indicate that ability grouping is beneficial for strong students’ school well-being but rather detrimental for the school well-being of weak students. Also single sex education is more favorable for girls’ non-achievement outcomes than for boys’ non-achievement outcomes. Class compositions can lead to differential effects as well as opposing effects within the same students. Hence grouping of students is a delicate practice and it must be handled with care to reduce delinquency and drop out.

**Objective:** The study is to find out a new multidimensional nested-factor model of academic self concepts that incorporates both domain-specific and general academic self concepts, and the position of general academic self concepts at the apex of the self concept hierarchy.

**Method:** The sample selected comprises of 15 year old students in 26 countries (N = 106,680). Strict mechanisms and multi-stage sampling mechanism were applied to get high representation of the data. The instruments used in the PISA study consists of the items from the Self Description Questionnaire which is considered to be the best self-concept instrument. To make the questionnaire small three best items were selected from the 10 item self concept scales for verbal, mathematics, and academic self-concepts by the statistical experts after pilot testing. Statistical analyses were conducted in two steps for first order factor model and the nested-factor model of academic self-concepts.

**Conclusion:** The finding showed that the nested-factor model provided a good fit to the data in each of the 26 countries. General and domain-specific academic self-concepts were meaningfully related to gender as well as to student achievement. Further more, it showed that the relationship between academic self concepts and student characteristics may differ substantially depending on whether the model applied does or does not account for the influence of general academic self-concept on domain-specific measures of academic self concepts.

**Objective:** The purpose of the conceptual paper is to suggest educationist with a framework for understanding the academic self-concepts of gifted students. Academic self-concept is theoretically linked with other constructs, including academic achievement and aspirations, it is very important that educators be aware of the experience gifted students may face.

**Discussion:** According to them academic self-concept is an idea or set of ideas one has about oneself. Since they were working with gifted adolescents a number of strategies to decrease the negative effects of social comparison on student’s academic self-concept suggested as follows: a) Be familiar with the extent of self – concepts that may be held by each talented student. b) Self-concept must not be viewed as a means to its own end. Give realistic praise and challenge to the gifted students. c) Information about the student characteristics i.e. learning styles, motivation self-concept, can help in planning learning experience. d) Student must be given balanced exposure to competitive, cooperative and individualistic activities in the classroom. e) Provide student with feedback about individual growth instead of comparison with other students. f) Expose teachers with opportunities to learn more about the special needs of gifted students.


**Objective:** The purpose of the study is to examine i) whether academic (eg. Math) self – efficacy and academic self- concept represent two conceptually and empirically distinct psychological constructs when studied with the same domain. ii) the nature of
relationship existing between both self – constructs. iii) their antecedents iv) their mediating and predictive qualities for background variables such as gender and prior knowledge and outcome variables such as math performance, math interest, and math anxiety

Method: the study is based on the Belgian data from the 2003 PIA survey. The measures selected are Math self efficacy, Math self concept, Math anxiety, and Math Interest. Along with this gender, prior math grade, difficulty level of secondary studies and Math score. Amos 6 with maximum likelihood Estimation was used to analyse the data.

Result: i) Math self – efficacy and math self- concept are conceptually and empirically different constructs .ii) students ‘academic self – concept strongly influences their academic self – efficacy beliefs. iii) academic self- concept is a better predictor for affective – motivational variables, while academic self- efficacy is the better predictor academic achievement.


Objective: The purpose of the study is to find the relationship of ability, academic achievement, social comparison, perceived level of difficulty, academic self- concept, and future goals in populations of accelerated high schools students.

Method: The sample comprise of three groups(International Baccalaureate , Advanced Placement, and Residential high school in the campus). Several instruments were used based on the variables used in the study.
Result: The three groups have different patterns of self concept according to the model in the study. The three groups perceived difficulty and achievement were larger predictors of academic self – concept than the social comparison variables. The study found strong relationship between a student’s academic self- concept and his or her future educational aspirations.


Objective: The purpose of the study was to find the relationship between academic self – concept and academic performance.

Method: The sample consists of 363 students selected by multistage cluster sampling method. The questionnaire was made by the researcher, scholastic marks were used.

Result: There is a close relationship between academic self – concept and measure of academic performance.

2.6.2.9 Marsh,H.W and Martin,A.J.(2011). Academic Self Concept and Academic Achievement: Relations and causal ordering

Objective: The purpose of the review is to examine support for the reciprocal effects model(REM) that posits academic self- concept and achievement are mutually reinforcing, each leading to gain in the other – and its extension to other achievement domains.

Method: Review of theoretical, methodological, and empirical support for the REM a meta analysis.
Result: ASC has direct and indirect effects on achievement. An increase in ASC result in increase in achievement. It also plays a central role in other educational outcomes.

2.6.3 Review of Research Related to Hemispheric Dominance


Objective: To investigate the difference in brain hemisphericity and learning styles on students’ confidence in using the graphics calculator (GC) to learn mathematics.

Method: The sample size was 44 undergraduate mathematics students in Malaysia and the instruments used were Brain – Dominance Questionnaire, Index of learning Style Inventory, and Confidence in Using GC to Learn Mathematics Questionnaire.

Conclusion: The statistical analysis showed that the sample differ significantly in their hemispheric preference and learning styles Sequential- global and sensing intuitive learning styles were found to associate significantly with brain hemisphericity. However, there was no significant association between brain hemisphericity with gender, race and program of study. Finally, the study also revealed that GC confidence rating ae not significantly different across brain hemisphericity as well as learning styles.


Objective: To study the association between problem solving strategies and brain hemisphericity
Method: A sample of 98 ninth grade students were randomly selected from a high school in south east Texas to be surveyed. The students completed a demographic questionnaire, an open-ended mathematics problem and the style of learning and thinking questionnaire.

Results: students who tested high for left brain dominance tended to prefer a written, logical explanation strategy to solve certain complexity levels of the mathematics problems. Students who tested high in right brain dominance, tended to prefer drawing diagram to solve certain complexity levels of the mathematics problem. The study concluded that the general characteristics associated with each hemisphere of the brain, also apply to mathematical problem solving. Hence the researcher concludes that using teaching strategies that are associated with both hemispheres develop more whole brained mathematical problem solvers.

2.6.3.3 Erduran Avci,D., and Yagbasan,R.(n.d.). A Study on impact of Brain – based learning Approach on Students’ achievement and retention of Knowledge about “Work-Energy”.

Objective: The purpose is to find the effect of brain- based learning approach on 7th grade students’ achievement and retention of knowledge about “work – energy’ issue.
Method: The sample is 91 students of 7th grade in experimental and control group. Pre test Post test control group design is used. Lectures were conducted based on brain based learning approach.
Result: The results show 43.3% of the experimental group use slight preference toward left, 26.7% show slight preference toward the right dominance 20% moderate preference for the left. Brain based instruction affect achievement of the students.
2.6.3.4 Morton, B.E and Rafto, S.(2006) Sex and Aggression: Corpus Callosal size is linked to Hemisphericity not Gender

Objective: To find the relation between Corpus callosum cross sectional area (CCA) and hemisphericity

Method: magnetic resonance imaging(MRI), 113 subjects

Result: Midline CCA of 113 subjects were significantly correlated not with handedness or sex but with hemisphericity. Right brain oriented individuals of both sexes had significantly larger CCA than left brain – oriented persons of either sex. There are quantitative methods to assess any person in terms of their probable right or left brain orientation. A primary standard has been discovered that enables the absolute hemisphericity of an individual to be determined, based on anatomical landmarks within the brain. Many traits that separate the cognitive and behavioural styles of R- and L- brain oriented person have been identified, most of which have no known ties to brain asymmetry as yet. Hence brain hemisphericity must be included in the studies and observation support many binary behaviours correlated with hemisphericity which are currently mistaken for sexual traits.

2.6.4 Review of Research Related to Learning Styles

2.6.4.1 Claycomb, M (1978) Brain research and learning

Objective: To understand research on brain activity and its implications for educators

Method: A critical analysis of the Human Brain and its functions is done. A narrative description of various researches through the years and specifically highlighting the concept of triune brain, division of labour concept between left and right hemisphere are done.
Conclusion: theories of brain formation suggest that our concern as educators must be for educating all areas of the brain. Researches suggest that basic education must include informational, processing skill, non logical behaviour and artistic activities that form our creative life. Brain dysfunction may be the reason for many disabilities. Many social and emotional problems have their roots in brain dysfunction. Hence a teacher require to deal with varied approach to such students. Implicit in all research is that in instruction use many modalities to match different learning styles. Also stress on individual approach to instruction is stressed.


Objective: The study is a meta- analysis on several articles based on gender difference in learning styles conducted after 1980.

Method: Curry’s onion model was used to classify the definitions on learning styles and to reconstruct the theoretical frameworks. The extent to which learning style is considered stable or variable in different context determine its position in the model. Narrative review was taken to review the articles as well as quantitative study was also used. The two instruments used are Kolb’s learning style inventory and Entwistle’s Approaches to studying inventory to determine the direction and magnitude of gender differences in various samples

Conclusion: According to Curry Model it was found out most of the theoretical framework fell in the middle or outer layer of the Model. This location indicates that strong influence of learning context on women’s and men’s learning styles. While there were difference between Learning styles, research design rarely included learning context. On Kolb’s instrument the results showed that men were more likely
than women to prefer the abstract conceptualization mode of learning. On Entwistle’s ASI a difference was found on the affective component of approaches to studying.


Objective: To learn the learning style of first year university student specifically to learn the learning style as per faculty and explore the relationship between learning style and academic performance for students in various faculties.

Method: Exploratory descriptive correlational research conducted with quantitative framework.

Conclusion: Across the six faculties the Accommodator learning style was the most represented, followed by the Diverger learning style. No significant relationship was found between learning styles and academic performance.


Objective: The study was conducted to measure perceived cognitive style, metacognitive monitoring and epistemic cognition, hierarchal model of cognitive processing as an indicator for problem solving confidence. The tries to find out whether cognitive indicators can be used as a diagnostic foundation for improving ill-structured problem solving capacity for adult professionals who develop software or use software systems to solve ill – structured problems.

Method: A 95-item questionnaire was used to determine 1) the relationship between cognitive style and problem solving confidence, 2) the relationship between metacognitive monitoring and problem solving confidence, 3) the relationship between epistemic cognition and problem solving confidence, and 4) whether
cognitive style, metacognitive monitoring, and epistemic cognition explain a significant amount of variance in problem solving confidence. Multivariate analysis and backwards (stepwise) linear regression were conducted to establish the relationship between each of the study variables.

**Result:** The analysis determined that measured scores for the perceived cognitive style and metacognitive monitoring were moderately significant predictors of problem solving confidence as evidenced by a regression model that explained 20.5% of the expected variance.


**Objective:** to study the learning styles preference of PGCE English trainees.

**Method:** mixed method is used for the study. Data was collected using Felder & Solomon (1994) Index of learning styles questionnaire and three phenomenological based interviews examining the learning journey of the English trainees and consider to what extent their learning styles preference impact on their learning and development as teachers.

**Conclusion:** There are ‘typical’ and ‘atypical’ learning style preference for trainees in different subject disciplines. In particular, these can be seen in relation to the sensing- intuitive and visual- verbal learning styles dimensions of Index of learning styles. Qualitative analysis indicate that the Learning styles preference is apparent in their memories of prior education and learning, their evaluation of university and school based teacher training and their choice they make as teachers in the classroom.
2.6.5 Review of Research Related to Academic Achievement

2.6.5.1 Landline, J., Stewart, J. (1998). Relationship between Metacognition, Motivation, Locus of control, self efficacy, and Academic Achievement.

Objective: The purpose of the study was to find the relationship between Metacognition and certain personality variables and the role they play in academic achievement.

Method: A sample of 108 students were selected for the study. The instruments used were i) learning process questionnaire for assessing the extent to which students endorse different metacognitive approaches to learning. ii) general information questionnaire- to find the general information of the respondents. iii) Harter’s scale of Intrinsic Versus Extrinsic orientation in the classroom- this was used to assess students’ motivational orientation toward learning. iv) The Nowicki – Strickland Scale is a scale to measure individual locus- of – control v) The general Self- Efficacy Scale to measure general expectations of self – efficacy.

Result: The results indicate that there is a positive relationship between metacognition, motivation, locus of control, self- efficacy and academic average. Hence there is a relation between metacognition and the selected personality variables.


Objective: To examine the effect of Metacognitive instruction on the mathematics achievement in the final examination. Also to examine the differential effects of
metacognitive instruction on two components of metacognition: knowledge about cognition and regulation of cognition.

**Method:** A sample of 61 students who studied mathematics for matriculation exam were selected and half of them were subjected to meta cognitive instruction called IMPROVE and other became the control group. The data was collected in three areas i) matriculation exam results, ii) Metacognitive Awareness Inventory of Schraw (1994) and Interviews. Analyses were both quantitative and qualitative methods.

**Result:** It was found that IMPROVE students outperformed their counterparts on mathematics achievement and regulation of cognition, but not on knowledge about cognition. Furthermore, during the matriculation exam, IMPROVE students executed different kinds of cognitive regulation processes than the control students.

**2.6.5.3 Coutinho, S.A (2007). The relationship between goals, metacognition, and academic success.**

**Objective:** The study investigated the relationship between mastery goals, performance goals, metacognition and academic success.

**Method:** The participants were 179 undergraduates of a Midwestern University and survey method was used. The students completed the 25 item goals inventory, 52 item Metacognitive Awareness Inventory and a demographic sheet.

**Results:** Analyses revealed a partial mediation effect in the relationship between mastery goals and academic performance. Performance goals were unrelated to academic performance and the study suggests that students with mastery goals reap the rewards of academic success.
2.6.5.4 Young, A and Fry, J.D.(2008). Metacognitive awareness and academic achievement in college students

Objective: The purpose of the study was to determine how Metacognitive awareness relates to broad and single measures of academic achievement in college students.

Method: A sample of 178 students completed MAI face to face out of which, 45 were graduates and 133 were undergraduates 158 were online respondents.

Result: Correlations were found between Metacognitive awareness and cumulative GPA as well as end of course grades. Scores on the MAI significantly differ between graduates and undergraduates.


Objective: To study the impact of metacognitive awareness on students’ performance in chemistry.

Method: The sample size for the present study is 900 students of grade X. Metacognitive awareness was measured using MAI and the performance of students was measured with the help of researcher made test in the subject of chemistry.

Result: Indicated that metacognitive awareness was significantly correlated with the performance of students. The highly metacognitively aware science students performed well on the test. Also there was no significant difference in the metacognitive awareness of male and female students.
2.6.5.6 Trainin,G, Swanson, H.L. (2005). Cognition, Metacognition and Achievement of College students with learning disabilities [LD]

**Objective:** The purpose of the study was to study find how successful college students with LD compensated for their deficits in phonological processing. For this the researchers compared the cognitive and metacognitive performance of students with and without LD.

**Method:** The sample size was 40 (20 LD and 20 normal) from four universities of southern California. They were matched closely as possible on demographic variables such as ethnicity, college major, gender and academic standing. Though achievement levels for both group were comparable students with LD scored significantly lower than students without LD in word reading, processing speed, semantic processing and short – term memory. Differences were also found between groups in self- regulation and number of hours of studying.

**Result:** students with LD compensated for their processing deficits by relying on verbal abilities, learning strategies, and help seeking.

2.6.6. Review of Research Related to Gender Differences

2.6.6.1 Kusumoto,K (2009). Gender effects on College Students’ Academic Knowledge Awareness

**Objective:** The purpose of the study is to find whether there is gender difference or correlation in an academic achievement with concerning of accurate knowledge awareness among college students.

**Method:** An academic test was provided in the last week of the semester for the students. On the side of the test Knowledge Monitoring Accuracy (KMA) were displayed on the right side of the test items. Along with the test items answering they
were required to answer the KMA also. Students were told there were no right or wrong answer for KMA and had no effect on their academic grades. Thus they completed their exam as well as the KMA questionnaire simultaneously. In this study KMA scores were analysed

**Results:** There were no significant difference among variables between male and females. Significant positive correlations were reported between KMA complex and academic scores as well as academic scores and KMA positives and significant negative correlations were reported between academic scores and KMA negatives. It was concluded that there are no differences in gender but still KMA still identify student learning awareness appropriately. This study reveals that higher KMA positives positively relates to better academic achievement and students with higher KMA negatives, negatively relates to lower academic achievement in educational situations.

**2.6.6.2 Cooper, S.S.(2009) Metacognitive Development in Professional Educators**

**Objective:** The purpose of the study was to examine the metacognitive skills of adults.

**Method:** Metacognitive awareness inventory was completed by 214 pre-service and experienced teachers. Metacognitive awareness Inventory developed by Schraw and Dennison (1994) was used for the study.

**Result:** The results indicated that metacognition improves significantly with age and with years of teaching experience. male and female respondents showed no significant difference in metacognition.

**Objective:** The purpose of the study is to examine the difference between metacognition of English and Science teachers in secondary school.

**Method:** The sample of the study consisted of 100 English teachers and 100 science teachers in secondary school.

**Result:** It was found out science teachers performed better than English teachers on metacognitive inventory and teaching experience of teachers significantly accounted for difference in metacognitive awareness score of teachers. The study did not find any significant gender difference in metacognitive awareness of teachers.

### 2.7 REVIEW OF RESEARCH IN INDIAN CONTEXT

#### 2.7.1. Review of Research Related to Metacognitive Awareness and Academic Self-Concept

**2.7.1.1 Srivastava, R and Joshi, S.(2011). The effect of school and area on academic self-concept and Academic Achievement of Adolescents**

**Objective:** The purpose of the study is examine the i)effect of school on academic self-concept and academic achievement of adolescent ii) the effect of area on academic self-concept and academic achievement of adolescents.

**Method:** To measure academic self-concept, Indian adaptation of March Academic Self Description Questionnaire II was used. Index of academic achievement was
prepared from two previous annual examination of the students along with the personal data sheet.

Result: Academic self-concept and academic achievement of adolescents were higher in the high facility schools than the low facility schools. Academic achievement of urban adolescents was also higher as compared to rural adolescents. A student needs a good academic self-concept in order to be success in their later life. To achieve this success, school and area of residence do affect the adolescent’s academic self-concept and academic achievement.

2.7.2 Review of Research Related to Metacognitive Awareness and Learning Styles

2.7.2.1 Acharya, C. (2002) Students’ learning style and their Implications to teachers.

Objective: The purpose of the article is to discuss prominent research on learning styles and the implication of learning styles in teaching strategies.

Discussion: Learning styles are studied by psychologists and various models are developed such as of Kolbs, Dunn and Dunn. Awareness of learning styles can help faculty to be sensitive to the various students with various learning styles. They can prepare learning experiences to match the wide array of learning styles of the class. The theories of learning styles can be condensed into four dimensions. i) Personality of the learners. ii) Information processing iii) Social and Situational Interaction among learners. iv) Identifying learning styles. Some of the strategies to promote effective learning using data on learning styles are; i) conduct research and get
information about learning styles ii) Establish curricular experience that help students learn how to learn. iii) Inventories of learning styles and other processes can be used to help make students aware of their own preferences and strengths.

2.7.2.2 Sharma, A.A(2009). Learning styles across culture: Study on Learning styles of students pursuing Management Education in India.

Objective: The purpose of the study is to explore the learning styles of students pursuing management education in India and its implication on the educators.

Method: The sample comprised of 175 students with well balance representation from males and females. For the purpose of the study, HELP(Hardy Educational Learning Profile) an adult cognitive learning style instrument developed by Dr.Christopher Hardy and Dr.Susan Hardy was used.

Result: Both the genders have outer focussed interaction, preference for concrete information and objective decision making style. ANOVA test was performed on the three dimensions of the HELP questionnaire to test the significance of difference between the mean scores of male and female students on dominant learning characteristics. The test substantiated the conclusion that there was great similarity in both genders displaying outer interaction focus and taking objective decision. But there was some disparity between them on information gathering process with males showing higher preference to concrete information as compared to females.

2.7.2.3 Sharma,P(2011). A study of learning- thinking style of Secondary School students in relation to their academic achievement.

Objective: The study attempts to find out the relationship and significance of difference between academic achievement and learning – thinking style of secondary school students.
Method: Normative Survey Method was applied for the study and standard X was used for the study.

Result: The analysis indicated that learning – thinking style and academic achievement of secondary school students are positively and significantly related to each other. Academic achievement is a factor which influence the learning – thinking style of secondary school students. Male and female secondary school students are not different in respect to their academic achievement whereas they are different in respect to their learning – thinking style.

2.7.3 Review of Research Related to Metacognitive Awareness and Academic Achievement


Objective: To study the readiness towards the use of meta-cognition in the learning process of higher secondary students.

Method: Survey method was used for the study and the sample comprised 214 final year students of higher secondary school in Ahmedabad. Meta cognition Use Readiness Scale (MURS) was used to collect the data.

Results: It was found out that there is a significant difference in the readiness towards the use of meta-cognition of higher secondary students on the basis of gender differences. Also there was significant difference among the higher secondary students in the readiness towards the use of meta-cognition on the basis of academic streams. There was positive correlation between the readiness towards the use of metacognition and academic achievement.
2.7.3.2 Mamta, Garg. (2011). Peeping into the learning world of secondary teacher trainees: can their academic success be predicted?

Objective: The purpose of the study was to examine the styles of learning and thinking, study habits, achievement motivation of teacher trainees along with their attitude towards teaching and perception for B.Ed course. Also the predictors that may determine the academic success of the pre-service teachers were analysed.

Method: By random sampling technique 200 pre-service teachers were extracted for the study. The scales used for the study were i) Socio economic status scale ii) styles of learning and thinking – SOLAT tool iii) Deo – Mohan Achievement Motivation (n – Ach) Scale. iv) Study habit Inventory v) Teacher attitude Inventory vi) perception about B.Ed course scale developed by the researcher.

Result: The data was analysed by product moment correlation, factor analysis, and multiple regression. No significant correlation were obtained between age and three variable of academic performance that is theory papers, skill in teaching, and total marks. This means the academic performance of on-campus trainees is not related with their age. But socio-economic status had positive and significant relationships with performance of trainees in their skills in teaching exam and overall performance. The performance in theory paper had nonsignificant relationship with socio-economic status. There was no significant correlation between left or right hemispheric learning styles and academic performance. In fact left hemispheric thinking styles trainees had negative correlation with their performance in theory papers, showing their marks were low in theory papers. Right hemispheric thinking styles have non-significant relationship with academic performance. The study habits have nine predictors of which budgeting time, reading ability, note taking,
memory, healthy habits and overall study habits have positive and significant relationships with their theory paper marks. The performance in skill in teaching of on-campus teacher trainees is related positively and significantly with notes-taking whereas the condition for study is negatively correlated with the performance in skill in teaching. The overall academic performance of these trainees is significantly and positively correlated with budgeting time and healthy habits. These enhance the performance of on campus teacher trainees in theory papers and aggregate marks. Achievement motivation have positive correlation with academic motivation, academic challenge, meaningfulness of task, attitude towards teachers, individual concern, general interest and dramatics. Performance skills in teaching have significant negative correlation with achievement anxiety and sport. Attitude of the trainees towards teaching profession has significant correlation with performance in theory papers and performance in skills in teaching.

2.7.4 Review of Research Related to Metacognitive Awareness and Gender Differences


Objective: To study the effect of gender on Madyamik results

Method: Multistage stratified clustered sampling was adopted in the study. Total sample was 1530. Detailed mark sheet were collected and socio economic information was also collected

Results: It was found that average marks obtained by boys and girls did not differ significantly. Significant differences were observed in average marks of boys and girls group for various regions having various degree of urbanisation. Boys performed
2.7.4.2 Sheeja, S.V and Annaraja, P. (2011). Teaching Competency of secondary teacher education students in relation to their metacognition.

**Objective:** To explore the effectiveness of metacognitive skills in developing the teaching competency among secondary teacher education students.

**Method:** Survey method was used for the study with a sample of 600 students. It was selected by stratified random sampling technique. The scales used were metacognitive inventory and teaching competency scale. t-test

**Result:** Male and female teacher education students differed significantly in metacognition. Female students are better than male students. Rural and urban students differed significantly in metacognition with urban students mean scores were better than the rural students. Male and female students do not differ significantly in teaching competency except in the dimension of interest in profession. Urban students are better than rural college students in their interest in profession, instructional strategy and classroom behaviour, except in the dimension of attitude towards children and teaching competency in total. It was found that there is significant relationship between metacognition and teaching competency of secondary of secondary teacher education students.
2.7.5. Review of Research Related to Metacognition

2.7.5.1 Narayanan, A (2009). Resilience, Metacognition and Complexity

**Objective:** To examine the relationship between resilience and certain cognitive variables

**Method:** Resilience was assessed by using Resilience Scale for Adolescents. Sample 114 high school in the age group of 15-16 years. Both male and female students were included in the study.

**Result:** Findings showed that among the aspects of attributional schemata investigated in this study complex explanation and metacognition had significant effect on resilience. The highly resilient had higher preference for complex rather than simple explanation for explaining human behaviour and used metacognition concerning explanations more than those who had low resilience.

2.8 IMPLICATIONS OF THE REVIEW OF LITERATURE FOR THE PRESENT STUDY

Number of studies have been conducted on metacognition in relation to various variables, such as math and verbal ability; motivation and locus of control; self efficacy, academic average; and learning styles. Not many studies were found in relation with hemisphericity, some studies found were in relation to sex and aggression, learning styles and problem solving strategies. Similarly academic self concept was studied in relation to achievement, academic self efficacy, affective development. Only one study was found between self concept and metacognition of ethnic minorities. There were some studies on learning styles and metacognition and
learning styles and learning development. These studies have become the foundations for the present studies.

The present study is a correlation study between metacognitive awareness and selected variables such as academic self-concept, hemispheric dominance, learning styles, academic achievement and gender differences in metacognitive awareness. No study was found for metacognition in relation to such a wider array of educational relevant variables. It was also noted that very few studies are done on metacognition in India.

2.9 SUMMARY

The review of research shows that metacognitive awareness is positively correlated with academic achievement. Metacognitive factors have significant relations with academic self-concept. With respect to gender differences no particular trend could be analyzed as the research conducted has used more of specific purposes. However, most of the studies show no gender differences in metacognitive awareness.
REFERENCES


Bigozzi, L & Vezzani, C. (2005). *Role of individual writing on metacognitive awareness in scientific concepts learning.* A study conducted by the Department of Psychology, University of Florence, Italy.


convention of the American Educational Research Association in San Francisco,


Dixit, M. N. (2011) Readiness towards the use of metacognition and its relationship with academic achievement of higher secondary schools. *SPIJE 1*(1)

*Engineering Education, 94*(1), 57-72.


Flavell, J. H. (1979). Metacognition and cognitive monitoring. a new area of


Garg, Mamta (2011) "Peeping into the Learning World of Secondary Teacher
Trainees: Can their Academic Success be Predicted?," *Australian Journal of
Teacher Education*: Vol. 36: Iss. 12, Article 8. Available at:
http://ro.ecu.edu.au/ajte/vol36/iss12/8

performance in high school students. *Science direct procedia Social and
Behavior Science*. 15.1034-1039. Retrieved on 06/05/12 from

Business Review*. 11(1)

quantitative synthesis of “Metacognitive” Studies.*Educational Researcher* 17(9)
5-8

metacognition in ethnic minorities. Paper presented at the American
Psychological Association Annual conference, Sanfrancisco.(ERIC
Document.ED347 877).


comparison, and achievement among academically accelerated secondary


Springer. doi:10.1007/s11409-006-6893-0


Sulaiman, S., Abdullah, F. and Ali, M. (2006). *Gender and Ethnicity Differences in Metacognitive Skills and Problem-solving Ability among physics students in Johor*. This paper is presented at Science and Mathematics Research Seminar, jointly organised by Science and Mathematics Association Johor and Faculty of Education, *(UTM)* on 27th December 2006 at C15-220(Seminar room) Faculty of Education Universiti Teknologi Malaysia, Skudai Johor


Young, A., & Fry, J.D. (2008). Metacognitive awareness and academic achievement in college students. *Journal of the Scholarship of Teaching and Learning*. 8(2) 1-10