CHAPTER I

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“All round development” will be the answer of every person, especially associated to the field of education directly or indirectly, when one is asked about ultimate aim of education. It is perhaps the most appropriate answer to the question also but question arises, do we have such a perfect education system? Do our education policies are self sufficient to cater the needs of the society? Do our schools are actually providing such facilities to the teachers as well as to the students so as to facilitate the process of achieving this aim? Or do we have well equipped teachers with full knowledge of latest methods and techniques required to achieve such aim?

Vivekananda points out that the defect of the present day education is that it has no definite goal to pursue. A sculptor has a clear idea about what he wants to shape out of the marble block; similarly a painter knows what he is going to paint. But a teacher, He says, has no clear idea about the goal of his teaching. His words clearly reflected the scenario of education system in the country like India (Nithiya, 2012).

If we look into the past, India was known for its education system and Indian philosophy. Many educationists of India made their place in the eyes of the world, but with the modernization and westernization, the entire concept of education has changed. The concept of education has never been so important and central in the life of individuals, organizations, and societies in the history of our civilization as it is observed in the contemporary times. Today’s societies are living, developing, thriving, competing and improving on the pivot of knowledge only. To satisfy the needs of students of the 21st century new experiments, creative innovations, and appropriate strategies are being developed and tried out to improve education at all levels. Strategy is the art of conducting a campaign. In education, it is a scientific way of presenting the subject matter, keeping in mind the psychological and physical requirements of children.

The task of knowledge representation has two parts: the first is to analyze body of knowledge and identify the relevant concepts, relations, and assumptions; the second is to translate the result of the analysis into some notation that can be processed. Neither part is easy, but the first is far more difficult (Sowa, 2006). The teachers who use the traditional
method exclusively on the presentation of the contents to be learned, with all the imperfections which Ausubel points to the expository teaching, which is used in schools (Ausubel, 2003) in which the teacher uses "pure verbal techniques" too early, presenting information very often in a tactful and arbitrary way, without realizing at all the frameworks. So there is need to clear concepts in the minds of the learner. More simply, knowledge is constructed in the mind of the learner (Bodner, 1986). Cognitive psychology places emphasis on understanding how the mind works, on how learners learn, and on meaningful learning. The constructivist learning theory, with its roots in the learning theory of Ausubel, Novak and Hanesian (1978) clearly states that every learner actively builds or constructs her or his own private understanding of the world. (Markow & Lonning, 1998)

So the demand of today education is to shift from verbalism or lecture method to learning by doing, learning by actively involving i.e. collaborative learning, cooperative learning, Concept Mapping “The most important single factor influencing learning is what the learner already knows, ascertain this and teach accordingly” (Ausubel, 1968). It clearly demands a strategy that would transform the position of the teacher from being active speaker to facilitator. As stated by the logician Alfred North Whitehead “Human knowledge is a process of approximation. In the focus of experience, there is comparative clarity. But the discrimination of this clarity leads into the penumbral background. There are always questions left over. The problem is to discriminate exactly what we know vaguely”. Here Whitehead (1937) clearly explained the role of discrimination for concept formation.

1.1 CONCEPT MAPPING

A concept map can be considered as somewhat similar to a spider chart, an organized chart of a flow diagram. A concept map for teaching and learning is one, arranged in a hierarchical organization in which the more inclusive concepts at the top of the map and the more concrete and specific ones at the bottom.

Concepts are the basic unit of all types of learning. The concepts are the ways by which facts and experiences can be integrated and remain impressed in the mind much longer than facts. According to Weil and Joycee (1978) “Helping children learn concepts and teaching them how to learn concepts is a fundamental purpose of schooling.
Constructivist approaches to teaching and learning science emphasize deep understanding of concepts (as opposed to memorization), discussion, explanation and exploration to students’ implicit knowledge”. So to be successful in learning, students have to take possession of knowledge actively by seeking experts conceptual linkages between new concepts and those, they already possess.

Originally the method was developed by Novak at Cornell University in the 1960s. This concept emerges in the field of learning after new school of constructivism, which accepts active participation of the learner in construction of knowledge.

This process of elaborating personal, meaningful knowledge takes place by restructuring the already existing concepts. “Meaningful learning involves the assimilation of new concepts and proposition in the existing cognitive structures” (Novak, 1991).

Concept maps are used as teaching tools and have generated many positive results in the classroom (Novak, 1980; 1981). Ausubel (1963) made the very important distinction between rote learning and meaningful learning. Meaningful learning requires three conditions:

a) The material to be learned must be conceptually clear and presented with language and examples relatable to the learner’s prior knowledge. Concept maps can be helpful to meet this condition, both by identifying large general concepts held by the learner prior to instruction of more specific concepts, and by assisting in the sequencing of learning tasks though progressively more explicit knowledge that can be anchored into developing conceptual frameworks.

b) The learner must possess relevant prior knowledge. This condition can be met after age 3 for virtually any domain of subject matter, but it is necessary to be careful and explicit in building concept frameworks if one hopes to present detailed specific knowledge in any field in subsequent lessons. We see, therefore, that conditions (1) and (2) are interrelated and both are important.

c) The learner must choose to learn meaningfully. The one condition over which the teacher or mentor has only indirect control is the motivation of students to choose to learn by attempting to incorporate new meanings into their prior knowledge, rather than simply memorizing concept definitions or propositional statements or
computational procedures. The indirect control over this choice is primarily in instructional strategies used and the evaluation strategies used. Instructional strategies that emphasize relating new knowledge to the learner’s existing knowledge foster meaningful learning. Evaluation strategies that encourage learners to relate ideas they possess with new ideas also encourage meaningful learning (Novak & Canas, 2006).

Concept maps are frequently employed in the classroom because they offer a "complementary alternative to natural language as a means to communicate knowledge" (Gaines & Shaw, 1995). This visual approach has proven to be of great benefit to diverse student groups.

Concept Maps are generally confused with Mind Maps but these are two different ways of classifying and representing information.

![Concept Map Diagram](http://www.banxia.com/dexplore/resources/whats-in-a-name)

**Figure 1.1: Representation of information through Mind Maps**

http://www.banxia.com/dexplore/resources/whats-in-a-name

In Mind Maps (figure 1.1, Weideman & Kritzinger, 2003) one main concept is taken as starting point, and becomes the “central word”. Further five to 10 main ideas (also called child words) are then plotted around the central word, with links back to the central word.
Another five and 10 ideas can be added to any one to these child words, creating an ever growing pattern of network of concepts around the central one (Buzan, 1993). In a mind maps links are usually “passive”, not representing anything more than association. In concept maps the links are labeled with descriptions, representing anything more than, defining the association between concepts.
Concept Mapping is the second way of representing information. There are three features used in creating concept maps: (a) a list of concepts, (b) lines that represent the relational links between these concepts, and (c) labels for these linking relationships. These have been defined by Martin (1994) as “two-dimensional representations of cognitive structures showing the hierarchies and the interconnections of concepts involved in a discipline or a subdiscipline”. So the main difference between Mind Maps and Concept Maps is that the first has only one central concept while the later could have a number of them.

The procedure of Concept Mapping starts with the generation of a list of concept through brainstorming. Connecting lines are drawn between these concepts to indicate the flow of interrelationships between concepts which may result in a knowledge structure. These maps can be refined by many rethinking and redrawing processes as more knowledge is accumulated form a search (Novak, 1995).

1.1.1 Kinds of Concept Maps -

**Spider Maps**- These maps are organized by placing the central theme in the centre of the map. Sub-themes are shown surrounding the centre of the map in an outwardly radiating manner.

![Figure 1.4: Spider map](image)

**Advantages** -

- Easy to configure.
- Data is organized around a unified theme.
- Easy to read.
Disadvantages -

- Difficult to show relationship without making the map messy.
- Does not allow for the integration of all data and the relationship among data.

Hierarchical/chronological Maps - These maps present information in a descending order of importance. The most important information is placed on the top. Distinguishing factors determine the placement of the information.

Advantages -

- Follows a definite pattern.
- Most general data is located at the top and moves to the specific data.
- Easy to read.

Disadvantages -

- Does not allow an interrelationship between data.
-Disallowing a route for critical thinking.

Flow chart maps - These maps organize information in a linear format.
Advantages -

- Easy to read.
- The information is organized in a logical orderly fashion.

Disadvantages -

- Minimal data can be shown in such maps, which leads to incompleteness.
- Lacks critical thinking and reasoning skills.

Systems maps - These maps organize information in a format similar to the flowchart with the addition of ‘Inputs’ and ‘Outputs’.

![Systems map](image)

**Figure 1.7: Systems map**

Advantages -

- Very complete as including all data that allows for the interrelationship to be evident.
- Uses both critical thinking and problem solving skills.
- Linking both theory and practice.

Disadvantages -

- Such maps are usually very complex.
- Can be difficult to read due to the number of relationship involved.
- Take more time to complete.

Jonassen (1996) considered Concept Mapping as an important tool, as it provides an external representation of structural knowledge in the form of two-dimensional semantic network, which potentially extends working memory, and encourages critical
thinking. So, concept map is a “mind tool” which facilitates strategic actions. According to Sowa (2000) Concept Mapping also known as cognitive mapping or semantic networks, is a graphic notation for representing knowledge in patterns of interconnected nodes and arcs. According to Asan (2007) Concept Mapping is a method to visualize the structure of knowledge. Since the knowledge expressed in the maps is mostly semantic, concept maps are sometimes also called semantic networks. Nelson (2007) defined Concept Mapping as a non-linear, graphic representation of unstable domains, depicting major concept nodes and the interrelationship of those nodes. It is a learning strategy identified as having a significant impact on retention and retrieval of information, with continued processing of data over time.

Ling and Boo (2007) report on a quasi experimental study examined the effectiveness of Concept Mapping as revision tool in enhancing pupil examination performance in Primary Science. The research report showed better results by Concept Mapping method rather than teaching by traditional method. Beyerback (1988) defined Concept Mapping as a technique of graphically representing concepts and their hierarchal interrelationships along two dimensions to examine the growth of students’ knowledge.

A good concept map can function as a graphic organizer visualizing not only a writer’s ideas for a specific writing topic, but also the connected relationships among the ideas (Sturm & Rankin-Erickson, 2002). Three studies (Bos & Anders, 1992; Ritchie & Volkl, 2000; and Griffin & Tulbert, 1995) examined the effects of graphic organizers on retention and recall. Overall findings of the three studies indicated that graphic organizers are a helpful method for improving student retention and recall of information for both elementary and junior high students with learning disabilities, as well as upper elementary students (fifth and sixth grade). Follow-up tests at various intervals following instruction found that students retained information they learned via graphic organizers. In one study, graphic organizers were also found to help students transfer retention and recall skills to new situations (Griffin & Tulbert, 1995).

Lambiotte and Dancereau (1991) state that the students that viewed or made concept maps would have a broader knowledge base and therefore be more able to solve problems compared to those students that learned by rote memorization. They also found that the students with low prior knowledge learned better with Concept Mapping than the other. Cognitive structure and Concept Mapping are highly personal as each individual’s knowledge is unique. Hence, concept maps are idiosyncratic. There is no one “correct”
concept map. However, this does not mean that all concept maps are correct: it is possible to identify errors, such as the absence essential concepts or inappropriate relationship between concepts.

Well prepared concept maps facilitate both teaching and learning process. These maps facilitate teaching because teachers can use these to prepare and organize lessons by sequencing topics with in lectures (Novak, 1995). Logical sequencing of topics helps to present instructional materials in a more meaningful way. It is proven that "humans are significantly better able to absorb and retain meaningful learning than rote learning" (Willerman & Mac Harg, 1991). Moreover, during the Concept Mapping process, teachers will have the opportunity to identify and reduce ambiguities, enabling them to deliver clearer and more coherent explanations to the students. For the students, Concept Mapping gives new meaning to learning as they organize the acquired knowledge in their own way (Willerman & Mac Harg, 1991). This newly acquired knowledge can be linked to existing relevant concepts in the students' own cognitive structures (Ausubel, 1963) and be expressed on a single two dimensional diagram. These well-thought-out diagrams represent information in a simple but clear manner, which allows learners to visualize key concepts and their interrelationships in a more integral sense in a short time. Enhancing a student's abilities to comprehend work-ship materials quickly will help reduce the time constraint problem during presentation. Moreover, concept maps communicate knowledge pictorially instead of using lengthy textual explanations. As research points out, that "mental picture may be providing a framework for organizing and remembering information, (Gambrell & Bakes 1987).

Concept mapping tools allows students to customize maps in ways that are not possible using paper-and-pencil. Anderson-Inman and Zeith (1993) compared the use of the Concept Mapping program Inspiration with the paper-and pencil approach and found that using this program encourages revisions to the concept map because deletions, additions, and changes are accomplished quickly and easily. Especially young students who still struggle with handwriting skills benefit greatly from concept mapping tools.

Wang, Cheung, Lee and Kwok (2006) remarked that concept maps have been widely put to educational uses. They possess a number of appealing features which make them a promising tool for teaching, learning, evaluation, and curriculum planning. Ruiz-Primo and Shavelson (1995) discussed more research needs to be done to provide reliable and valid information on the effect of different concept-mapping techniques.
To conclude, we can say that earlier education was based on traditional methods of teaching, which were teacher centered but with the advancement and modernization these methods were replaced by new innovative methods like concept attainment learning, computer assisted instructions, co-operative learning, collaborative learning and Concept Mapping, which are learner centered methods. Concept map is a list of concepts with relational links and labels for these linking relationships. (As shown in figure 1.8)

Concept Mapping is a graphic notation for representing knowledge in a connecting mode. Concept maps are helpful in teaching and learning process as these maps facilitate learning because these have a long lasting impression on the mind of student thereby improving the learning outcome of the students.

Learning outcomes are concerned with the success of the learner rather than the intentions of the teacher (expressed in the aims of a module or course). They can take many forms and can be broad or narrow in nature (Adam, 2004) whereas American Association of Law Libraries (2004) defined learning outcomes as “Statements that specify what a learner will know or be able to do as a result of a learning activity.”

According to University of Exeter (2007):

Learning outcome: An expression of what a student will demonstrate on the successful completion of a module. Learning outcomes:
• are related to the level of the learning;
• indicate the intended gain in knowledge and skills that a typical student will achieve;
• should be capable of being assessed.

So learning outcomes means the knowledge we attain from teaching process and is also known as academic achievement. Hence, academic achievement may be defined as the act of achieving or successful performance.

1.2 ACHIEVEMENT

Achievement signifies accomplishment or gain or a performance carried out successfully by an individual on the completion of task. It means all those behavioural changes which take place in an individual as a result of learning experiences of various kinds.

Crow and Crow (1954) defined achievement as the extent to which learner is profiting from instructions in a given area of learning i.e. achievement is reflected by the extent to which knowledge or skill has been acquired by a person from the training imparted to him. Traw (1960) defined academic achievement as the attainment ability or degree of competence in school tasks usually measured by standardized tests and expressed in grades or units based on norms, derived from a wide sampling of pupil’s performance. Stagner (1962) defined achievement as a degree of proficiency or progress made by pupils in the mastery of school subjects. Good's Dictionary of Education (1973) defines achievement as the knowledge attained or skills developed in school subject usually designated by the test scores or by marks assigned, by the teachers or by both. According to Saxena and Dwivedi (1979) the term scholastic achievement refers to the attainment or accomplishment in the field where a subject receives some instruction or training. According to Morgan, King, Weisz and Schopler (1986), “Achievement is the task oriented behaviour that allows the individual’s performance to be evaluated according to some internally and externally imposed criterion.” According to Stephens (1980), “Achievement is the unique responsibility of educational institutions established by the society to promote the scholastic developments of pupils.” According to Rao (1980), “Achievement is concerned to a great extent with the development of knowledge, understanding and acquisition of skills. In the words of Verma and Upadhyay (1981)
achievement is the attainment or accomplishment of an individual in some or particular branch of knowledge after a certain period of training.” According to Webster Dictionary of Education (1989), “Academic achievement is the performance by a student in a course based on formal study in an institution of learning.” Random House Webster’s College Thesaurus (1997) Academic Achievement means those qualities or attributes or characteristics or traits of an individual which contribute to or have a learning or effect or influence or accomplishment or proficient of performance pertaining to any activity scholastic in nature.

Ladson-Billing (1999) stated "At its best, academic achievement represents intellectual ability to participate in the production of knowledge. At its worst, academic achievement represents inculcation and mindless indoctrination of the young in to the canons and orthodoxy." Oxford Advanced Learner’s Dictionary (2000) defined achievement as a thing that somebody has done successfully especially using his/her own efforts and skills whereas according to Merriam Webster's Collegiate Dictionary (2001) “Achievement is an act of achieving a result gained by efforts, the quality and quantity of student's work.” Kumar (2001) defined academic achievement as “the sum total of information gained after completing a course of instruction (partially or fully) in a particular grade that he has obtained on an achievement test.” According to Craighhead and Nermeroff (2001), “Academic achievement may be defined as “a measure of knowledge, understanding of skills in a specified subject or group of subjects.” According to Dictionary of Education (2008), "Academic achievement is a measure of knowledge gained through formal education usually indicated by test scores, grade point average and degree.”

On the basis of above definitions, Academic achievement can be summed up as-

a) Quantity and quality of learning attained in a subject or group of subjects after a period of instruction.
b) Knowledge attained or skills developed in school subjects i.e. the level of proficiency attained in academic work or as formally acquired knowledge in school subjects.
c) Intellectual ability to participate in the production of knowledge.
d) Ability or degree of competence in school tasks usually measured by standardized tests.
e) It is determined by the grades, or marks secured by the students in the examination.
f) It reveals the level of educational accomplishment in various subjects taught in educational institution.
g) The criterion of promotion to the next class.

1.3 ACHIEVEMENT IN CHEMISTRY

Achievement refers to a degree or level of success or that of proficiency attained in some specific area concerning scholastic or academic work. According to Pandey (1973), “Academic achievement is the quantity and quality of learning in a subject or group of subjects as assessed by examination marks.” It is one part of the wider term of educational growth and helps to know where the student stands. In general it refers to the scores obtained in the annual examination. Higher the achievement more is the openings for the students and they can go for better lines and better jobs in all fields thereby bringing success in one’s life. This success is equally related with Science so study of Science is one of the essential aspects. Chemistry is one of the main branches of Science dealing with chemicals and reactions. Here Achievement in Chemistry is considered as mean gain scores obtained by the students in the achievement test in chemistry.

Sam, 1992; Mazumdar, 1992; and Bhattacharya, 1997) and motivation (Saraswati, 1988; Saxena, 1988; Dhar, 1989; Devanesan, 1990; Bhaskaran, 1991; Harikrishan, 1992; and Rani 1992); Achievement Motivation (Desai, 1971; Mitra, 1991; Lekhi & Kaur, 1995; Sreenivasa & Baburao, 1997; Vaslow, 2000; Ellakakumar & Elankathirslvan, 2001; Khosa, 2001; Yadav & Mayuri, 2001; Sardana, 2006; Kaur & Mehta, 2007), thus Achievement Motivation is an important correlate of academic achievement.

1.4 ACHIEVEMENT MOTIVATION

Every person wants to have a unique accomplishment, an accomplishment of excellence. When a person tries to manifest concern for excellence in his work, we call it as behaviour backed by achievement motive. Achievement Motivation is considered to be deep rooted and fixed in human nature. Achievement Motivation is a system of good direction that is closely associated to competence, higher standards of excellence, hope of success, aggressiveness, dominance perseverance and fear of failure. It is a desire to do well. Achievement Motivation sometime refers to as “The motive for mastery”.

Achievement Motivation is an important ability. Ability determines what a person can do and motivation determines what a person will do, thus motivation plays an important role in improving the level of performance. This desire is as basic and natural as the other biological or psychological needs. However, in a competitive society or set up the desire to excel over other or achieve higher level than one’s peers is intensified which in turn lead to a stronger may derive or motive to achieve something or everything that is essential to beat the other in a race and consequently experience a sense of pride and pleasure. This type of motivation produced by such desire for achievement is called achievement motivation.

Generally Achievement Motivation has two aspects- positive and negative. The person who has more positive approach or aspect is called high motivated person and a person having more avoidance is called a low motivated person.

It was Murray (1938) who first of all used the term Achievement Motivation to refer to achievement needs. According to him, Achievement Motivation means to accomplish something difficult, to master, to manipulate or to energize physical objects, human beings or ideals and to do this as rapidly and independently as possible so as to overcome obstacle and attain a high standard.

As said earlier the concept of an Achievement Motivation was put forth by
Murray (1938). But it was through the hard work of McClelland (1953) and his co-workers that this topic has assumed practical importance in education and other fields. Theory of Achievement Motivation was developed by McClelland (1953) at Harvard University and Atkinson (1964) at the University of Michigan.

Some Psychologists consider that all human behavior is intended to reduce tension and reach a state of psychological and physiological equilibrium. But McClelland (1953) concluded that motive, rather than being essentially tension states are also derives towards action based on expectation. There is a great need to create a ‘need’ in a child to learn and thus he has to be motivated. According to him, “Achievement Motivation is the desire to do better, to achieve unique accomplishment, to compete with standard of excellence and to involve oneself with long term achievement goals.”

Atkinson (1964) states “the theory of Achievement Motivation attempts to account for the determinants of the direction, magnitude and persistence of behaviour, in limited but very important domain of human activities.”

Finger (1966) investigated some characteristics of Achievement Motivation as persistence (work success), planning (time orientation), self control, deliberateness (morality) which presents usually in high motivation individuals and lack in low motivation group. One can also add personal responsibility, risk taking, level of aspiration, innovating activities and vocational goals as features of achievement motivation.

Achievement Motivation has also been defined by the German exponent Heckhausen (1967), “The striving to increase or keeping as high as possible one’s own capability in all activities in which a standard of excellence is thought to apply and where the execution of such activities can therefore, either succeed or fail.” De Charms, Morrison, Reitman and McClelland (1955) contended the Achievement Motivation as disposition to strive for success in competition with others with some standard of excellence, set by the individual. Mehndiratta (1997) defines Achievement Motivation as psychological need and energetic drive that prompts an individual to strive for and work towards mastering his/her environment by the successful accomplishment of a goal or goals accompanied by a sense of satisfaction and self worth called achievement needs.

Burger (1997) indicates that high need achievers are moderate risk taker, have an energetic approach to work and prefer job that give them personal responsibility for
outcomes. Further, Burger (1997) indicates it is important that parents provide enough support to allow the child to develop a sense of personal competence without robbing the child of his independence and initiative. That is, parents must reward their children for their accomplishment, but too much involvement might leave the child with an undermined sense of accomplishment.

According to Alderman (1999), “Achievement Motivation is related to those achievement oriented performance situations in which the person knows that he will be evaluated, the competition will be present and that there will be risk to the outcome that the outcome will be either favourable or unfavourable to him and excellence of his performance will be judged.” Whereas according to Colman (2001), “Achievement Motivation is a social form of motivation involving a competitive drive to meet standard of excellence.” Salvin (2006) defines Achievement Motivation as the generalized tendency to strive for success and choose goal for development in life.

So based on the above definition we can conclude, Achievement Motivation is the way through which one desires to obtain a higher standard with the help of goal directional human activity. It plays a significant role in shaping the total behaviour and personality, which in turn shapes the economic and social destiny of a given society.

Among the correlates of achievement Study habit is another variable which has been explored (Singh, 1984; Kasat, 1991; Stella & Purushothaman, 1993; Gelat, 1999; Alude & Onelemhemhen, 2001; Nancy & Sheeba, 2001; Sandhu, 2014; Siddiqui & Fatima, 2014).

1.5 STUDY HABITS

The task of learning is not dependent on teachers’ alone. It is not only teachers’ responsibility but also of the learners’. Efficient learning depends not only on good teaching but also on satisfactory learning procedures. Efficient learning depends on learner's ability to schedule his time, the plan of his study, the habit of concentration, note taking, mental review, over learning, the judicious application of whole and part methods, massed and distributed learning and so on. In other words learning involves the development of Study Habits.

Many reading reforms have been formulated in our education system, but no thought has been given on developing Study Habits in pupils. One of the greatest defects in Indian system of education is the lack of training in the effective methods of study. The
most important requisite for effective study is a good system of study. In present system, more stress is laid on academic performance of the students but a good academic achievement is not possible without good Study Habits.

Good (1959) defines Study Habits as the basic features involved in the application of the mind to a problem or a subject, the characteristic pattern which an individual follows in learning about things and people." According to Good (1973), “Study habit is the tendency of a pupil to study when the opportunities are given, the pupil's way of studying whether systematic or unsystematic, efficient or inefficient etc.” Edel (1969) described study habit as the time preferred, the time lapse between study sessions, the degree of noise or music tolerated or invited as physical conditions of the study, the extent to which the extra -curricular activities and the particular study mechanisms employed by different students. Study Habits can be interpreted as a planned programme of subject matter mastery.”

According to Biswas and Aggarwal (1971), "Study Habits are methods of study. No one method should be considered the best for all. It may vary from subject to subject. It is not enough that a student knows how to study but he should practice it ardently so that he may not lapse into his old ineffective Study Habits." Goldenson (1984) stated that habits are persistent pattern of learned behavior which becomes so ingrained that it is almost automatic. It develops habitual ways of thinking, feeling, perceiving, talking and walking as well as habitual attitudes, reactions; verbal expressions and mannerism. These patterns help to structure one’s behavior, but if they become too rigid, they hinder adaptation to new situations. According to Onubugwu (1990), “Study Habits is a technique, a student employs to go about his or her studies which are consistent and have become stereotyped as a result of long application or practice.” According to Dictionary of Education (2008), "Habit is a state of body, natural or acquired, aptitude acquired by practice, custom and manner, whereas study is described as earnest endeavors, application of books and subjects, which one studies. Therefore study habit is the endeavour towards studies acquired through state of body which is natural or acquired."

Thus, Study Habits are true indicators of individuality of a person. These are planned programme of subject mastery. They characterize the learner's learning character. In fact, every learner has a peculiar method of style of pursuing his or her academic tasks. These Study Habits also serve as the vehicle of learning.
The problem of Study habit is of immense important both from the theoretical as well as practical points of view. When we work at the theoretical point of view, development of efficient Study Habits and skill forms the basis of efficient learning and as such one of the continuous objectives of teaching should be the inculcation of good Study Habits and skills amongst the students. From the practical point of view, the problem is more important. Often the teachers come across such students whose behaviour show average scholastic aptitude, yet they perform very poorly in their courses of study. A large majority of these seem to have faulty Study Habits. Proper guidance would help them to change their faulty Study Habits into desirable ones.

1.6 REVIEW OF RELATED LITERATURE

The term ‘Review’ means to organize the knowledge of specific area of research and to evolve body of knowledge. Survey of relevant literature is a precondition for meaningful and useful research. To make our research effective, presentation, adequate familiarity with all the research work already done in the field of study is essential.

Survey of related literature means to locate, to read, to evaluate the past and current status of the problem in hand. It gives the clear cut directions to the investigator, what has already been done, where gaps are still lying, so it motivates and stimulates the investigator by making him clear regarding various aspects of the problem.

By reviewing the related literature the researcher can avoid duplication of work as well as making useless efforts. It saves the time, money and energy of the investigator. Moreover by reviewing literature he may delimit his area and select the problem judiciously where ever he feels he can bring something new and beneficial to the society. It is also helpful in determine objectives, hypothesis as well as design of the study. Investigator may also come across about various tools and instruments which proved to be useful and promising in the previous studies.

Thus review of related studies or literature is an important pre-requisite for planning and then execution of any research work. The research works need to inquire up to date information about what has been done and said in an particular area. So that one can derive benefits from the work of their predecessors. Best (1978) has observed “Practically all human knowledge can be found in works and libraries. Unlike other animals that must starry new with each generation, man guides upon the accumulated and recorded knowledge of the past. This constant adding to the vast store of the knowledge makes possible progress in all areas of human behaviour.”
Review

The present investigation is aimed at exploring the effect of teaching through Concept Mapping on the achievement of students in relation to their Achievement Motivation and Study Habits. Thus the review is divided and presented under these major heads:

- Teaching through Concept Mapping and achievement
- Achievement and achievement motivation.
- Achievement and Study Habits.

1.6.1 Teaching through Concept Mapping and Achievement

A study was conducted by Pankratius (1990) in the College of Education, University of Nevada, Las Vegas, Nevada. It was observed direct teaching of problem-solving methods to high school Physics students met with little success. Expert problem solving depended upon an organized knowledge base. Concept Mapping was found to be a key to organizing an effective knowledge base. The investigation of the effect of the degree of Concept Mapping on achievement was the purpose of this study. Six intact high school Physics classes, taught by this investigator, took part in the study. Two classes were control groups and given standard instruction. Four classes received six weeks of concept-mapping instruction prior to the unit under study. Two of these four classes were the low-level treatment group and were required to submit concept maps at the conclusion of the instruction. The other two classes were the high-level treatment group and were required to submit concept maps at the beginning and at the conclusion of the unit under study. One class from each treatment group took a pretest prior to instruction. An analysis of the posttest results revealed no pretest sensitization. A one-way analysis of covariance indicated a significant main effect for the treatment level at the p<0.05 level. A pair of single-\(df\) comparisons of the adjusted treatment means resulted in significant differences (p<0.05) between the control group and the average of the treatment means as well as between the two experimental groups. It can be concluded that for this sample (upper-middle-class high school Physics students) mapping concepts prior to, during, and subsequent to instruction led to greater achievement as measured by posttest scores.

Another study conducted by Willerman and Harg (1991) to determine if a concept map used as an advance organizer can improve the Science achievement of eighth-grade
students. Eighty-two eighth-grade students in four Science classes participated in this study. The experimental group completed the concept map at the beginning of the Science unit under the teacher's supervision. At the end of the two-week unit a Science test was administered to the experimental and the control group. The results of a one-tailed t test indicated that there was a significant difference between the two groups. The effect size was 0.40. It appears that the concept map can provide the classroom teachers with a meaningful and practical structured approach for using advance organizers in their classes.

Four studies (Alvermann & Boothby, 1983; Alvermann & Boothby, 1986; Armbruster, Anderson & Meyer, 1991; Griffin, Malone & Kameenui, 1995) in the area of social studies used Concept Mapping tool to help students organize information from expository texts and comprehend content area reading. All the studies were conducted with either fourth or fifth-grade students. Findings from these studies concluded that Concept Mapping too helped students select, organize, and recall relevant information, as measured by post tests. Students were also able to transfer thinking and learning skills to novel situations and content.

Concept Mapping tools allows students to customize maps in ways that are not possible using paper-and-pencil. Anderson-Inman and Zeith (1993) compared the use of the Concept Mapping program Inspiration with the paper-and-pencil approach and found that using this program encourages revisions to the concept map because deletions, additions, and changes are accomplished quickly and easily. Especially young students who still struggle with handwriting skills benefit greatly from Concept Mapping tools.

In an experimental study (DeWispelaere & Kossack, 1996) conducted in a Spanish Junior High and High School as a second language class revealed that Concept Mapping tool improved student's higher order thinking skills as measured by performance on chapter quizzes, tests, and student projects.

In his study, Bello (1997) sought to determine gender influence on student’s concept-mapping ability and achievement in evolution. As a case study, only one small group of students participated in the study. A total of eighty-seven second-year senior secondary school students took part in the study. A slightly modified form of the Evolution Theory Test developed by Bello (1997) was employed for data collection. Findings from the study revealed that there was no gender influence on students' concept-
mapping ability and their achievement in evolution. In his view, Biology teachers should team and use concept-mapping as an instructional strategy in teaching evolution and other similar Biology topics such as genetics and ecology as a way of improving students' achievement in mixed gender and ability classrooms. Also, Biology students should be introduced to concept-mapping as a tool for meaningful teaming.

The problem addressed by Markow and Lonning (1998) was that first-year college Chemistry students learn little of the conceptual material associated with Chemistry experiments they perform. The thesis of this research is that the construction of pre-lab and post-lab concept maps helps students understand the concepts involved in the experiments they perform. The study was conducted using 32 non–science majors enrolled in a first-year Chemistry course. The experimental group constructed pre-lab and post-lab concept maps, while the control group wrote essays explaining the conceptual Chemistry of the four experiments used in this study. Both groups took 25-item achievement tests 1 week after each experiment. Pre-lab and post-lab concept maps were scored and evaluated for significant differences. Five students were interviewed to investigate their perceptions regarding the usefulness of concept maps in Chemistry laboratories. No significant differences were found between the groups with respect to students’ conceptual understanding as determined by the multiple choice achievement tests. Students responded very positively toward the use of concepts maps in the laboratory. They felt strongly that constructing pre-lab and post-lab concept maps helped them understand the conceptual Chemistry of the experiments.

The study conducted by Slotte and Lonka (1999) evaluated concept maps spontaneously constructed by applicants (N=502) in a Medical school entrance examination. In all, 36 maps were produced. Concept maps were evaluated for content of relevant terms and for the number of interrelationships indicated. The aim was to determine whether including relevant ideas on a concept map is related to the learning of those ideas. Because concept maps are effective tools for making the structure of knowledge explicit, it was hypothesized that the quality and content of spontaneously made maps would be related to improvement in the comprehension of text material. Understanding was assessed in terms of success in essay-type tasks designed to measure the ability to define, explain, and apply statistical knowledge. The results indicated that merely including the relevant concepts in a map has little effect on the comprehension of those concepts, whereas the extent and complexity of concept maps plays a powerful role in the understanding of scientific texts.
Ritchie and Volkl (2000) assessed the effectiveness of two generative learning strategies, Concept Mapping and laboratory experiments involving object manipulation, to determine if either one is more-effective with individual learners or learning groups in a Science classroom, in their studies. Eighty sixth-grade Science students were randomly assigned to group or individual conditions and to one of two experimental treatments. Experimental treatments were changed between a first and second posttest. Long-term retention was evaluated with a third, delayed posttest. Students starting with concept maps showed higher achievement on the delayed posttest than students beginning with the laboratory experiment. No difference was found between students working as individuals or in groups, but a significant interaction between generative learning strategies and grouping condition was revealed. Implications for sequencing generative learning strategies are discussed.

In his paper Ruiz-Primo (2000) described concept maps as an assessment tool to measure one aspect of achievement, the organization of propositional (declarative) knowledge in a domain. A concept map-based assessment consists of a task that elicits structured knowledge, a response format, and a scoring system. Variation in tasks, response formats, and scoring systems produce different mapping techniques that may elicit different knowledge representations, posing construct-interpretation challenges. This paper provided an overview of the research on the technical characteristics of concept maps. It briefly described some of the studies that have been conducted to this end, and what have learned so far about this form of assessment. With respect to the different mapping techniques the following observations were found:

- Construct-a-map with assessor-generated concepts is the technique that most accurately reflects student differences on connected understanding.
- Construct-a-map and fill-in-the-nodes are not equivalent mapping techniques.
- Neither are the fill-in-the-nodes and fill-in-the-linking-lines techniques.
- Neither construct-a-map nor fill-in-the-map techniques are sensitive to the sample of concepts, blank nodes, nor blank linking lines selected.

Gordon (2000) conducted a qualitative study to address the effect of Concept Mapping on the searching behavior of tenth-grade students engaged in research projects based on their instruction in a classroom-based genetics unit. The setting was an automated library of a private American school in Europe. Ten Biology students were chosen by purposive sampling. Selection criteria monitored by user profiles, included
student age, computer experience, native language, grades, and test scores. One group used Concept Mapping, while the other received the same classroom instruction without mapping. Data on searching behavior were collected using think-alouds, interviews, debriefing, and journals. Calculations based on Bayesian statistics and the Fano measure from information theory were triangulated with qualitative analysis of data. While the entire research process, as defined by Kuhlthau's model, was examined to include stages from pre-focus formulation to writing the research paper, this article centers on the information search. Fano’s information measures showed there was a greater probability that concept mappers will use print rather than electronic means that they will search in SIRS rather than the OPAC, and that in electronic searching they will use subject heading rather than keyword. In print, as opposed to electronic searching, measures showed mappers applied a larger number of search terms, employed opening moves, re-formulations, search operations, and relevancy judgments more often and executed more depth than breadth searching. In all cases probability measured at least half a nat (one nat equals 2.718), indicating chances were approaching twice as likely that searchers exhibiting these characteristics in print indexes will be mappers. Larger differences between the groups emerged in electronic searching, where mappers spent less time. Quantitative data verified mappers were more thorough and efficient, reformulating by shifting synonyms and moving from general to specific search terms and terminating searches to read rather than when they depleted their search terms. Stronger focus formulation emerged as the most important determinant of searching behavior. Further research is recommended to replicate the study with a larger sample, using information theory as an alternative to classical statistics in hybrid qualitative-quantitative studies.

Another study conducted by Brandt, Elen, Hellemans, Heerman, Couwenberg, Volckaurt and Morisse (2001) with the aim to examine whether the construction of integrated knowledge structures by students can be stimulated by Concept Mapping and by better visualization of concepts and their interrelationships. The investigation was carried out in regular teaching settings: Chemistry courses in secondary schools in Flanders, in the domain of Electrochemistry. One hundred and thirty two final year students from ten classes in three secondary schools in Belgium (Flanders) participated in this study. A significant positive effect of extra attention to visualization on the learning achievement of students was found. However, significant effects of Concept Mapping as an instruction method could not be detected under the given research conditions.
Tsai, Lin and Yuan (2001) developed and evaluated a web-based concept map testing system for Science students. Thirty-eight Taiwanese high school students were involved and it was found that their performance on the system was not significantly related to their achievement as measured by traditional standard tests. Their views about the use of the system, in general, were positive. An analysis of students’ future use of the system and their motivation and learning strategies revealed that those with more critical thinking metacognitive activities and an effort regulation management strategy showed more willingness to use the online testing system. Moreover, students with high test anxiety showed a preference to be tested through the system.

Ahlberg and Ahoranta (2002) suggested new improved educational tools to monitor and promote quality of geographical education. It was shown that in literature concept maps (Gowin, 1981; Novak, 1980; Novak & Gowin, 1984) and mind maps (Buzan, 1989, 1993) were not properly understood. The difference between concept maps and mind maps was made clear by constructing a mind map and a concept map using the same concepts from Geographical Education. It was shown that the concept map was an accurate representation of the main features of cognitive structure, while the mind map is an ordered association map open to multiple interpretations. Improved concept maps and Vee heuristics are presented as tools to monitor and promote meaningful, deep, creative geographical learning and metacognition. Value thinking was explicitly promoted by improved Vee heuristics. Empirical examples from a cases study of a geographical learning project were presented, and their usefulness for practical teaching and educational research was analyzed and evaluated. Suggestions were made both for practice and further research.

Akinsanya and Williams (2003) wrote an article ‘The complexity of teaching, learning and assessment strategies remains a problem in nurse education especially with the changes in new curricula’. This article explained one solution, which was considered and explored prior to implementation for the assessment of an inquiry-based module in nurse education. The overall aim for selecting this method of assessment was to provide consolidation of prior learning from the core content of the module and to give the students an opportunity to gain further, wide and varied knowledge on a number of concepts in a short period. Case predominantly acknowledged over the last year, by nursing students on the Inquiry-Based Learning (IBL) B.Sc. and Diploma of higher education in nursing education programme, and also nurse educators who have the responsibility of facilitating the learners.
BouJaoude and Attieh (2003) conducted a study to check the effect of using concept maps as study tools on achievement in Chemistry. Tenth grade students from a co-educational school in Lebanon were engaged in building concept maps as homework to investigate the correlation between their mastery of Concept Mapping skills and their achievement in Chemistry, and gender differences in using Concept Mapping as a homework tool. This study provides some insight into the use of Concept Mapping as a homework tool and provides significant results concerning its different effects on different sex groups where females achieved higher scores than males on Chemistry tests, especially on questions at the knowledge and comprehension levels. The results also show that Concept Mapping helped low achievers achieve higher in Chemistry. Students exhibited positive attitudes toward using concept maps in Chemistry.

In their quasi-experimental study, Wheeler and Collins (2003) used a pretest-posttest design with a control group to evaluate the effectiveness of Concept Mapping in developing critical thinking skills in baccalaureate nursing students. A convenience sample (N=76) was randomly assigned to experimental (N=44) and control (N=32) groups. The experimental group was taught to use Concept Mapping of patient information to prepare for clinical experiences. The control group was taught to use traditional nursing care plans. Critical thinking skills were measured with the California Critical Thinking Skills Test, which yielded six scores: an overall score and five subscales (analysis, evaluation, inference, deductive reasoning, and inductive reasoning). A significant difference (p<0.05) was found between the mean pretest and posttest scores and each subscale. Post hoc tests found differences between groups to be insignificant, while various differences within a group were significant. Experimental group scores improved significantly (p<0.05) on the overall score and the analysis and evaluation subscales, while control-group scores improved significantly only on the evaluation subscale and declined significantly on the inference subscale. The findings suggested that Concept Mapping was effective in helping students develop critical thinking skills.

Another study conducted by Chularut and DeBacker (2004) in the Department of Educational Psychology, University of Oklahoma, USA which tried to investigate the effectiveness of Concept Mapping used as a learning strategy with students in English as a Second Language (students for whom English is not a first language) classrooms. Seventy-nine ESL students participated in the study. Variables of interest were students achievement when learning from English language text, students reported use of self-
regulation strategies (self-monitoring and knowledge acquisition strategies), and students self-efficacy for learning from English-language text. A randomized pre-test–post-test control group design was employed. The findings showed a statistically significant interaction of time, method of instruction, and level of English proficiency for self-monitoring, self-efficacy, and achievement. For all four outcome variables, the Concept Mapping group showed significantly greater gains from pre-test to post-test than the individual study group.

Yeh (2004) proposed an interactive model of cross-domain Concept Mapping with an emphasis on brain functions, and it further investigated the relationships between academic achievement, creative thinking, and cross-domain Concept Mapping. Sixty-nine seventh graders participated in this study which employed two 50-minute instructional sessions. The findings suggested that (a) the seventh graders may lack the awareness or ability to integrate knowledge and make connections between their learning and life experiences; (b) creative thinking, academic learning and Concept Mapping share similar capacities; and (c) cross-domain Concept Mapping, which fosters cross-domain information integration and connections between learning and life experiences, can be an efficient mental tool in understanding a student's creative thinking and academic learning.

A study conducted by Tiimen and Taspinar (2005) compared the Concept Mapping with the traditional instruction method in consideration of student's achievements in English course. The students who took "English" class in 9th grade at Balakgazi High School in 2005-2006 attended this study. An experimental group and a control group consisting of 23 members each were organized. The Concept Mapping was carried out to the experimental group. Traditional instructional method was carried out to the control group. Various concept maps related to these subjects were developed. An achievement test was used to collect the data and then a questionnaire was developed to determine the students' views about the Concept Mapping. On comparing the control group and the experimental group, the findings indicated that experimental group where the Concept Mapping was carried out, had become more successful. In permanent of knowledge there has been no significant difference between groups. The students have had some difficulties while developing concept maps on their own. According to the results of this study, it may be recommended that; while using concept maps in language teaching, teacher-made maps firstly should be used. The students should be encouraged to develop their own concept maps.
Alias (2006) conducted a study to investigate the effect of using teacher generated maps on the learning of linear motion concepts in the secondary school Physics. The study used a pre and post-test quasi-experimental design method with a control group. The samples were two groups of form four students from a Teluk Intan Technical Secondary School in Perak, Malaysia consisting of 28 and 29 students for the experimental and control group respectively. The experimental group was taught physics with concept maps being one of the teaching and learning tools and the control group was taught physics without concept maps. Data were gathered on types and frequency of classroom interactions, students’ perception of concept maps and their learning achievements in physics test. The results of the study revealed that Concept Mapping group obtained a statistically significantly higher mean gain on the physics test. The group also performed better on the long-term achievement measure.

Candan, Turkmen and Cardac (2006) conducted a study to reveal fifth-grade primary school students’ misconceptions about the concepts of force and motion and to compare the effects of traditional teaching methods and concept maps in remedying these misconceptions. The research was designed as a quasi-experimental approach that concept maps and traditional teaching methods were applied to the experimental and control groups, respectively. The study approximately took six weeks. A thirty-item test was constructed for the purpose of identifying the students’ understanding and misconceptions concerning the concepts of force and motion. Each item in the test included one scientifically acceptable answer; one common misconception revealed during the interview sessions, and two reasonable and plausible distracters. The test was examined by a group of experts consisting of three Science educators for its validity. The alpha reliability coefficient of the test was found 0.83. The test was used to collect data before and after the study as pre-test and post-test. Independent and paired-samples t-tests were used to answer the research questions of the study. The interviews made with the students disclosed that fifth grade primary school students held misconceptions concerning the force and motion. The study indicated that the students in the experimental group, taught with the concept maps, showed greater achievement in the unit than did the students in the control group training with the traditional method. The results of this study provided further evidence to support the findings in the related literature indicating that Concept Mapping is still an effective tool to reveal misconceptions and to teach scientific concepts in fifth grade Science courses. In addition, Concept Mapping can provide alternatives to traditional methods to remedial.
Students learn Mathematics in meaningful ways, by developing their understanding through the construction of their own patterns of meanings and through participation in social interactions and critiques (Novak, 2002; Novak & Canas, 2006).

Bilesanmi-Awoderu (2006) conducted a study to investigate the relative effectiveness of Concept Mapping and lecture methods on the academic achievement of Nigerian high school studies in Biology using gender and locus of control as intervening variables. This study made use of a 2x2x2 non-randomized control group, pretest-posttest quasi-experimental factorial design. The sample consisted of two hundred and forty (240) senior secondary two students of which 120 were males and 120 were females. Two instruments; Biology achievement test (BAT) and Locus of control scale (LOCS) were used to collect the data. Data were analyzed using analysis of covariance (ANCOVA). The results show that the concept-mapping strategy is more effective in enhancing students' achievement in Biology than the lecture method. Teachers enjoined to use the Concept Mapping strategy in teaching both the male and female students because this method has been found to be effective in the teaching of students, irrespective of their gender and locus of control.

The purpose of the study done by Hinck, Webb, Sims-Gibbens, Helton, Hope, Utley, Savinske, Fahey and Yarbrough (2006) was to empirically test the effectiveness of Concept Mapping for student learning and the students’ satisfaction with the strategy. Concept Mapping, a learning strategy used to understand key concepts and relationships between concepts, has been suggested as a method to plan and evaluate nursing care. A quasi-experimental pre- and posttest design was used to examine the content of concept maps of care plans constructed by junior-level baccalaureate students (N=23) at the beginning and end of a community-based mental health course. Additionally, students completed a questionnaire to self-evaluate their learning and report their satisfaction with Concept Mapping. Findings indicated that Concept Mapping significantly improved students’ abilities to see patterns and relationships to plan and evaluate nursing care, and most students (21/23) expressed satisfaction in using the strategy. This study supported Concept Mapping as an additional learning strategy and has extended knowledge in community based nursing education.

Deyu Hu (2006) conducted a study with a purpose to examine two scaffolding methods on the performance of students in computer-based concept linking and retention of comprehension. After training and practice in Concept Mapping and Cmap Tools a
computer-based Concept Mapping program, 116 undergraduate students were randomly assigned to one of four treatment groups to work on a computer-based Concept Mapping task. Students in the no scaffolding (NS) group did not receive any scaffolding. Students in the linking phrase scaffolding (PS) group received linking words or phrases as scaffolding. Students in the articulation hint scaffolding (AS) group received a hint question as scaffolding, which asked them to elaborate on relationships between concepts in full sentences. Students in the linking phrase and articulation hint scaffolding (PAS) group received both scaffolding while working on the computer-based Concept Mapping task. One week after the treatment, students took a concept linking posttest, in which they constructed a concept map in Cmap Tools based on a web-based instruction on the human heart. After another week, they took another posttest on retention of comprehension about the heart. Two 2x2 factorial analysis of variance (ANOVA) were conducted to examine the main effects of linking phrase scaffolding and articulation hint scaffolding and any interaction effect between them on the performance of students in computer-based concept linking and retention of comprehension. The results showed no significant difference in the performance of students in both tests. However, the Pearson’s correlation analysis showed that there was a positive correlation between students’ performance in computer-based concept linking and retention of comprehension (γ=0.447, p<0.01).

Ojima (2006) observed that the majority of research to date on pre-task planning has investigated the impact of planning time on second language learners’ (L2) oral production, and has generally reported its positive effects on their task performance. However, little research on planning has been conducted in writing contexts, and there is no firm evidence to demonstrate that pre-task planning promotes L2 learners’ written production in the ways that many researchers have reported for L2 speaking contexts. In this paper, the author tried to explore whether and how Concept Mapping as a form of pre-task planning could benefit the writing performance of three Japanese ESL (English as a second language) learners. It was analyzed four compositions from each of the learners, written with and without Concept Mapping; using measures of accuracy, complexity, fluency and holistic measures of global quality, communicative quality, organization, argumentation, linguistic accuracy, and linguistic appropriacy. He also examined through a questionnaire, retrospective interview, and logs, the learners’ applications of the strategy in their writing processes. Pre-task planning was associated
positively with the overall measures of the learners’ written production during in-class compositions, with the exception of accuracy. Moreover, each learner made unique applications of the Concept Mapping strategy in their writing processes, suggesting that Concept Mapping may help ESL learners improve their composing but in ways unique to individual experience, motivation, and task conditions.

Asan (2007) undertook a study in the Department of Instructional and Learning Technologies, Sultan Qaboos University, Sultanate of Oman. The purpose of this research project was to determine the effects of incorporating Concept Mapping on the achievement of fifth grade students in Science class. The study was conducted with twenty-three students at Ata Elementary School, Trabzon, Turkey. The students were tested with teacher constructed pre and post test containing 20 multiple-choice questions. The pupils in the experimental and control groups were exposed to the same teaching techniques covering a unit on heat and temperature. They were given the same pre-test after the initial lessons. However, after the pre-test, the control group was given a traditional oral review of the material and the experimental group was exposed to the review by the use of inspiration, which was computer based Concept Mapping tool. After these reviews, the students of both groups were given the post-test. Test scores were analyzed for any statistically significantly difference in the scores of the test. The results of the study indicated that Concept Mapping has a noticeable impact on student achievement in Science classes.

Tumen and Mehmet (2007) conducted a study to compare the Concept Mapping with the traditional instruction method in consideration of student's achievements in English course. The students who took "English" class in 9th grade at Balakgazi High School in 2005-2006 attended this study. An experimental group and a control group consisting of 23 members each were organized. The Concept Mapping was carried out to the experimental group. Traditional instructional method was carried out to the control group. Various concept maps related to these subjects were developed. An achievement test was used to collect the data and then a Questionnaire was developed to determine the students' views about the Concept Mapping. The primary findings indicate that: (1) Comparing the control group the experimental group that the Concept Mapping was carried out has become more successful; (2) In permanent of knowledge there has been no significant difference between groups; and (3) The students have had some difficulties while developing concept maps on their own. According to the results of this study, it
may be recommended that: (1) While using concept maps in language teaching, teacher-made maps firstly should be used; and (2) The students should be encouraged to develop their own concept maps.

In his paper Simon (2007) assessed the usefulness of Concept Mapping (an educational learning, assessment, and curriculum development technique developed by Novak, widely used in the Natural Sciences) within an accounting education context. It shows how an accounting-based concept map can be constructed by students and educators to provide a visual, conceptually transparent graphical representation of an individual's understanding of a particular knowledge domain. The method is firmly rooted in Ausubel's theory of meaningful learning and its emphasis upon the hierarchical structure of concepts is particularly relevant to accounting. While Concept Mapping has been used extensively in many (particularly Science) disciplines, it has received relatively little attention within accounting education. The paper's contribution is to extend its application within an accounting education context by focusing upon how Concept Mapping can enhance students' learning by evaluating student-prepared concept maps, showing how Concept Mapping can be used at different levels within a course (i.e. curriculum, topic and activity) and reporting feedback of its use with two cohorts of students, within a financial accounting theory component. The use of educator-prepared concept maps, with concepts omitted, proved popular as tutorial quiz exercises and increased the quantity and quality of participation. However, students were less willing to construct their own concept maps and engage in meaningful learning. While most students were able to build upon aspects of their prior knowledge, stronger students used a greater range of concepts, a richer set of linkages and more examples than weaker students did. Concept maps were useful in diagnosing students' and instructors' misconceptions. Many students found Concept Mapping relatively easy to use, provided a better understanding of complex issues, liked the visual representation and holistic view, and so supported their learning. However, educators need to become proficient in constructing maps and using appropriate software, not make the maps too complex, provide students with some initial training in the technique and consider the fit between using the techniques as a learning tool and as an assessment tool. While no significant differences were found in the usefulness of the method for students of different ages and gender, Asian students generally found the method to be more useful than did UK students.
In his study Lim (2008) investigated the effectiveness of Concept Mapping strategies with different levels of generativity in terms of knowledge acquisition and knowledge representation. Also, it examined whether or not learners’ self-regulated learning (SRL) skills influenced the effectiveness of Concept Mapping strategies with different levels of generativity. The participants were 285 undergraduate students who enrolled in a 200-level statistics course at a large northeastern university. The independent variables of this study were the levels of self-regulated learning skills and the levels of generativity in Concept Mapping strategies. The levels of SRL skills were divided into high and low, while the levels of generativity in Concept Mapping were operationalized in three treatments: Expert-generated Concept Mapping, partially learner-generated Concept Mapping, and fully learner-generated Concept Mapping. Dependent variables were knowledge acquisition (factual and conceptual knowledge), and knowledge representation of concept maps (the proposition quality, overall quality, and the quantity of propositions). According to the manova results for the first research question, three levels of generativity operationalized in Concept Mapping strategies produced significantly different levels of effectiveness for knowledge acquisition (F=3.094; p=0.016; Wilk’s Lambda=0.939). Tukey post hoc comparisons showed that the expert-generated concept map group outperformed the partially learner-generated concept map group in factual knowledge, while the expert-generated concept map group outperformed both the partially learner-generated concept map group and the fully learner-generated concept map group in conceptual knowledge. Regarding the second research question, self regulated learning skills caused significant difference in factual knowledge (F=7.627, p=0.006). Regarding the third research question, no significant interaction was found, when using manova, between the levels of generativity in Concept Mapping and the levels of self-regulated learning skills. However, regression analysis indicated that the higher the participants’ self-regulated learning skills, the higher the factual knowledge acquisition score, only for the expert-generated concept map group and partially learner generated concept map group. Regarding the last research question on knowledge representation, a significant effect of the levels of self-regulated learning skills was found in proposition quality, overall quality, and the quantity of proposition (F=3.004; p=0.037; Wilk’s Lambda=0.880). More specifically, the participants with high self- regulated learning skills scored significantly higher in the overall quality of knowledge representation and the quantity of propositions made in each concept map.
Instructional implications included: (a) When using expert-generated concept maps, learners should be encouraged to actively interact with the given map; (b) When using partially-learner generated concept maps, learners should be guided not to focus only on the fill-in-the-blank activity; (c) When using fully learner-generated concept maps, consider details of procedures as a secondary component; (d) When evaluating fully learner-generated concept maps, use the quality of cross-link as an indicator of high self-regulators.

Amundsen, Weston and McAlpine (2008) The authors’ goal in working with university academics is to support an intellectual process of close examination of instructional decisions, making explicit the rationale and intentionality underlying those decisions. Subject matter understanding is the primary point of reference in this process. The focus of the research described here is the use of an unstructured form of Concept Mapping to support academics in the analysis of course content as the first step in a course design process. While some academics with whom the authors have worked have been initially skeptical about Concept Mapping, the large majority of them, in the end, report that they value the process and what they gained from it. The findings show that the Concept Mapping process provided an alternate means to rethink course content, one that highlighted relationships among concepts, encouraged a view of the course as an integrated whole, and frequently provided the occasion to make explicit the types of thinking required in the course.

Sheu (2008) discussed finding relevant information on the Internet can be a daunting task which would be enhanced if the material were organized and could be accessed in an efficient manner. Browsers based on a concept map-based interface and on a World Wide Web page-based interface were compared for ease in finding information necessary to answer a series of search questions based on the same domain material (developmental psychology). Users differed in the amount of concept map training they received and the type of learner they tended to be (meaningful vs. rote learners). The results indicated that the concept map-based interface resulted in better search performance for all learners although this difference was most pronounced for meaningful learners. Training in concept map construction appeared to have no more effect on search performance using the concept map based interface, than control conditions. Taken together, the results suggest that organizing information via a concept map-based
interface leads to more accurate search performance than the typically used web page-based browser.

Chiou (2008) examined whether Concept Mapping can be used to help students to improve their learning achievement and interests. The participants were 124 students from two classes enrolled in an advanced accounting course at the school of Management of a University in Taiwan. The experimental data revealed two important results. First, adopting a Concept Mapping strategy can significantly improve students’ learning achievement compared to using a traditional expository teaching method. Second, most of the students were satisfied with using Concept Mapping in an advanced accounting course. They indicated that Concept Mapping helped them to understand, integrate and clarify accounting concept and also enhanced their interest in learning accounting. They also thought that Concept Mapping could be usefully used in other curriculum areas.

Kumar (2009) studied the effectiveness of Concept Mapping and concept attainment model as instructional strategy in relation to Study Habits, style of learning and thinking. Investigator selected the sample of 432 students of X class from five schools of Chandigarh and taught a few topics of Science. Results obtained showed that these methods were more significant in acquisition of Science concepts than through traditional methods. Also, the interaction between instructional strategy and style of learning and thinking was found statistically significant.

İngeç (2009) conducted a study in which Concept Mapping was used as an assessment method on the impulse–momentum topic. The purpose of the study was to determine teacher candidates’ knowledge about understanding of the concepts of impulse and momentum by comparing and contrasting two different methods; namely, students’ concept maps and an achievement test. The results of the study revealed a weak correlation between the achievement test and the concept map scores since concept maps assess the students’ knowledge from a conceptual perspective while the achievement tests measure the level of students’ knowledge on the topic and his/her ability to apply this knowledge on different occasions.

Okoye and Okechukwu (2010) conducted a study to examine the effect of concept-mapping and problem solving teaching strategies on achievement in Biology among Nigerian secondary school students. The method used for the study was a quasi-experimental pre-test treatment design. One hundred and thirteen senior secondary
(S.S. III) students randomly selected from three mixed secondary schools located in Delta North Senatorial District of Delta State, Nigeria were used as subjects for the study. The experimental group was taught selected topics in Genetics using concept-mapping and problem-solving strategies while the control group was taught using the traditional lecture method. The result of the study showed that the experimental group performed significantly better in Genetics than the control group and that gender does not affect students’ achievement in Biology in general.

Karakuyu (2010) conducted a study with the aim to investigate the effect of students’ Concept Mapping on their Physics achievement and attitudes towards Physics lesson. 58 ninth-grade students were participants from the two classes’ enrolled to general Physics course in a high school in Turkey. One of the classes was randomly chosen as experimental group (28), constructed electricity concept map and the other was control (30) group, did not receive any presentation on Concept Mapping. Data were collected via the pre and post administration of the Physics Achievement Electricity Test (PAET) and Concept Maps Attitude Scale towards Physics (CMASTP). The study conducted in six weeks in a class that met two times a week. The material covered was about electricity. Results showed that while there were no significant differences in the attitude and achievement between the experimental and control groups. However, the experimental group students were observed to have a tendency of more positive attitude than the control group students. Results also showed that drawing concept map instruction was more effective than traditional instruction in improving Physics achievement of the participating students.

Qarareh (2010) investigated the effect of using the Concept Mapping strategy in teaching on the achievement of fifth graders in Science. To achieve this goal, eighty students were randomly selected then divided in to two groups:- an experimental group was taught by using Concept Mapping, and control group was taught by traditional method. Data were collected using the following two instruments:-a number of teaching situations which planed by concept map and achievement scale of (25) items. To answer the questions of the study, analysis of variance were used. The study revealed that concept map show greater effect on academic achievement. The researcher recommended the use of Concept Mapping in Science teaching.

Schaal (2010) conducted a study to check the cognitive and motivational effects of digital concept maps in pre-service Science teachers training. The objective of the study
was to examine if the use of complementary concept maps (a) influences achievement and (b) if motivational variables influence the use of the concept maps. In both cases, influences of computer-user self-efficacy were expected (c). The students' (N=171) concept map use was logged, achievement was tested and motivational variables were surveyed (e.g. interest/ enjoyment, perceived competence, effort/ importance, value/usefulness). The log file-data allowed distinguishing learners according to their concept map use. Results reveal the benefit of additional concept maps for achievement, positive motivational aspects and computer-user self-efficacy as mediating factors showed some influence. The emphasis of further research should be on students' active engagement in structuring their individual learning by constructing concept maps themselves, especially in Science education courses.

Employing Concept Mapping as a tool to study the acquisition of environmental awareness in relation to Achievement Motivation and cognition styles was undertaken by Sharma (2010). For data analysis, researcher used 2×2×2×2 analysis of variance. Results revealed that students taught through Concept Mapping acquired and retained more concepts of environmental awareness. Results also indicated that instructional strategies, Achievement Motivation and cognitive style did not interact significantly to show variation in the acquisition of concepts of study.

Another study was undertaken by Patrick (2011) to determine if the use of Concept Mapping as study skill can influence students’ achievement in Biology. The design of the study was quasi experimental pretest posttest control group design. The population consisted of 280 SSII students from where 120 students were selected. 100 students were used for analysis while 20 students dropped out of the study. To guide this study five research questions were raised and three hypotheses stated and tested at 0.05 level of significance. The major instrument used for data collection was Biology achievement test. Another instrument used for data collection was an interview schedule to determine the students’ perception of the usefulness of Concept Mapping in their studies. The major findings of this study include: a non significant difference in immediate Post achievement test scores between students who used Concept Mapping as a study skill and those who reviewed and summarized in their studies; a steady, consistent and significant increase in test scores of students who used Concept Mapping as study skill across achievement tests 1-6; a significant difference in estimated retention between students who used Concept Mapping as study skill and those who summarized after
review, and all the students interviewed agreed that concept maps helped them to determine relationships among concepts, sharpened their understandings and increased their critical thinking. It was concluded that Concept Mapping could serve as an appropriate alternative for studying Biology since what is learned through it can be retained for a long time.

Dosanjh (2011) conducted a quasi-experimental study to measure the effects of three Concept Mapping learning strategies (concept identifying, proposition identifying, student generated) on urban middle school students' understanding of the circulatory system. Three intact classes of seventh-grade students were assigned to one of the three Concept Mapping strategies. The students were given a pretest on the circulatory system then learned and used their respective Concept Mapping strategies while learning about the circulatory system. At the conclusion of the study, students' Science achievement was measured by performance on an achievement test and rubric scores of their respective concept identifying, proposition identifying, and student generated concept maps. The results of the study suggest that all three of the Concept Mapping strategies are effective in increasing students' Science achievement. Additionally, the moderate significant correlations between the posttest and concept map scores of the current study established that concept maps are a useful measure of student knowledge. Lastly, the results of the current study also suggest that the concept identifying mapping strategy may be a useful scaffold in instructing students how to develop student generated concept maps.

Awofala (2011) investigated the effect of Concept Mapping strategy on achievement in Mathematics of 88 junior secondary year three Nigerian students. The study adopted a pre-test, posttest non-equivalent control group quasi-experimental design and data collected for the study were analyzed using the t-test statistic. The experimental group, taught with Concept Mapping strategy obtained mean post-test score which was significantly higher than the mean post-test score of the control group. Results showed that Concept Mapping is an effective strategy for teaching and learning Mathematics. The strategy is also capable of improving students’ mastery of content at the higher-order levels of cognition. Based on the findings, the study recommended that Concept Mapping should be added to the teaching strategies of Mathematics teachers at the secondary school level.

Rani (2011) studied the effect of Concept Mapping on Science achievement among IX graders in relation to test anxiety and self efficacy. A sample size of 120
students of Mohali district was taken into consideration and results obtained revealed significant effect of instructional strategy on Science achievement taught through Concept Mapping and conventional teaching. However, no significant difference was found between Science achievements of students with high and low test anxiety. Even high and low self efficacy was found non-significant in the studies conducted. Also, no significant interaction was found between instructional strategies with test anxiety and self efficacy w.r.t. Science achievement.

To examine the effect of using computerized concept maps during the pre-writing phase on learners’ writing performance Pei-Lin Liu (2011) conducted a study in which ninety-four freshmen enrolled in an English course were divided into high-level, middle-level, and low level learners according to their baseline writing scores. The experimental part of the study took place over two-hour class periods for nine weeks. All participants went through all three treatments for accomplishing three writing assignments. It was found that both computerized mapping treatments had equally positive effects on low-level and middle-level learners compared with the no-mapping treatment. However, high-level learners performed significantly better with the individual-mapping treatment than with the other two treatments. The quality of the concept maps constructed cooperatively exceeded the quality of those constructed individually. The quality of the maps was also correlated to the learners’ writing performance.

The study taken by Akay, Kaya and Kilic (2012) focused to support, enrich, and broaden the process of education using concept maps and to determine the effects of concept maps in Biology classes on school success, attitude and retention of the knowledge taught. The study was conducted as an experimental study with pre-test and post-test control groups. The participants of the study were impartially chosen 11th grade high school students from an Anatolian High School and a Teacher Training Anatolian High School. 45 students, 21 in the control and 24 in the experimental group, participated in the study. In the present study, ‘urinary system’ unit was taught. Whereas the control group was taught traditionally, the experimental group was taught using concept map based teaching technique. Data was collected using concept map attitude scale and Biology achievement test, a 45 item scale with a reliability coefficient of (α=0.78). In order to identify the differences among the groups, Biology achievement test was used as pre and post test. Data obtained to determine the achievement of both groups were analyzed using t test analysis model of the SPSS 11.0 package program. At the end of the study, a statistically significant difference (p<0.05) between emerged traditional teaching
method and using concept map while teaching. The data also indicated that the cognitive support of the concept maps had a positive impact on students’ achievement and retention of knowledge. The data furthermore indicated that students have a positive attitude for concept maps.

Kamble (2012) conducted a study on 84 third-year undergraduate mechanical engineering students enrolled in the internal combustion engine course at a college of engineering of the University of Mumbai in India. The experimental group revealed two results. Firstly, adopting Concept Mapping strategy can significantly improve students' learning achievement compared to using the traditional teaching methods. There were significant differences favoring the experimental group for the knowledge recall questions and the knowledge application questions. Secondly, most of the students were satisfied using the Concept Mapping strategy in an internal combustion engine course. They indicated that concept maps can help them to learn, identify the key concepts, and connect the various concepts. They also thought that Concept Mapping could be used in other curricular areas.

The study conducted by Koc (2012) explored (a) pre-service teachers’ perceptions of using Concept Mapping in one of their pedagogical courses, (b) the predictive power of such implementation in course achievement, and (c) the role of prior experience with Concept Mapping, type of mapping, and gender on their perceptions and performances in Concept Mapping and achievement. The subjects were 89 pre-service teachers majoring in technical education in Turkey. Each participant developed five concept maps and shared them with classmates. The data sources included assessments of concept maps, midterm exam scores, and student feedback questionnaires. Overall, participants had positive perceptions about Concept Mapping. They indicated that Concept Mapping helped them prepare for class lessons and examinations, understand complex issues, and reflect on their (mis)understandings. Concept Mapping significantly predicted course achievement. Gender, prior experience with Concept Mapping, and type of mapping were found to be insignificant factors in their perceptions and performances in Concept Mapping and in the prediction of achievement.

Sharma and Singh (2012) conducted a study on 200 class 9th students and concluded that the experimental group taught through Concept Mapping strategy was significantly better in acquisition of Social studies concept as compared to the group taught through traditional method.
Udeani and Okafor (2012) conducted a study which investigated the comparative effectiveness of the expository and Concept Mapping instructional strategy of presenting secondary school Biology concepts to slow learners. One hundred and twenty four Biology slow learners were identified and randomly assigned to the expository group (N=62) and Concept Mapping group (N=62) and respectively taught the concept of photosynthesis. The groups were post-tested after two weeks of teaching for any significant differences in their Biology achievement. Analysis of post-test scores indicated that the group taught by the Concept Mapping instructional strategy performed significantly (p<0.05) better than their expository group counterparts. Specifically, female slow learners taught with the Concept Mapping instructional strategy performed significantly (p<0.05) better than their male counterparts taught by the same method. These results have implications for Biology teacher preparation, especially in the areas of teaching females and identifying slow learners and adopting effective methods of tackling their problems.

Another study was done under Panjab University by Sood (2012) which read as “The effect of video assisted instruction and computer based Concept Mapping on achievement in Mathematics in relation to emotional intelligence and attitude towards technology”. In which 300 students of secondary class were selected from purposively sampling. Investigator taught eighteen topics of Mathematics. 3x3x3 analysis of variance was used. Results obtained showed that these methods were more significant in acquisition of Mathematical concepts than traditional method. Even students taught through Concept Mapping method achieved more than students taught through video assisted instruction. However level of attitude towards technology did not affect the achievement scores.

Vaishnav (2012) conducted a study to determine the effects of Concept Mapping on the achievement of trainee teachers of B.Ed. course for Educational Psychology subject. The study was conducted with one hundred twenty (120) trainee teachers of B.Ed. course enrolled at Chirayu K.C. Bajaj College of Education, Nagpur City, Maharashtra state, India. The trainee teachers of B.Ed. course were divided in to two groups randomly as experimental and control group. Both the group was tested with self-prepared criterion reference test as pre-tests containing 20 multiple-choice questions and standardized problem solving ability test of Garg. After the pretest, the control group was taught through traditional method of teaching and the experimental group was taught
through Concept Mapping technique along with regular teaching. After completion of the unit, the students on both groups were given the same criterion reference test and problem solving ability test as posttest. Test scores were analyzed for any statistically significant difference in the scores on the test. The results from the present study indicate that Concept Mapping has a positive impact on B.Ed. trainee teachers’ achievement in Educational Psychology subject.

Wehry, Monroe-Ossi, Fountain and Cobb (2012) examined the use of Concept Mapping for formative and summative assessment of northeast Florida middle school students’ knowledge of Human Geography. The students were participants in an afterschool, academic, college reach-out program that provided opportunities to test Concept Mapping strategies that support spatial thinking and stimulate interest in Human Geography. The study documents the use of Concept Mapping for assessment of seventh graders’ achievement of a specific lesson and for students’ Human Geography achievement across all implementation grades. Concept Mapping results provided insight into aspects of the curriculum and instruction where appropriate modifications could better facilitate meaningful learning.

The study done by Aggarwal (2012) investigated the effectiveness of Computer based Concept Mapping (CBCM) in acquisition of concepts of Chemistry in relation to attitude towards science. In this study 240 students of three schools of Amritsar were taken. Pre-post quasi experimental design was applied. CBCM was found to be better instructional strategy. Gender was found to be insignificant factor. No significant interactional affect of instructional strategy, gender and attitude towards Science was found.

Adlaon (2012) in his study emphasized on an alternate instructional tool called “Concept Map”. The goal of this study was to determine the effectiveness of using concept maps in improving the Science achievement of 10th -grade students and compare it with a traditional approach for a Biology unit. Furthermore, the interaction of the student’s Concept Mapping ability and their learning gains was investigated. Both the control and the experimental groups were required to take a pre test before instruction and a posttest at the end of three weeks. The test consisting of 31 questions was used to assess learning gains on a Biology Unit about Balance in Nature. Student-constructed maps were scored using Novak’s scoring scheme. The first finding of the study was that concept map – exposed students did not perform much better than the same level students in the
traditional group. The difference in the learning gains between the experimental and the control group in their unit test, though statistically significant, did not seem to be solely due to Concept Mapping. The second finding indicated that total scores in concept maps did not strongly predict student achievement in Science. Moreover, results showed that the levels of Concept Mapping ability were not associated with the concept-mapping students’ learning gains. Nevertheless, the study suggests that, when carefully integrated into the normal classroom procedure and when other contributing factors such as student motivation and preparedness, reading ability levels, time and classroom environment are considered, Concept Mapping has a potential to be an effective instructional strategy.

Yoo and Cho (2012) discussed that concept maps, visual representations of knowledge, are used in an educational context as a way to represent students’ knowledge, and identify mental models of students; however there is a limitation of using Concept Mapping due to its difficulty to evaluate the concept maps. A concept map has a complex structure which is composed of concepts and their relationships that often have a weighted direction. This work explored the feasibility of the analysis of concept maps using data mining methods, and investigated the possibility of using concept maps as a research tool to understand college students learning. A total of 111 college students participated in this study. The findings from frequent concept mining and sub-concept map mining suggested that students expect a traditional way of learning. The study also showed a promising area of further study in the area of data mining in education.

Miandoab, Mostafaei and Ghaderi (2012) conducted a study which examined the effect of Concept Mapping instruction on students’ learning performance in a History course. The subjects consisted of 43 thirds high school male students. They were divided into two groups: concept map instruction group, and control group. Four weeks of experimental instructions were given to the experimental group. Students’ progresses were examined by pre-test and post-test measurements. The experimental results showed that subjects in the experimental group performed significantly better than control group.

Hwang, Wu and Kuo (2012) conducted a study which investigated the effects of two different touch technology-based Concept Mapping interaction modes on students’ learning achievements and learning attitudes in a natural Science course, as well as their degree of acceptance of using concept maps to learn. Ninety two sixth graders were randomly divided into three groups. Experimental Group, One was taught using the Interactive Whiteboard (IWB)-based Concept Mapping approach, Experimental Group
Two learned with the touch screen-based Concept Mapping approach, while the control group learned with the traditional paper-and-pencil-based Concept Mapping approach. The experimental results show that, in terms of learning attitudes toward the Natural Science course and the degree of acceptance of using concept maps to learn, the students were significantly more positive about the two touch technology-based interaction modes than they were about the traditional paper-and-pencil mode.

Cheema and Mirza (2013) conducted a study which aimed to analyze effect of Concept Mapping; a constructivism based learning strategy, on academic performance of 7th grade students in the subject of General Science. This quasi experimental research, based on 2x2 factorial research design involved 167 students from two single sex schools. Major objectives of the study were to; (i) find out the effect of Concept Mapping as a learning strategy on the academic achievement of students (ii) study differential effect of Concept Mapping on academic achievement of male and female students (iii) to find out the interaction effect of Concept Mapping as a learning strategy and gender on students’ academic achievement. Researchers developed achievement test was used as pre test and post test. During the treatment of five months, experimental group was trained to develop concept maps for three weeks. Subsequently students developed concept maps of General Science content individually, shared those in groups and were compared by teacher with scientifically accepted concept maps for possible correction and improvement. Data on gain achievement scores were analyzed through 2-way anova. Results showed that the male and female students taught through Concept Mapping performed better than the students taught through traditional teaching method. However male students taught through Concept Mapping performed significantly better than the female students. It is therefore recommended that Concept Mapping should be used in elementary classes for teaching General Science. Concepts maps may also be incorporated in the textbooks of Science subjects at the school level.

Agboola and Oloyede (2013) conducted a study to compare the effectiveness of Concept Mapping and peer tutoring instructional strategies in improving the academic performance of secondary school students in Chemistry. The study adopted the non-equivalent pre-test, post-test group design. The population for the study consisted of senior secondary school Chemistry students in Osun State, Nigeria. A total of 57 senior secondary school II (SS II) Chemistry students in two intact classes from two schools in Ife Central Local Government Area constituted the study. The students were randomly
assigned to Concept Mapping and peer–tutoring treatments groups. Three instruments were used for this study to collect data. They are the Chemistry Achievement Test (CAT), Attitudes of Students Towards the use of Concept Mapping Instructional Strategy in Teaching and Learning of Chemistry (ASTCMSC) and Attitudes of Students Towards the use of Peer-Tutoring Instructional Strategy in the Teaching and Learning of Chemistry (ASTPTSC). The CAT test which was used as pre-test, posttest and retention test consisted of 30 multiple choice test items on Organic Chemistry, Periodic Table of elements and Volumetric analysis. The ASTCMSC and ASTPTSC consisted of sixteen-item questionnaire each with Likert type response format administered to students to find out their attitude towards the learning of Chemistry. Four null hypotheses were generated and tested for this study. Data obtained were analyzed using t-test, One Way and Two Way Analysis of Variance (ANOVA). The results showed that there was a significant difference in students’ performance when Concept Mapping and peer tutoring instructional strategies were used to teach Chemistry. Students in the Concept Mapping group performed better than those in peer-tutoring group. The results also showed that there was a significant difference in the retention ability of students exposed to Concept Mapping and peer tutoring instructional strategies. Students in the Concept Mapping group had higher retention ability than those in peer-tutoring group. However, the results showed that sex did not significantly influence students’ academic performance in Chemistry when the two strategies were used. Finally the results showed that the use of Concept Mapping and peer-tutoring instructional strategies did not significantly influence the attitude of students to the learning of Chemistry. The study concluded that Concept Mapping and peer-tutoring instructional strategies could be used to enhance students’ acquisition and retention in order to improve their achievement in Chemistry.

A study conducted by Ezeudu (2013) focused on Influence of concept maps on achievement retention of senior secondary school students in Organic Chemistry. The sample consisted of 435 students comprising 220 students for experimental group and 215 for control group. The results of the study showed: (a) The use of concept maps had a significant effect on the students’ achievement and retention in Organic Chemistry. The use of concept maps was, therefore, more effective than the lecture method for teaching Organic Chemistry. (b) Gender was not a significant factor on the students’ achievement and retention in Organic Chemistry. The male and female students’ therefore, showed the same level of achievement and retention in Organic Chemistry using concept maps. (c)
The combined effects of method and gender on achievement and retention in Organic Chemistry were significant.

Jack (2013) conducted a study the design which was a non-randomized pre-test, post-test, control group quasi-experimental design using intact classes in 251 Senior Secondary three (SS III) Chemistry students in the three senatorial districts of Taraba state which were randomly assigned, experimental and group through balloting using the replacement and withdrawal technique. The result of the analysis showed a significant difference between the performance of students exposed to the two experimental groups (Concept Mapping and guided-inquiry methods) and the control group (expository method), the result of the Sheffe test was in the favour of Concept Mapping. It was therefore concluded that Concept Mapping would be an effective teaching strategy for teaching difficult concepts in Chemistry since it improved students’ performances/retention in the subject.

Julius and Wachanga (2013) conducted a study to investigate how the Experiential Concept Mapping teaching strategy affects secondary school students’ achievement in Chemistry. Solomon Four- Group, Non-equivalent Control Group Design was used. The participants were 179 Form two students from four classes enrolled in day co-educational district secondary schools. Two classes were randomly chosen as experimental groups and the other two were control groups. Experimental groups were taught through experiential Concept Mapping teaching strategy while control groups were taught through the Regular Teaching Methods. The study was conducted in four weeks and the material covered was Structure of the Atom and Periodic Table from Form Two syllabus. The students were pre-tested and post-tested using a Chemistry achievement test. The study showed that experiential Concept Mapping resulted in higher students’ achievement in Chemistry more than regular teaching methods. Gender had no significant effect on students’ achievement when experiential Concept Mapping is used.

Abdulkarim and Hassan (2013) conducted a study to investigate the effect of using Concept Mapping strategy in teaching Physics on the academic achievement. Participants were (46) first year students from two classes enrolled to course “Fundamentals of Physics I” in Dhofar University. One of the classes was randomly selected as experimental group (23) students and the other was control group (23) students. Data were collected via the pre- and post – of the Physics test. The study
conducted in 8 weeks in a class met three times a week. The material covered was about mechanics. Results showed that there were no significant differences at (α=0.05) in the academic achievement between the experimental and control group. Also the study showed that there were no significant differences attributed to the interaction between teaching methods and gender.

Saeedi, Saif, Asadzadeh and Qavam (2013) conducted a study to compare the effectiveness of methods of presentation of concept maps and methods of Concept Mapping on reading comprehension. The subjects of this study consisted of 66 third-year high school students (33 female, 33 male), that were selected randomly by multistage sampling method. Participants were randomly assigned to three treatment groups and one control group. The research instruments were: a) experimental texts, b) comprehension test, and c) Camp Tools software, and d) Teacher-generated concept maps. Treatment groups included computer-based Concept Mapping, paper-pencils Concept Mapping, and reading text with prepared concept maps. The control group for the study did not receive any concept map. The results of this study indicated that presentation of per-prepared concept maps significantly improved comprehension, compared to the map generation and control group. But paper-pencil and computer-based Concept Mapping compared to the control groups were not statistically significant. The best way for use of concept maps is teacher-generated concept maps with texts.

Fatokun and Eniayeju (2014) conducted a study to investigate the effects of Concept Mapping-Guided Discovery Integrated Teaching Approach on the achievement and retention of Chemistry students. The sample comprised 162 Senior Secondary two (SS 2) students drawn from two Science Schools in Nasarawa State, Central Nigeria with equivalent mean scores of 9.68 and 9.49 in their pre-test. Five instruments were developed, validated and used by the investigator for the study; they are namely; Chemistry Achievement Pre-Test (CAPE), Chemistry Achievement Post-Test (CAPO), Chemistry Achievement Retention Test (CART), Lesson Plans for the Control Group (LPCG) and the Lesson Plan for the Experimental Group (LPEG). Pre-test/post-test control group design was employed. Results of the Scheffe’s test for multiple comparisons revealed that boys in the experimental group performed better than girls in the experimental group. The results of the t-test analysis of the retention test showed that the mean score of the experimental group was significantly better than that of the control group (p<0.05).
Jena (2014) conducted a study on 200 rural secondary school students of Kapurthala district of Punjab for the subject of Mathematics. The post-test means of the experimental and controlled group were compared. Significant difference was found in the mean scores of both the groups. The mean score of group taught through Concept Mapping was significantly more than that of the group taught through traditional method. It was thus concluded that Concept Mapping has a noticeable impact on achievement of student in Mathematics.

Nwagbo and Okonkwo (2014) conducted a study to investigate the effect of Concept Mapping teaching strategy on students’ achievement in environmental concept in Chemistry. The sample of the study consisted of 313 senior secondary school students who offer Chemistry in all public secondary schools in Nnewi Education Zone of Anambra State, Nigeria. The results of the study revealed that Concept Mapping is better than lecture method in enhancing students’ achievement in environmental concepts of Chemistry.

Victoria and Paul (2014) conducted a study to check the effects of Concept Mapping-Guided Discovery Integrated Teaching Approach on the learning style and achievement of Chemistry students. The sample comprised 162 Senior Secondary School (SS 2) students drawn from two Science Schools in Nasarawa State, Nigeria which had equivalent mean scores of 9.68 and 9.49 in their pre-test. Five instruments were developed and validated while the sixth was purely adopted by the investigator for the study, Four null hypotheses were tested at α = 0.05 level of significance. Chi Square analysis showed that there was a significant shift in students’ learning style from Accommodating and Diverging to converging and assimilating when exposed to Concept Mapping- Guided Discovery Approach. Also t-test and ANOVA indicated that those who in experimental group achieved and retained content learnt better.

Conclusion

We have observed in review of literature that various studies had been done in order to evaluate the effect of Concept Mapping on the achievement in various subjects and it is also equally true that majority have been conducted in western countries. Some studies on Concept Mappingas Montiel (1980), Cohn (1987), Jegede and Okebukola (1990), Stensvold and Wilson (1992), Horton et al. (1993), Wilkes et al. (1999), Sungur, Tekkaya and Geban (2001), Chang and Chen (2002), Novak (2002), Preszler (2004),
Snead and Snead (2004), Wang and Dwyer (2004), Novak and Canas (2006); Saquma and May (2007), Olgun and Sila (2008), Aydin et al. (2009), Chiou (2009), Okoye and Okechukwu (2010), showed that teaching through Concept Mapping has significant effect on the achievement of the students whereas studies of Brandt et al. (2001), Deyu Hu (2006), Adlaon (2012), Abdulkarim and Hassan (2013) found no significant differences in the academic achievement between Concept Mapping and traditional method but majority of studies were the positive effect of the strategy on the achievement.

Concept Mapping not only improves theoretical aspect but it was found that the construction of prelab and postlab Concept Maps help students understand the concepts involved in the experiments they perform (Markow & Lonning, 1998). Results of study of Slotte and Lonka (1999) indicated that merely including the relevant concepts in a map has little effect on the comprehension of concepts, whereas the extent and complexity of concept maps plays a powerful role in the understanding of scientific texts. if we talk about use of Concept Mapping individually and in groups, here study of Ritchie and Volkl (2000)assessed no difference was found between students working as individually or in groups, however the findings of Chularut and DeBacker, (2004) showed that Concept Mapping in group had significantly greater gains from pre-test to post-test than the individual study group.

Study of Ahlberg and Ahoranta (2002) showed that the Concept Map was only an accurate representation of the main features of cognitive structure. Yeh (2004) shared that cross-domain Concept Mapping can be an efficient mental tool in understanding a students’ creative thinking, improved students’ higher order thinking skills (De Wispelaere & Kossack, 1996), longer retention of concepts (Sharma, 2010; Patrick 2011) The findings of (Wheeler & Collins, 2003) suggested that Concept Mapping was effective in helping students to develop critical thinking skills, Not only students with normal abilities but slow learners were also benefitted with Concept Mapping, specifically, female slow learners taught with the Concept Mapping instructional strategy performed significantly better than their male counterparts taught by the same method (Udeani & Okafor,2012) while results obtained by Cheema and Mirza (2013) showed that male students taught through Concept Mapping performed significantly better than the female students, on the contrary findings of Bello (1997), Bilesanmi-Awoderu (2006), Simon (2007), Okoye and Okechukwu (2010), Ezeudu (2013), Abdulkarim and Hassan (2013) revealed that there was no gender influence on students' Concept-Mapping ability and their achievement in the subject. Anderson-Inman and Zeith (1993) found young
students who still struggle with handwriting skills benefit greatly from Concept Mapping tools.

Apart from these different researchers experimented to check the importance of Concept Mapping on various subjects. Studies of Pankratius (1990), Alias (2006), and Karakuyu (2010) showed that concept map instruction was more effective in improving physics achievement than traditional instructions. Area of Chemistry was undertaken by Markow and Lonning (1998), Brandt et al. (2001), Saouma and May (2003), Aggarwal (2012), Agboola and Oloyede (2013), Ezeudu, (2013), Jack (2013), Julius and Wachanga (2013), Fatokun and Eniayeju (2014) and showed its positive effect excluding the study of Brandt et al. (2001) while positive effect was found on the area of Biology in the studies of Bello (1997), Okoye and Okechukwu (2010), Schaal (2010) Patrick (2011), Akay (2012), Udeani and Okafor (2012) whereas Hwanget al. (2012) checked its impact on Natural Sciences Cheema and Mirza (2013), Slotte and Lonka (1999) on medical school, Ritchie and Volkl (2000) compared Concept Mapping in laboratory experiments, area of Environmental Sciences was dealt by Sharma (2010). Concept Mapping had proved to be one of the most challenging learning experiences for nursing students (Akinsanya & Williams, 2003; Wheeler & Collins, 2003; Hinck et al., 2006).

This technique has positive impact on the achievement in case of Mathematics (Novak, 2002; Novak & Canas, 2006; Awofala, 2011), History (Miandoab, Mostafaie & Ghaderi, 2012) and English course (Tiimen & Taspinar, 2005), it was also recommended that; while using concept maps in language teaching, teacher-made maps firstly should be used. The students should be encouraged to develop their own concept maps.

To conclude we can say there was significant difference of instructional strategy on achievement taught through Concept Mapping and conventional teaching on the academic achievement of the students. Hence we can say Concept Mapping helps in easy understanding of concepts to the students, irrespective of their grades and also affects their improved performance in various aspects. So, Concept Mapping also helped to bring all desired effects in the field of education whether its better academic performance, learning and retention ability.

1.6.2 Achievement and Achievement Motivation

Desai (1971) produced reports on Achievement Motivation and its relation to academic achievement. In his second project sponsored by N.C.E.R.T., he concluded that as a result of development in Achievement Motivation, the pupils gained performance in
examination to the extent of 50 per cent marks. In his third project taken at Baroda with Trivedi, he explained that there was a significant gain in the school performance of pupils, because of gain in terms of Achievement Motivation. In the fourth project sponsored by the U.G.C., Desai along with Trivedi and his colleagues devised a special curriculum and implemented in 14 schools of 700 pupils. It was found that the gain of achievement scores influence significantly the pupils’ performance in examination as well as in their way of thinking and behaving.

Malik (1977) in a study of reading comprehension in the relationship of intelligence and certain personality factors with achievement in Chemistry at Xth class level, found that Achievement Motivation to be slightly related to achievement in Chemistry. Achievement Motivation is to some extent helpful in academic achievement in Chemistry.

Sharma (1981) as quoted by Mandalapu and Digumarti (2003) observed that poor academic motivation, poor linguistic ability, poor planning of study work, poor adjustment and emotional insecurity contributed to under-achievement of rural girls in secondary schools of Haryana. Rajput (1984) as quoted by Mandalapu and Digumarti (2003) obtained the results that in neutral classroom conditions, the achievement of students in Mathematics was not affected by their achievement motivation.

Kingra (1986) conducted a study on sample of IX class selected from six rural schools of Ludhiana district. Rao’s Achievement Motivation test was administrated. The results of the study revealed a significant negative correlation between Achievement Motivation and academic achievement.

Mehta (1987) studied relationship of academic achievement with personality, Study Habits and achievement motivation. He found that the students who had high Achievement Motivation achieved higher school achievement when one of the independent variable was attitude towards parents and teachers. Similarly, the students having high Achievement Motivation achieved higher school achievement when one of the independent variable was attitude towards discipline.

Reddy (1990) conducted a comparative study of some educational variables on students of private and Government schools. The sample comprised of 1340 students, the number from Government schools being 709 and from private schools being 631 from
three districts of Karnataka. The results of the study reported that Achievement Motivation had no significant relationship with academic achievement.

Kalie and Kour (1990) studied Achievement Motivation in relation to over and under achievers in Science and Mathematics. They found that no significant relationship between Achievement Motivation and achievement in Science and Mathematics.

Mitra (1991) in an extensive study of gifted over achieving and under achieving students found that (i) gifted children’s academic achievement has significant relationship with achievement motivation. (ii) There was a significant relationship between academic achievement and Achievement Motivation of gifted underachievers.

Lekhi and Kaur (1995) reported in their study that academic achievement and Achievement Motivation are positively correlated. However they found no significant difference in the achievement scores of the students with high and low achievement motivation.

Dewan (1996) in his study “A comparative study of academic achievement, family environment, motivation and intelligence of secondary groups” found that the academic achievement is positively and significantly correlated with achievement motivation.

Sreenivasa and Baburao (1997) conducted a comparative study on 200 professional and non-professional college students to find out difference in their Achievement Motivation and confirmed a positive relationship between academic achievement and Achievement Motivation whereas the effect of selected variables on the motivation and attitudes of urban secondary students in a large metropolitan school district was studied by San Juanita (1998) and found that student’s academic status and grade level were not related to their achievement motivation.

Hernandez (1998) in his study “Correlates of academic achievement among Latin public high school students” revealed that there is no significant relation between scholastic achievement and Achievement Motivation of the students.

Archer, Cantwell and Bourke (1999) studied the interrelationship among characteristics that predicted achievement among undergraduate students. The sample included 71 older and 61 younger students from Australia. The data was gathered through a questionnaire containing measures of motivation. The results in the college records
were taken as the academic achievement of the students. The findings revealed that motivation had positive relationship with academic achievement of the groups. Vaslow (2000) investigated the relationship between motivational patterns and academic achievement in urban African American middle school students and found that student’s motivational factors were significant predictor of educational outcomes.

Ellakakumar and Elankathirslvan (2001) in their study “Achievement Motivation of higher secondary students and their achievement in Physics” found that achievement related motivation and achievement marks in Physics were positively related to each other. Khosa (2001) in her study Achievement Motivation and parental background as the determinants of students’ academic achievement found that academic achievement and Achievement Motivation are positively correlated.

Yadav and Mayuri (2001) in their study observed that high self control, adaptability along with high morality scores helps in high achievement. In other personality factors high achievement motivation, low general anxiety and internal orientation helped in school success. Kaur (2001) in her study “Academic achievement as related to Achievement Motivation at senior secondary level” found that there is no significant correlation between academic achievement and Achievement Motivation of school students.

Neeraj (2001) reported significant difference in vocational and academic streams between boys and girls in respect to achievement motivation. The high Academic achievement of the academic group students has high academic motivation whereas low academic achievements of the vocational group students have low achievement motivation. So Achievement Motivation was positively related with academic achievement.

Tavani and Losh (2003) examined motivation, self-confidence and expectations as predictors of academic performance among high school students. The sample consisted of 4012 students of Florida State. From the findings a significant positive relationship was found between motivation and Academic achievement. Parental education had also positive relationship with Achievement Motivation of the students.

Manimekalai and Dharma (2005) conducted a study which exhibited a positive relationship between Achievement Motivation and scholastic achievement. It is concluded that suitable instructional designs and process of education motivates the girls for their self upliftment with excellence.
Another study was done by Steinmayr and Spinath (2009) in the University of Heidelberg, Department of Psychology, Germany with the aim to examine to which extent different motivational concepts contribute to the prediction of school achievement among adolescent students independently from intelligence. A sample of 342, 11th and 12th graders was investigated. Students gave self-reports on domain-specific values, ability self-perceptions, goals, and achievement motives. Hierarchical regression and relative weights analyses were performed with grades in math and German as dependent variables and intelligence as well as motivational measures as independent variables. Beyond intelligence, different motivational constructs incrementally contributed to the prediction of school achievement. Domain-specific ability self-perceptions and values showed the highest increments whereas achievement motives and goal orientations explained less additional variance. Even when prior achievement was controlled, some motivational concepts still proved to contribute to the prediction of subsequent performance. In the light of these findings, the importance of motivation in educational contexts was established.

Investigation made by Busato, Prins, Elshout, and Hamaker (2009) was titled as intellectual ability, learning style, personality and Achievement Motivation as a predictor of academic success in higher education. In the sample, 409 first year psychology students of Netherlands were included for the purpose. The analysis of the study confirmed that Achievement Motivation was associated positively with academic success of the students.

Hart and Albarracín (2009) conducted a study and examined the hypothesis that situational achievement cues can elicit achievement or fun goals depending on chronic differences in achievement motivation. In the study chronic differences in Achievement Motivation were measured, and achievement-denoting words were used to influence behavior. The effects of these variables were assessed on self-report inventories, task performance, task resumption following an interruption, and the pursuit of means relevant to achieving or having fun. Findings indicated that achievement (priming vs. control priming) activated a goal to achieve and inhibited a goal to have fun in individuals with chronically high-Achievement Motivation but activated a goal to have fun and inhibited a goal to achieve in individuals with chronically low-achievement motivation.

The study of Abd-El-Fattah and Patrick (2011) examined the relationships among Achievement Motivation orientations and academic achievement and interest, whether
achievement goals mediate these relationships. A sample of 503 students aged 14-16 years from 8 secondary schools in two Australia cities responded to a questionnaire package, comprising measures of individual-oriented Achievement Motivation (IOAM), social-oriented Achievement Motivation (SOAM), achievement goals, and academic interest. Results of the study showed IOAM and SOAM correlated positively. Students endorsed higher levels of IOAM than SOAM. IOAM correlated positively with a mastery-approach goal whereas SOAM correlated positively with mastery-approach, performance-approach, and performance-avoidance goals. Performance-approach and performance-avoidance goals mediated the relationship between SOAM and academic achievement. Mastery-approach goals mediated the relationship between IOAM and SOAM and academic interest.

Achievement and its relationship with Achievement Motivation and academic self concept were studied by Awan, Ghazala and Anjum (2011). The subjects consisted of 336 students (146 males and 172 females) from four public and four private schools of the Sargodha district at secondary level. Intact groups of all eight schools enrolled in 9th grade were involved in the study. An Urdu translated version of ‘Academic Self-Description Questionnaire II’ (Marsh, 1990) and ‘General Achievement Goal Orientation Scale’ (McInerney, 1997) was used for data collection. The results revealed that Achievement Motivation and self concept were significantly related to academic achievement. Significant gender differences were discovered which were in favour of girls. It was suggested that teachers must use motivational strategies to involve students in academic activities for improving their self concept and grades.

The study of Amrai, Motlagh, Zalani and Parhon (2011) explored the correlation between academic motivation and academic achievement among Tehran University students. In this cross-sectional correlation study, 252 Tehran University students were required to fill the academic motivation questionnaire. This 43-item questionnaire measured 8 aspects of motivation. Criterion for academic achievement was a mark which students themselves reported. Data were analyzed through using SPSS16 by means of Pearson Correlation coefficient. Data analysis indicated positive and significant correlation between Academic motivation and Academic Achievement. Furthermore subscales of task, effort, competition, social concern within eight subscales had a significant relationship with academic achievement. Regarding the results, students’ academic achievement requires coordination and interaction between different aspects of motivation.
Bandhana and Sharma (2012) conducted a study on 250 students (118 male and 132 female). The results of the study revealed that students with high Achievement Motivation has high academic achievement in comparison to the ones studying with the low Achievement Motivation and the boys have higher level of Achievement Motivation in comparison to girls.

The prime purpose of the study done by Abesha, (2012) was to propose and test an integrated parental and social-cognitive model of Academic achievement and examine the effects of parenting styles, academic self-efficacy, and Achievement Motivation on academic achievement by employing an ex-post facto prospective research design. The data on demographic characteristics, parenting styles, academic self-efficacy and Achievement Motivation were collected through self-report questionnaires from a sample of 2116 (763 females and 1353 males) undergraduate first year students selected via multi-stage cluster random sampling technique from Addis Ababa University, Kotebe College of Teacher Education, and Wolayta Soddo University in Ethiopia and accessing their second semester Grade-Point-Averages (GPAs) of 2008/09 academic year from the Registrars’ Offices of the respective Higher Education Institutions. The results of the study showed that regardless of students’ sex, Achievement Motivation had a significant and positive direct effect on Academic achievement.

The study of Onete, Edet, Udey and Ogbor (2012) examined the relationship between first year education students’ Achievement Motivation and their academic performance. The design employed for the study was survey (expo-facto). A total of seven hundred and fifty (750) out of one thousand three hundred and fifty two students (1352) students of the 2010/2011 academic session were randomly selected for the study. To guide the study, two hypotheses were formulated on students’ academic Achievement Motivation and academic performance as well as students’ social Achievement Motivation and academic performance. The instrument used for the study was tagged “Education Students’ Achievement Motivation Scale (ESAMS)” which was adapted from Cofer and Appley (1964) Achievement Imagery and Grandal and Grandal (1965) Modified Intellectual achievement Questionnaire (MIAQ). The instrument consisted of two parts, A and B. Part A consisted of items on respondent’s Bio –data while Part B comprised of 15 items which elicited responses from students’ achievement motivation. The results of the study after analysis of the hypotheses obtained data with “ANOVA” statistical analysis technique indicated that neither students’ academic Achievement
Motivation nor students’ social Achievement Motivation had any significant influence on education students’ academic performance.

Prasad (2013) conducted a study on 288 secondary school students (86 high and 202 low achievers) from Bhagalpur (Bihar). The results of the study revealed significant effect of motivation on Academic achievement.

Chetri (2014) conducted a study on 480 secondary school leavers studying in different schools of Sikkim by using stratified random sampling techniques from various government and non government managed schools within the age range of 16-17 years, from urban and rural areas. The results of the study revealed a significant positive relation between Achievement Motivation and Academic achievement.

Emmanuel, Adom, Josephine and Solomon (2014) conducted a study on 120 selected from four senior high schools (two each from rural and urban areas) from Western region of Ghana. The results of the study showed no significant relation between Academic achievement and Achievement motivation.

Sandhu (2014) conducted a study to investigate the relation between academic achievement of adolescents and Achievement motivation. The sample comprised of 200 10+1 class students from Government senior secondary schools of Ludhiana City. The finding of the study showed significant positive relation between Academic Achievement and Achievement Motivation.

Siddiqui and Fatima (2014) conducted a study on sample of 278 (Muslims and Non-Muslims) adolescents studying in class X of Aligarh schools. The results of the study showed for both Muslims and Non-Muslims the Achievement Motivation influenced the Academic achievement for total sample and for female population but not in the case of male population.

Conclusion

between Achievement and Achievement Motivation but the results of studies by Rajput (1984), Kalie and Kour (1990), Reddy (1990), San Juanita (1998), Hernandez (1998), Kaur (2001), Onete et al. (2012) and Emmanuel et al. (2014) confirmed no significant relation between Achievement and Achievement motivation. Kingra (1986) found significant negative correlation between Academic achievement and Achievement motivation.

Malik (1977) Achievement Motivation is too little extent helpful in academic achievement in Chemistry. Bandhana and Sharma (2012) revealed positive effect of Achievement Motivation on the academic achievement. They also found that boys have higher level of Achievement Motivation in comparison to girls whereas the results of the study of Abesha (2012) showed that regardless of students’ gender, Achievement Motivation had a significant and positive direct effect on Academic achievement.

1.6.3 Achievement and Study Habits

Jamuer (1974) found that Study Habits affect scholastic achievement independent on intelligence. He also found that a study habit is related to (a) position in family, (b) father's occupation; (c) hobbies, (d) future educational and (e) vocational plans of study. In another study Dhaliwal and Saini (1978) investigated prevalence of academic under achievement among high school students. The results showed positive significant relationship between Study Habits and level of achievement.

Ansari (1980) found that Study Habits and study behavior are both significant variables which determine the academic performance of the students. Zarb (1981) studied the relationship between academic achievement and six non academic variables in ten students. The sample consisted of 30 males and 98 females, from a working class urban neighborhood. The six non-academic variables studied were (i) Study Habit (ii) self-concept relative to peers (iii) acceptance of educational system, (iv) self-concept relative to family (v) general Achievement Motivation and (vi) academic self concept. The battery of measures included the academic self-concept scale, survey of Study Habits and attitudes. Results indicated that self-concept and Study Habits were significant predictors of grade point average for both males and females. These results suggested that the best students in a normal population are not necessarily those with a high self-concept and family self-concept, but those who have developed good Study Habits and realistically perceive themselves as academically successful.

Agarwal (1983) conducted a study on reading ability in relation to certain cognitive and non-cognitive factors. A sample of 200 males and 200 female students of XI grade
were randomly selected from high schools in Bihar, India. The subjects completed a battery of reading ability tests, Study Habits inventory, general intelligence and non-verbal intelligence tests, anxiety, Eysenck personality inventory and youth adjustment inventory. The results indicated that males had a greater predisposition to better Study Habits, neuroticism, extroversion, favorable parental attitude and a better ideal self than females. However, females showed a higher reading ability and academic achievement than males. There were significant and positive correlations in both males and females between reading ability and their Study Habits. Similarly Chhina (1983) conducted a study on ‘Study Habits’ in relation to over and under achievement in English. It was concluded that over achievers in English had significant better Study Habits as compared to under achievers in English.

Christian (1983) studied need achievement and Study Habits of the pupils of standard 10\textsuperscript{th} in relation to sex, Study Habits inventory of Patel (1976) and TAT test of Mehta were administered on a sample of 79 girls and 68 boys. The analysis of variance revealed that girls and boys had equally good Study Habits. The study suggested that Study Habits are one of the important factors, which is helpful to achieve more in the promising field.

Singh (1984) conducted a study and found that (i) adolescent boys had significantly better Study Habits than adolescent girls, (ii) Study Habits were related to the academic achievement significantly and (ii) Study Habits of adolescent boys and adolescent girls differed significantly at different levels of academic achievement and intelligence i.e. high, middle and low.

Lawrence, Volet, Dodds and McGaw (1985) conducted a study of organizational characteristics, in which they observed distance education students "thinking aloud" as they opened their coursework material and gave a demonstration of how they would go about planning their work. They found that high achievers emphasized understanding, drawing major concepts together and applying to education experiences, expressed problems that were task-related (new concepts to learn, volume of work, and shortage of time); re-organized and selected information and built up their own overviews of material. Low achievers were more intent on gaining knowledge required by their supervisors, problems expressed were personal (anxieties, inability to express themselves); they wanted to receive and use information, and use overviews of material already provided; and they preferred to rote learn strategies needed for their examinations.
Singh (1987) investigated into the Study Habits of scheduled caste adolescents in relation to their intelligence and achievement motivation. The random sample consisted of 100 boys and 100 girls of 9th standard at high and senior secondary schools of Bilaspur, Kangra and Simla districts of Himachal Pradesh in India. Study Habits Inventory and general mental ability test and TAT were used for the study. General mental ability test above the mean score were considered as high group and below the mean scores as low group. The results reported that the main effect of intelligence (F=9.03) on Study Habits was very highly significant. High intelligent group had better Study Habits than the low intelligent group.

An investigation into the Study Habits of scheduled caste adolescents in relation to their sex and Achievement Motivation was made by Singh (1989). The study was conducted on 150 boys and 150 girls belonging to scheduled caste from 9th classes in Himachal Pradesh, India. The ‘F’ value of 5.16 for the main effect of sex on the Study Habits was significant at 5 percent level. It indicated that the Study Habits of boys and girls differed significantly. Boys had significantly better Study Habits than girls.

Ramaswamy (1990) studied the relationship between Study Habits and Academic achievement in high and low achieving boys and girls of 11th standard in Madurai district, Tamil Nadu, India. The study habit inventory of Patel (1976) was used to measure the Study Habits. Product moment correlation was used to find out the relationship between Study Habits and Academic achievement. The correlation analysis revealed that (i) Study Habits are not significantly related to Academic achievement among high achievers boys, (ii) Study Habits are significantly related to academic achievement among low achievers in boys, (iii) Study Habits are significantly related to academic achievement among high achiever girls and (iv) Study Habits are significantly related to academic achievement among low achievers girls.

Studies conducted by Deb and Grewal (1990) concluded that (i) home environment of the students and planning of the schedule was significantly related to their academic achievement and (ii) and significant relation between Study Habits and Academic achievement was found.

Kasat (1991) made an in-depth study of the causes of failures in Mathematics in S.S.C examination of Marathi medium school students in Palghat Tehsil. He examined two hundred boys and girls who had failed and found that most of them had poor intelligence, poor numerical ability, poor comprehension and recall ability, no interest in Mathematics,
poor Study Habits, lack of help from parents and teachers and difficulties in certain topics.

A study on assessing the level of test anxiety, self-concept, adjustment and Study Habits in predicting academic achievement was conducted by Misra (1992). Sample of 88 Oriya male students of 9th and 10th class in three schools of Bhubaneshwar and Orissa, India was taken. To determine Study Habits of subjects Wrenn’s Study Habits inventory was used and total marks obtained in annual examination was used to know the relationship between the independent and dependent variables. It revealed significant and positive correlation between Study Habits and academic achievement.

Tymms and Gibbon (1992) examined the relationship between time spent on homework and exam grades among approximately 3000 students from schools and colleges in Northeast England. Average time spent was 5 hrs per week. Girls reported spending approximately 30 minutes/week more than boys. The study revealed that students who marked for long hours gained slightly better grades than those who worked for modest periods.

Russell and Petrie (1992) have cited a research study aimed to find out the relationship between Study Habits and student behavior and academic performance (cumulative GPA) of university students. Findings of this study indicated a positive correlation between study behavior, study habit and academic achievement.

Panda (1992) investigated Study Habits of disadvantaged and non-disadvantaged adolescents in relation to sex and academic achievement. The sample of the study consisted of 50 disadvantaged boys and 50 non-disadvantaged girls of 9th and 10th classes in Orissa, India. The subjects were selected randomly and matched with age, sex, area of living and birth order. Patel’s (1976) study habit Inventory was used in the study. The data was analyzed by applying ANOVA. The ‘F’ value for sex indicated significant difference. From the mean values, it was revealed that boys had significantly better Study Habits than girls.

A study of Mehta and Malhotra (1993) was carried out to find out the predictors of academic achievement among 300 arts students. Stepwise regression analysis revealed that Study Habits and study attitudes were the important predictors of academic achievement.

Stella and Purushothaman (1993) examined the Study Habits of underachievers. The sample of 90 underachievers selected through randomized block design consisted of
students of Standard IX from there state board schools of Tamil Nadu, India. For this one rural and two urban areas were selected. IQ score was taken as a blocking variable. There were 30 under achievers from each IQ category high, average and low. Culture Fair Intelligence test scale-2 form 3 designed by Cattell and Cattell (1961) edition and Study Habits Inventory by Patel (1976) was used for the study. Results showed significant difference between Study Habits of high and low IQ under-achievers (t=3.76: P<0.05). It also indicated significant difference between urban and rural students in respect of Study Habits. The mean value showed that urban students had better Study Habits than rural students. But no significant difference was found between boys and girls.

Loranger (1994) compared the study strategies of six 16-18 year old successful and unsuccessful learners to determine if successful learners would differ in the quality of their information processing from unsuccessful learners. Each subject read and studied on article and participated in an interview. Results showed that successful students tended to be more motivated to succeed and more likely to be active, purposeful & flexible in their strategy use while less successful students perceived themselves as successful, & they lacked self knowledge of inefficient strategy use.

In their study Patel and Patel (1996) found that the girls from good Study Habits group scored significantly more than all other groups. Boys from good Study Habits groups were the second who scored better than the rest. Girls and boys from poor Study Habits group scored statistically equal.

Verma (1996) studied the effect of Study Habits on academic achievement among 500 students of X class. The sample was selected from schools in Delhi by using random cluster sampling technique. Two way analysis of variance was applied to know the main and interaction effects. The ‘F’ values of 13.43, 6.84 and 5.59 which were significant at one percent level revealed significant independent effect of Study Habits on performance in Hindi, English and Social Studies. This result further revealed that students possessing good Study Habits scored higher than students possessing poor Study Habits in these courses.

The study of Patel (1997) investigated the causes of under achievement in Mathematics of eight grade students having high numerical ability. A sample of 35 high achievers and 40 low achievers was selected from schools in Gandhi Nagar, Gujarat (India) based on their marks in Mathematics. The chi-square analysis revealed that Study
Habits have tremendous effect on the achievement. High discussing important concepts / aspects of Mathematics with teachers / peers and finding out solutions to their difficulties etc. Similarly Rajyaguru (1997) took a sample of 183 students of standard VIII from Bhavnagar District and revealed that the locus of control is a better predictor of Mathematics achievement than Study Habits.

Sampath and Selvarajgnnanaguru (1997) studied the Study Habits of higher secondary commerce students. 428 higher secondary second year commerce studying in Chidambaram taluk in Tamil Nadu were selected by using cluster sampling technique. Study Habit Inventory by Mukopadhyay and Sansanwal (1983) was used as a tool of the study. The ‘t-test’ indicated that there was no significant difference between Study Habits of boys and girls.

Yadav, Ansari and Savant (1999) critically analysed Study Habits and academic achievement of college students. The purposive sample comprised of 70 B.Sc-II, 107 B.Sc III and 75 B.Sc IV year male students of college agriculture studying during 1997-1998 was selected and administered Study Habits inventory. The data were subjected to classification, frequency, percentage, mean, standard deviation and t-test analysis. The results revealed that plan of study, method of study, concentration, preparation for examination and perfection of subject were significantly related to academic achievement.

Gelat (1999) conducted a study on a sample of 576 boys and 464 girls studying in secondary schools with a view to find out the effect of efficient Study Habits on the academic achievement of students. Study revealed significant difference in the academic achievement of students with good Study Habits and poor Study Habits.

Verma and Kumar (1999) found that Study Habits were positively related to achievement in tenth grade examination in Dehli (N=1000). Good Study Habits are positively related to achievement.

Alude and Onelemhemhen (2001) studied the effect of study habit counseling on the academic performance of secondary schools students in English language. The 108 senior secondary school class and two students of lumen Christ secondary school, Uromi, Edo state, Nigeria was targeted. The multi-stage stratified sampling method was used. The study habit inventory (Bakare, 1977) was taken. The findings of the study were counseling students on good Study Habits can bring about improvement in the students’ academic performance and showed that after Study Habits counseling on the various
areas of the inventory, students in the experimental group (i.e. study habit) showed a significant improvement in the scores as compared to the control group where there was no significant improvement.

Similarly, in a study undertaken by Nancy and Sheeba (2001) results concluded that if we improve student's habit of preparation for examination, reading, note taking, school environment and habits of concentration there will be considerable improvement in their process outcome in Biology. Armstrong (2001) declared the Study Habits as the connection between learning readiness’s with an activity in form of a process. Mostly it is for the acknowledgement based on some specific goal and compulsory exercises.

Kaur (2001) investigated the research problem “The impact of Study Habits and Achievement Motivation on the academic achievement of B.A/B.Sc. I students in relation to sex and area”. Study revealed positive significant relationship between Study Habits and academic achievement. The students who achieved high on academic achievement had good Study Habits; boys had good Study Habits than girls; urban students had better Study Habits than rural students.

The study by Aluja and Blanch (2004) analyzed the relationships among Cattellian personality factors, scholastic aptitudes, Study Habits, and academic achievement. A total of 887 volunteer students from primary education (453 males and 434 females), enrolled in 29 public schools, participated in this research. It was found that the scholastic aptitudes were the most predictive variables of achievement, while the personality traits had a low direct contribution to academic achievement, although the students with higher scores on socialized personality traits showed better Study Habits than those students with lower scores on personality socialization traits. The relationship between personality and academic achievement seems to be mediated by Study Habits. Moreover, females obtained higher academic achievement scores than males. These differences could be explained by the fact that females showed a more socialized personality pattern and better Study Habits.

Bhanot (2004) investigated the effect of remedial teaching on Study Habits and performance of the IX class students in Mathematics. It was found that Study Habits changed with remedial teaching and it also had significant effect on Mathematical achievement of students.

Objectives of the study were: (a) To prepare and validate the Modular Approach to teach Tamil Grammar at Class IX; (b) to study the effectiveness of the Modular Approach materials in terms of achievement of the students of Class IX; and (c) to study the habits of students. A sample of 80 students from Class IX was selected through probability sampling method for this study. The findings of the study revealed that (a) Control group and experimental group students differ in their achievement in Tamil grammar and Study Habits. (b) The Modular Approach was effective in enhancing the academic achievement and Study Habits. (c) There was significant relationship between the Achievement and Study Habits.

Sardana (2006) conducted a study on 200 students of XI class, Ludhiana, found that there exists a positive and significant relationship between achievement in Mathematics and comprehension, concentration, task orientation, supports (dimensions of Study Habits) and Achievement.

Bala (2006) conducted a study on a sample of 756 students of XI class studying in Senior Secondary Schools in the Punjab State. The results of the study revealed that Study Habits were significant predictors of achievement in Mathematics.

Nuthana and Yenagi (2009) checked the influence of Study Habits, self-concept on academic achievement of boys and girls. The Objectives of the study were- (a) To find out the gender differences if any, on the factors affecting academic achievement, to analyze the Study Habits of high school boys and girls, to study the self-concept of high school boys and girls and to analyze the academic achievement of high school boys and girls. (b) To know the influence of Study Habits and self-concept on academic achievement of high school boys and girls. For this purpose, Self Concept Scale developed by Singh and Singh (1988) and Study Habits Inventory developed by Patel with slight modification (1976) was used. Major findings were (a) It was revealed that boys and girls had almost similar Study Habits. (b) It was revealed that boys and girls did not differ significantly on self-concept as the ‘t’ value of 1.75 is found to be significant. (c) It was found that boys and girls did not differ significantly on academic achievement as the t-level of 1.26 was found to be non-significant. (d) The association of Study Habits of girls with academic achievement was significant. While as the association of the Study Habits of boys with academic achievement was not significant. (e) The association of self-concept of boys and girls with academic achievement was significant. (f) It was revealed that significant relationship between reading and note taking habit, habits of
concentration and preparation for examination had significant correlation with academic achievement.

In another study the relationships among Study Habits, test anxiety, achievement, motivation, and academic success were investigated by Ergene (2011) in a Turkish tenth grade high school sample consisting of 510 participants, 267 (52.4%) of whom were females and 243 (47.6%) were males. The data were collected by the Turkish version of Test Anxiety Inventory (TAI), Study Habits Inventory (SHI) and Self Evaluation Inventory (SEI). Students’ GPA was accepted as the indicator of their academic success. Small but significant correlations were found between the worry subscale of TAI scores and academic success (r = -0.18, p<0.01), and between the Study Habits Scale scores and academic success level (r = 0.15, p<0.01). A positive relationship between Study Habits scores and Achievement Motivation level (r=0.39, p<0.01) was found. Gender, worry subscale of TAI and Study Habits predicted academic success in general. No correlation was observed between Achievement Motivation and academic success. Test anxiety and Study Habits were associated positively with academic success and there was no association with achievement motivation. Females were significantly higher in test anxiety scores as consistent with the literature. The results were discussed in the light of the literature.

Fayombo (2011) conducted a study in the University of the West Indies, Barbados, to examine some student-related variables (interest in higher education, psychological resilience and study habit) as predictors of academic achievement among 131 (Mean = 28.17, Standard deviation = 1.61) first year psychology students in the Introduction to Developmental Psychology class. They responded to four instruments: PAT (Psychology Achievement Test), IHES (Interest in Higher Education Scale), PRS (Psychological Resilience Scale) and SHS (Study habit scale). Descriptive statistics, Pearson product moment correlation and stepwise multiple regressions were conducted. Findings revealed significant positive correlations between the student-related variables and academic achievement. The student-related variables also jointly contributed 46% of the variance being accounted for in academic achievement (R² = 0.464, which is the square of the measure of correlation and an indication that the model is fit for future prediction of academic achievement among university students) and this was found to be significant. Additionally, it was found that interest in higher education was the best predictor of academic achievement and that psychological resilience and study habit were
other significant predictors. These results were discussed in the light of improving these student-related variables for effective teaching of psychology and good academic performance.

Bandhana and Sharma (2012) conducted a study on 250 students (118 male and 132 female). The results of the study revealed that students with good study habits have high academic achievement in comparison to those having poor study habits.

Oluwatimilehin and Owoyele (2012) conducted a study in Tai Solarin University of Education, Nigeria with the aim to investigate the relationship between Study Habits and students’ academic achievement in core subjects at the junior secondary school level. The aim was to determine the relationship between various aspects of Study Habits including homework and assignments, time allocation, reading and note taking, study period procedures, concentration, written work, examination and teacher consultation and students’ achievement in English language, Mathematics, Integrated Science and Art. This was meant to provide clearer understanding of the phenomenon. The descriptive research design of an ex post facto approach was used in the study. A sample of 300 JS2 students was drawn using simple random sampling technique. A major hypothesis was raised leading to the application of correlation and stepwise linear regression analysis. Findings reveal that of all the Study Habits’ subscales, ‘teacher consultation’ was most influential while the ‘time allocation’ exercise, concentration, no taking reading and assignments were regarded as less integral to students’ academic performances. Therefore, regular counseling services to train students on study skills strategies were advocated in order to boost their study habit and enhance their academic achievement.

Kumar and Sohi (2013) conducted a study to compare the study habits of male and female students of rural and urban area and their academic achievement. By using Stratified Random sampling method 100 students were selected from four schools of Karnal district of Haryana. ‘Study Habit Inventory of Palsane and Sharma’ was used to collect the data. Academic Achievement Scores of 9th class from respective schools was taken. Pearson’s Product Moment co-efficient of correlation was applied to know the relationships between study habits and academic achievement. It was found that there is very high and positive relationship between Study Habits and academic achievement of tenth grade students.

Another study done by Saini (2013) entitled as “A study of academic achievement of scheduled caste secondary school students in relation to Study Habits, home
environment and school environment,” was an attempt to find out the effect of home environment, school environment and Study Habits on academic achievements of scheduled caste students. The scheduled caste which are treated as untouchables continue to remain at the bottom of India’s caste hierarchy. They also remain at the bottom of economic hierarchy, having no land of the own and relegated to undertake only menial/dirty and ill paid jobs. The major caused that have kept the scheduled caste down in the society have been poverty, illiteracy, ignorance, and fear, resultants inability to assert themselves. The descriptive survey method is used in the present investigation. The sample consists of 600 scheduled caste students. Amongst them 350 were boys and 250 were girls from 30 schools of three districts viz. Jind, Jhajjar and Rohtak. Home Environment Inventory, School Environment Inventory by Mishra and Study habit Inventory by Mukhopadhyaya and Sansanwal were used as a tool for the study. Tenth class marks were considered as academic achievement of respondents. Correlation, Mean, Standard Deviation and t test were the statistics used for data analysis. The findings of the study reveal that there was no significant relationship between study habit and academic achievement. Home environment had significant effect on academic achievement but school environment does not play a significant role in academic achievement. Ultimately the study while help teachers to touch the exact points of the deficiencies of their students. It is their disadvantageous environment which has pushed them for below, as regards academic achievement, Study Habits and concerned.

Another study conducted in Department of Guidance and Counselling, Ekiti State University, Nigeria by Ayodele and Adebiyi (2013) Study habit was examined as a determinant of academic performance of undergraduates in Nigeria. It also investigated how faculty and gender influence their study habit. The study employed a descriptive research survey type. The research instrument was titled” Study Habits determinants Questionnaire”. The face and content validity was ascertained by psychologist and Guidance and Counselling experts. A reliability coefficient of 0.85 was obtained using split half method. The population of the study includes all faculties in the university. Samples were selected through stratified and random sampling techniques. Two hypotheses were generated and were tested using student t-test and ANOVA at 0.05 level of significance. The descriptive analysis revealed that self concept was very strong determinant of study habit, so also was method of study, family background, socio-economic status, peer group and course of study. Again, gender was found to have no
significant difference on undergraduates’ study habit while on the other hand faculty of undergraduates had a significant difference on their study habit. The outcome of this study would be of immense help to undergraduates, helps to improve their Study Habits skills and in turn facilitate students’ performance. Improvement in students’ academic performance will therefore lead to national development as qualitative manpower will be produced. It was recommended based on the findings that home-front factors should be thoroughly addressed such that students will be able to manage other determinants. Also, the school, government and all stakeholders should make facilities and materials that facilitate studying available to students.

Adeyemi and Adeyemi (2014) conducted a study on 1,900 lecturers and 12,420 students in South Western Nigeria. Study Habits were found to be significant predictor of Academic achievement of students.

Lawrence (2014) conducted a study on 300 students selected randomly from 13 higher secondary schools in state of Tamil Nadu. The results of the study revealed no significant relation between academic achievement and Study Habits.

Sandhu (2014) conducted a study to investigate the relation between Academic achievement of adolescents and their Study Habits. The sample comprised of 200 10+1 class students from Government Senior Secondary Schools of Ludhiana City. The finding of the study showed significant positive relation between Academic achievement and Study Habits.

Siddiqui and Fatima (2014) conducted a study on on sample of 278 (Muslims and Non-Muslims) adolescents studying in class X of Aligarh schools. The results of the study showed for both Muslims and Non-Muslims the Study Habits influenced the Academic achievement for total sample and for male population but not in the case of female population.

Chamundeswari, Sridevi and Kumari (2014) conducted a study to investigate the relationship between self-concept, study habit and academic achievement of students. Sample of the study consisted of 381 students at the higher secondary level. The Self-concept Inventory (Deo, 1985) is used to study self-concept, Study Habits Inventory (Gopal Rao, 1974) is used to assess study habit, and academic achievement marks scored by students in their quarterly examination were taken for academic achievement scores. The results of the study revealed a significant positive correlation between study habit and academic achievement of students.
Conclusion

The study of related literature suggests that the achievement of the students is related to the Study Habits of the individual but the studies of Rajyaguru (1997) found other variables as better correlates of achievement than Study Habits. Studies of Chaudhary (2001), Lawrence (2014), and Siddiqui and Fatima (2014) found that Study Habits of students have no effect on achievement, however, majority of the studies conducted in this field indicated a significant positive relation between Study Habits and achievement (Singh, 1984; Kasat, 1991; Stella & Purushothaman, 1993; Gelat, 1999; Alude & Onelehmehnen, 2001; Nancy & Sheeba, 2001; Kumar & Sohi 2013; Adeyemi & Adeyemi, 2014; Sandhu, 2014; and Chamundeswari et al., 2014). Few studies were also in agreement with the concept that Study Habits puts more effect on girls than over boys having high achieving desirability and good Study Habits (Ramaswamy, 1990; Patel & Patel, 1996).

1.7 EMERGENCE OF THE PROBLEM UNDER STUDY

The above referred researches increasingly support the idea that the use of Concept Mapping tools can extend and enrich students’ learning in Science and Technology in an important and unique ways. It is well known that Concept Mapping tools has been widely recommended and used in a variety of ways in teaching of different subjects in countries such as U.S.A. (Novak, 1980; Lawson, 1994; and Nelson, 2007), Australia (Wilkes et al., 1999), Turkey (Asan, 2007; and Aydin et al., 2009), Singapore (Ling & Boo, 2007), Spain (DeWispelaere & Kossack, 1996), Taiwan (Tsai et al., 2001; and Chiou, 2008), Lebanon (BouJaoude & Attieh, 2003), Malaysia (Alias, 2006), and Nigeria (Okoye & Okechukwu, 2010; Fatokun & Eniayeju, 2014; Nwagbo & Okonkwo, 2014; Victoria and Paul, 2014). As compared to advance countries very less research work has been done in India in the field of Concept Mapping and especially its relation to Achievement Motivation and Study Habits.

Among the studies conducted in the subject of Chemistry (Markow & Lonning, 1998; Brandt et al., 2001; BouJaoude & Attieh, 2003; Aggarwal, 2012; Agboola & Oloyede, 2013; Ezeudu, 2013; Jack, 2013; Julius & Wachanga, 2013; Fatokun & Eniayeju, 2014) only one study (Aggarwal, 2012) was found conducted in India.

The review of related literature reveals that studies by Montiel (1980), Cohn (1987), Jegede and Okebukola (1990), Pankratius (1990), Stensvold and Wilson (1992),
Horton et al. (1993), Wilkes et al. (1999), Guastello et al., (2000), Ritchie and Volkl (2000), Sungur et al. (2001), Novak (2002), Chang and Chen (2002), Chularut and DeBacker (2004), Preszler (2004), Snead and Snead (2004), Wang and Dwyer (2004), Candan et al. (2006), Novak and Canas (2006); Asan (2007), Ling and Boo (2007), Saquma and May (2007), Chiou (2008), Olgun and Sila (2008), Aydin et al. (2009), Chiou (2009), Okoye and Okechukwu (2010), Karakuyu (2010), Awofala (2011), Dosanjh (2011), Akay et al. (2012), Sood (2012), Vaishnav (2012), Jack (2013), Julius and Wachanga (2013), Jena (2014), Fatokun and Eniayeju (2014), Nwagbo and Okonkwo (2014), Victoria and Paul (2014) showed that teaching through Concept Mapping has significant effect on the achievement of the students. But, studies by Brandt et al. (1993), Adlaon (2012), and Abdulkarim and Hassan (2013) showed that Concept Mapping has no significant effect on the achievement of the students. But the studies that investigated the effects of Concept Mapping on students’ achievement had mixed findings. To account for the differences in the findings, several studies have explored the interaction between Concept Mapping and students’ characteristics, such as cognitive preference (Jegede & Okebukola, 1988; Jonassen, 1996; Wang, 2004), and verbal ability (Stensvold & Wilson, 1992). However, few studies were found conducted in Panjab University (Kumar, 2009) on the effectiveness of Concept Mapping and concept attainment model as instructional strategy in relation to Study Habits and style of learning and thinking; Sharma, 2010 on acquisition of environmental awareness through Concept Mapping in relation to Achievement Motivation and cognition styles; Rani, 2011 on the effect of teaching through Concept Mapping on Science achievement in relation to test anxiety and self efficacy); Two more studies (Sood, 2012; Aggarwal, 2012) were found by the investigator while compiling the thesis done under Panjab University on Concept Mapping but no study related to achievement in Chemistry in relation to Achievement Motivation and Study Habits was found conducted on Government school students of Ludhiana district by the investigator. There may be many reasons, one of the reasons is that Concept Mapping is still a new method and not adopted by Science teachers in India especially in Government institutions. The other reason could be the problems in developing Novak's style concept maps. It is expected that findings of this research will encourage Science teachers to incorporate concepts maps into their teaching and will help them to bring improved results.

It can thus be concluded that most of the studies had been undertaken only in foreign countries. A little work had been done in India covering population of Chandigarh
Kumar, 2009; Sharma, 2010; Rani, 2011; and Sood, 2012), Amritsar (Aggarwal, 2012), Kapurthala (Jena, 2014) on effectiveness of Concept Mapping. But, no study has been found specifically done on the population of Punjab Government school students on subject of Chemistry. The proposed study thus seems fully justified as it checks the effect of teaching through Concept Mapping on achievement in Chemistry of grade IX on Punjab Government school students.

1.8 STATEMENT OF THE PROBLEM

EFFECT OF CONCEPT MAPPING STRATEGY ON ACHIEVEMENT IN CHEMISTRY OF IX GRADERS IN RELATION TO ACHIEVEMENT MOTIVATION AND STUDY HABITS

1.9 OPERATIONAL DEFINITIONS

1.9.1 Concept Mapping - Concept Maps in the present study are taken as two-dimensional representations of cognitive structures showing the hierarchies and the interconnections of all the Chemistry concepts for class IX of Punjab School Education Board. Various Concept Maps were prepared using steps recommended by Novak and Gowin (1984). Here hierarchical type of Concept Mapping was selected keeping age and grade in mind.

1.9.2 Conventional Teaching - In conventional teaching lecture discussion method was used in present study. The teacher presented the subject matter by active verbal interaction with the students.

1.9.3 Achievement in Chemistry - Achievement is defined as the extent to which learner is profiting from instructions in a given area of learning, Here Achievement in Chemistry was indicated by the mean gained scores (difference of scores of post test and pre test) of the students in the test of Achievement in Chemistry as constructed by the investigator.

1.9.4 Achievement Motivation - Achievement Motivation is operationally defined as the inherent motivation of an individual to perform better and strive towards excellence. In the present study Achievement Motivation refers to academic motivation, need for achievement, academic challenge, achievement anxiety, importance of grades, meaningfulness of task, relevance of school to future goals, attitude towards education, work methods, attitude towards teachers, warmth of interpersonal relations, individual concern, general and social interests, mountaineering, boating, dramatics, music and
sports as factors of Achievement Motivation as mentioned by Deo and Mohan (2011) in their Achievement Motivation scale. Here the scores obtained by the student in this inventory are termed as his Achievement Motivation in the present study.

1.9.5 Study Habits - Study Habits implies a sort of more or less permanent mode or method of studying. In the present study, Study Habits refers to comprehension, concentration, task orientation, study sets, interaction, drilling, supports, recording, language etc. as the factors of Study Habits as mentioned by Mukhopadhyaya and Sansanwal (2011) in their Study Habit Inventory. Here the scores obtained by the student in this inventory are taken as his Study Habits in the present study.

1.10 OBJECTIVES OF THE STUDY

The study had been designed to attain the following objectives:

1. To investigate the significance of difference in Achievement in Chemistry of the groups taught through Concept Mapping and Conventional teaching.

2. To investigate the significance of difference in Achievement in Chemistry of the groups having high and low Achievement Motivation.

3. To investigate the significance of difference in Achievement in Chemistry of the groups having good and poor Study Habits.

4. To investigate the significance of interaction between teaching strategies and Achievement Motivation on the Achievement in Chemistry.

5. To investigate the significance of interaction between teaching strategies and Study Habits on the Achievement in Chemistry.

1.11 HYPOTHESES OF THE STUDY

The study was designed to test the following hypotheses:

H0 1 There will be no significant difference in Achievement in Chemistry of the groups taught through Concept Mapping and Conventional teaching.

H0 2 There will be no significant difference in Achievement in Chemistry of the groups having high and low Achievement Motivation.

H0 3 There will be no significant difference in Achievement in Chemistry of the groups having good and poor Study Habits.
H₀₄ There will be no significant interaction between teaching strategies and Achievement Motivation on the Achievement in Chemistry.

H₀₅ There will be no significant interaction between teaching strategies and Study Habits on the Achievement in Chemistry.
CHAPTER II
METHOD AND PROCEDURE