CHAPTER – II

REVIEW OF RELATED LITERATURE

II.1. Introduction:

The survey of related literature is an essential aspect of any research work because a researcher does not carry the work in vacuum. Already some people might have carried out researches on problems closely related to the field. So it is wise, on the part of the researcher, to acquire to update information about what has been thought and done in the area of his/her choice.

George J. Mouley Says, “A thorough review of the related literature is an integral part of the conduct of research, helping the researcher in the classification of his/her problem and the avoidance of unnecessary duplication”.

A review of the related literature gives the scholar an understanding of the previous works. It also would develop the insight of the investigator. It enables to know the means of getting to the frontier in the field of the problem. Until the knowledge about what others have done and what still remain to be done in the area is learnt, one cannot develop a research project that will contribute to furthering knowledge in the field. The review provides ideas, examinations and theories of research available in the research problem.

II.2. Need for Review of Related Literature:

a. It can reveal investigations similar to the present and it can show how the collateral research handled these situations.

b. It can reveal the sources of data that may not have known existed.

c. It can illuminate a method of dealing with a problem situation that may suggest avenues of approach to similar difficulty one may be facing.

d. It can introduce significant research personalities of whose work and collateral writings one may have had no knowledge.
e. It can provide with new ideas and approaches that may not have occurred.

f. It can help to evaluate the research efforts by comparing them with the similar efforts of others.

II.3. Sources of the Present study:

Keeping in mind the advantages of the study of related literature, the present researcher reads extensively all the available materials. The dissertations and extracts from journals and periodicals related to the present investigation are summarized in the following pages. These will highlight the sample, tools and findings arrived at in the researchers conducted in Indian and global context. The studies are presented in the chronologically descending order.

II.4.a. Studies done abroad:

Gazi Mahabubul Alam (2010) did a study on *Volumetric analysis and chemistry students performance combined influence of study habit physiological and physiological factors*. This study is designed to investigate students’ study habit and some physiological and psychological factors influencing their learning of volumetric analysis. Study habit also describes some external activities which activate and facilitate the internal process of learning as defined by Rothkopf (1982). Two hundred and forty randomly selected senior secondary two students from six secondary schools in Akure South Local Government Area of Ondo state constituted the sample. It was hypothesized that students’ study habit variables such as time allocation, reading and note-taking, concentration, anxiety and stress and teachers consultation would not significantly influence students’ attitudes during volumetric analysis practical exercises. The hypotheses were tested by using chi square at 0.05 levels of significance following the administration of study habit inventory on the subjects. The students interest in chemistry particularly chemistry analysis and hence their performances in chemistry are dependent on good study habit and are determined by some physiological and psychological variables.
Michal Drechsler and Jan Van Driel (2009) did a study on teachers’ perceptions of the teaching of acids and bases in Swedish upper secondary school. A questionnaire consisting of a likert–type scale was developed, which focused on teachers knowledge of different models, knowledge of students difficulties and use of text books in their teaching of acids and bases. The questionnaire was sent to 441 upper secondary schools in Sweden and a total of 281 teachers answered it; through a cluster analysis they were divided into three sub-groups. From each sub-group, two teachers were interviewed in order to enrich the data. The results indicate that Swedish upper secondary chemistry teachers, on the whole, prefer to use Bronsted model of acids and bases, and think that the Bronsted model is clear for students. However, in cluster one, (47% of the teacher) teacher’s knowledge of how the Bronsted model differs from the Arrhenius model was limited and varied. Teachers in cluster two (38%) and three (15%) were better aware of the difference between the Bronsted and older models, but only teachers in cluster three did explain the history of development of knowledge about acids and bases in their teaching. The teachers in cluster two (like the teachers in cluster one) relied more on the content in the textbooks. There were, however, no differences among the three clusters in terms of knowledge of students’ difficulties.

Ahmet Akbhas, Adnan Kan (2007) did a study on Affective factors that influence chemistry achievement (Motivation and anxiety) and the power of these factors to predict chemistry achievement –II. The objectives of this study were to determine the affective factors in relation to the academic achievement of chemistry course and the level of affection. The second one is to seek whether these variables influence the students’ levels. In this research, motivation and anxiety for chemistry course of 819 high school students attending to different high schools located in the city center of Mersin were investigated. Anxiety and motivation scales developed towards
chemistry course by researchers were used as an instrument to collect the data. To provide evidence reliability and validity of scales, test re test reliability was conducted on data. In order to find reach, the research problem and sub problems, descriptive statistic, t tests, simple and multiple linear regression analysis and variance analysis have been performed. In this study, it was determined that while 2\textsuperscript{nd} grade students of high school have the highest motivation for chemistry course, 1\textsuperscript{st} grade students possess the highest anxiety level for chemistry course, as well. Also, it was found out that the motivation and anxiety for chemistry lesson, on their own, is a significant of chemistry achievement. To determine state of students enrolled out high school in terms of the sensorial factors (Motivation and Anxiety) correlation between these factors within different variables and the effects of these affective factors on the chemistry course achievement were investigated.

Frailich, Kesner Miri and Hofstein Avi, (2007) did a study on the influence of web based chemistry learning on students’ perceptions, attitudes and achievements. The goal of this study was to investigate whether integration of website into chemistry teaching influences 10\textsuperscript{th} – grade student perceptions of the classroom learning environment, their attitudes regarding the relevance of teachers in the experimental group were asked to implement four relevant chemistry, and their understanding of the concept of chemical bonding. Two groups participated in this study: an experimental group and a comparison group. The main study was conducted during the academic year 2005. The activities from the website that was developed, all dealing with the concept of chemical bonding. Quantitative tools of the study included: A Chemistry classroom web – based learning Environment Inventory to assess students perceptions regarding the relevance of chemistry to their life and attitude towards chemistry studies, a feedback questionnaire that examined the students response after performing the website activities and
achievement test that assessed their knowledge and understanding of the concept of chemical bonding. It was found that the experimental group outperformed the comparison group significantly in most of the research categories. This led to conclude that the web – based learning environment has potential to enhance the comprehension of chemistry concepts, students’ attitudes and interests and to increase students awareness regarding the relevant aspects of chemistry to daily life.

Adnan Kan, Ahmet Akbas (2006), did a study on affective factors that influence chemistry achievement (attitude and self efficacy) and the power of these factors to product chemistry achievement. The objectives were to determine the interests, choices, social activities, success or failures of students. It could be thought that the affective factors such as attitude, self –efficiency, motivation, and anxiety would effect before all other designs and interests of students in classes and then many other factors. In this manner, student’s performance would also be affected on account of the academic achievement. The secondary aim of this study is to reveal the effect levels of these variables on the students in the centum of Mersin province. The research was conducted with 1000 students studying at the 1st, 2nd and the 3rd grade of high schools which are located in the city center of Mersin in different duties instrumentation. Scales for attitude and for self – efficacy were developed for chemistry course and as instrument to collect the data. Developed scales are likert type scales and the responses to consisting items are graded from 1 to 5 points. In this study, in order to determine state of students training at high school in terms of the affective factors (attitude, self – efficiency), correlation between these factors within different variables and the effects of these factors on the chemistry course achievement were investigated. 2nd graders at high school are the ones who have the most positive attitude towards chemistry course and there is a significant difference between 1st and 2nd graders regarding the attitude toward chemistry course. Attitude towards chemistry is a significant predictor of achievement in chemistry and it explains 10.4% of the variance of chemistry achievement.
Banya Santonio, K. (2004) found the factors affecting the attitudes of young female students towards chemistry at the high school level. This study investigated whether self confidence toward chemistry, the influence of role models and knowledge about the usefulness of chemistry were affecting the attitudes toward chemistry, of 183 high school young females across the United States. The young female students surveyed had studied chemistry for at least one year prior to participating in the study during the fall semester, of 2003. The schools were randomly selected representing diverse economic backgrounds and geographical locations. Data were obtained using Chemistry Attitude Influencing Factors (CAIF) instruments and from interview with a focus group of 3 young female students about the effect of self –confidence towards chemistry, the influence or role models, and knowledge about the usefulness of chemistry on their decision to study chemistry. The CAIF instrument consisted of a 12 items self confidence questionnaire (confis), 12 items each of the knowledge about usefulness of chemistry (US) questionnaire. Confis was adopted (with permission) from CAEQ (Colly Dalgety, 2001). Young female students begin studying chemistry curiously, however, when unconvinced they become skeptical. Research focused on gender studies. It has indicated that attitudes towards science education differ between males and females. A declining interest in chemistry and the under representation of females in the chemical science was found (Jacobs 2000).

Chrishon Fords, Grace (2003) found the impacts of constructivist pedagogy on science education. This study focused on how constructivist pedagogy impacts science achievement of the fourth grade students in an Elementary Department of Defense school. Constructivism is a learning or meaning- making theory that offers an explanation of the nature of knowledge and how human beings learn. The population of this study was two fourth grade classes in an Elementary Department of Defense District
school. Data collection was accomplished in four ways such as (i) Focus group interviews of students, (ii) Individual interviews of students selected from the focus groups (iii). Interviews of teachers and (iv). Unobtrusive observations of science instruction. The findings of this study were an increase of 47% left scores 57% revealed experiments/projects and 64% working on the computers in groups were the fun things; 100% student interaction; 100% student attentativeness; and 70% using other resources.

Herrings Rita. I. (2003) found the effects of kinesthetic teaching strategies on student’s academic achievement in science. The purposes of this research study were to (a) compare the effectiveness of years of traditional textbook instruction with the effectiveness of kinesthetic based instruction in science on student test scores on the Iowa. Test of Basic Skills (ITBS), (b) compare the effectiveness of traditional and kinesthetic science teaching on teacher and student experiences in science through interviews with teacher and students, and (c) raise the opinions of students receiving kinesthetic based and text based book instruction in science. The study group involved students in fifth grade who had experienced kinesthetic based instruction for 4 years, two classroom teachers per grade level who provided text book – based instruction in science, and one classroom teacher per grade level who provided kinesthetic – based instruction in science. The science curriculum was studied in all classrooms. The findings were as follows, (I) kinesthetic teaching of science is more fun for teacher and students than traditionally taught. (II) There are differences in learning styles for students and teachers and experiences in science class can be rewarding one.

Kass Jesse, (Sahaya) (2003) investigated the impact of selected pre reading activities on student content learning through laboratory activities. This study investigated two pre reading activities impacted student learning from hands – on science activities. The study was based on constructivist learning theory. Based on the work of
Piaget, it was hypothesized that students who activated prior knowledge would learn more from the activities. Based on the work of Vygotsky, it was hypothesized that students who talk more and write more would learn more from the activity. The K.W.L.Chart and anticipation guide strategies were used with eighth grade students at Graves Middle School in Whittier, California, before learning about liners and convection currents. D.M.Ogle (1986) created the three columns K.W.L.Chart, to activate students, prior knowledge. In the first column, the students wrote what they already know about a subject. In the second column, the students wrote what they want to know about the subject, and the students completed the third column after learning a subject by writing answers to the questions that they asked in the second column. Duffel Meyer (1994) created the anticipation guide based on Herber’s (1978) reasoning guide. In the anticipation guide, the teacher created three or four sentences that conveyed the major ideas of the topic and the students either agreed or disagreed with the statements. After learning about the topic, students revisited their answers and decided if they were correct or incorrect and they had to defend their choices. This research used the Solomon (1947) four square designs and compared both the experimental groups to a control group that simply discussed the concepts before completing the activity. The research showed no significant difference between the control group and either of the treatment groups. The reasons for the lack of significant differences were considered. It was hypothesized that since the students were unfamiliar with the pre reading activities and did not have much experience with using either writing – to – learn or talking – to – learn strategies. The short- term intervention was not effective. Directions for future study were considered.

Khan, Samia (2002) did a study entitled teaching chemistry using curded discovery and an interactive computer tool. An initial test of scientific inquiry skills revealed that students enrolled in a computer enhanced college chemistry class using a
guided discovery approach produced significantly larger gains after class instruction compared with two other introductory chemistry classes of the same institutions. The purpose of this study was to analyze the instructional strategy in this class to understand how it may have contributed to gain in inquiry skills. Classroom observations of the computer enhance guided discovery classes and two other lecture based chemistry classes, uncovered a pattern of instruction in the guided discovery case that was markedly different from the other two classes, yet more similar to model construction processes of scientists. The central pattern institution in the primary case was referred to as the guided discovery approach and was characterized by instructional strategies designed to trigger, generate, evaluate and modify other teacher guidance strategies and the integration of an interactive computer tool.

Goossen, Linda Hale (2002) did a study on classroom questioning strategies as indicators of inquiry based science instruction. Inquiry teaching often rests upon the assumption that through the use of questioning and response strategies, teachers can stimulate students to actively construct knowledge. Based on this hypothesis, middle – school science lessons were observed and questioning and response strategies were identified that are related to inquiry – based instruction. Twenty four science lessons were observed, videotaped, and ranked by inquiry characteristics other than questioning strategy. The video and audio portions of the recordings were analyzed to determine the student and teacher’s questioning and response strategies in each classroom. These strategies were then compared to teaching style, along a continuum from traditional to inquiry, to identify questioning and response strategies that stimulate students to ask questions, solve problems, analyze evidence, consider alternative explanations, and other similar inquiry behaviors. The analyses indicated several questioning strategies of teachers that are related to inquiry teaching and learning and might be used as indicators
of inquiry teaching in middle school science lessons. These include the number of content related questions asked by teachers, the number of divergent questions asked by teachers, the number of times teachers probe for the intended response, the number of times teachers answer students questions, and the number questions per concept asked by teachers. Perhaps more importance was the observation that even after several decades of emphasizing the importance of inquiry methods in science education, neither students nor teachers participating in this study are asking higher – level cognitive questions deemed to be an important fact in the effective teaching and learning of science.

Meade Karen Marie (2002) found out the effects of inquiry instruction in undergraduate chemistry laboratory. The objective of the study was to identify conceptual and attitudinal effects of inquiry learning in technology based undergraduate chemistry laboratories. The sample were 428 participants who registered in general chemistry laboratory at the University of Iowa in the spring of 2002. Conceptual and attitudinal pretest and post test results were quantitative in nature. Qualitative results were collected from questionnaire and focus groups. Quantitative data were analyzed using a repeated measures analysis of variance to identify differences between treatment groups. A high inquiry treatment group was open ended and required students’ decisions regarding data collections, data representations and interpretation. The low inquiry treatment involves collaboration and traditional learning strategies.

Pretest to post test conceptual gains found to be significant for both treatment groups. Low inquiry students performed significantly better on exploration questions than high inquiry students. Process skills developments are at higher levels for high – inquiry students than low – inquiry students. Positive attitudes decreased significantly for all students from pre-test to post test. More favorable attitudes towards science enjoyment and the ability to do well in science were found for high – inquiry students. More favorable attitudes towards science enjoyment and the ability to do well in science were
found among low -inquiry males and high -inquiry females. More favorable attitudes toward the nature of science caused by use of the learning cycle were reported by high inquiry students. Low – inquiry students reported more favorable attitudes toward technologies in the laboratory than high inquiry students. Favorable attitudes towards the use of infrared spectrometers and unfavorable attitudes toward the use of pH meters were reported by both treatment groups. More formal reasoning skills were reported by high inquiry students. Both groups reported that looking for patterns was a common theme in the laboratories. These findings are significant because they indicate that inquiry activities positively affect attitudes toward science and contribute to the development of formal reasoning skills and process skills.

Donoram, William Joseph (2001), did a study entitled ‘Investigation Of Student’s Use Of Web – Based Tutorial Material And Understanding Of Chemistry Concepts’. The purpose of this study was to investigate students’ use of web – based tutorial materials in general chemistry and students understanding of chemistry concepts. The visualization and problem solving website includes tutorial materials for several visual chemistry topics such as VSEPR and coordination chemistry. Students generally valued the website because of the representations and visualizations it provided, the materials and information available on the website, and because they felt that they needed help with chemistry. Many students who did not use the website felt that they did not need help with chemistry and thus did not need this additional source of help. Both website users and nonusers were generally positive about using the web to learn chemistry. Motivation was also a factor in student decisions to use or not to use the materials on the web. To gauge students understanding of chemistry concepts, students were asked questions about coordination chemistry and drew concept maps during the interviews. Website users made more incorrect statements during the discussion of coordination chemistry questions but the student concept maps did not show a great difference in terms of percentages of correct and incorrect links.
George M. Bonder (2001) did a study on students perceptions of academic dishonesty in a chemistry classroom laboratory. Academic dishonesty has been an important issue in the classroom for as long as the classroom has been in use. Most reports pertain to exams, homework and plagiarism of term papers but one area that has not been studied extensively is that of the classroom laboratory. The research work focused on three guiding questions; (i) What are students’ perceptions towards academic dishonesty in a laboratory based class? (ii) What distinctions do students make between these types of academic dishonesty and dishonesty that may occur in the research laboratory? and, (iii) How if at all do these perceptions change with age and/or research experience? Four major assertions came from this work. The first was that students did not think that what they had done in the classroom laboratory is science and consequently did not treat the classroom laboratory differently than any other academic class. Additionally, they made a clear distinction between what happened in a class lab and what happened in a research or industrial lab. Consequently, students perceived there to be a significant difference in dishonesty between those two settings. Finally, the distinction was not as pronounced in graduate students and was seen as an element of maturity. In the process of determining the above assertions, students’ perceptions on the nature of science that had been revealed were also discussed. Their beliefs had direct relevance to students’ perceptions of dishonesty in both lab atmospheres.

Howell, Byron Edward (2001) found the impact of testing styles and testing methods on achievement in general chemistry. The research was conducted at a community college located in Northeast Texas and it studied testing style and testing methods in relation to achievement in general chemistry. Data were collected and examined from 212 participants. Of these, 143 completed both the MBTI and PEPS surveys. This provided 71 subjects designated as Sensor (S) types for the final phase of the study. The subjects were divided into two groups by performance on the EPS. One
group consisted of subjects that indicated a preference to communicate (test) using a formal/pencil–paper test format (linguistic testing style) and the other subjects indicated a preference to communicate (test) using a hands-on/movement test format (tactile testing style). All subjects were administered both a linguistic and tactile pretest prior to treatment and both a linguistic and tactile post test after treatment. The data were analyzed using a 2X2 ANOVA for significant effects at the P < 0.05 level of confidence. The results indicated a significant interaction effect between the student testing style and test methods. This study indicated that the type of testing done in general chemistry may be favoring students with certain types of communication preferences (testing styles). Therefore students with many of the worker characteristics desired by the chemical industry may not be successful in general chemistry and choose a different career path.

Husniye Demircioglu Niluter Norman (1999) did a study, Effects of some variables on chemistry achievement and chemistry-related attitudes of high school students. For this study, the chemistry attitude scale was designed in such a way as to measure attitudes towards chemistry in different dimensions. The students in the sample perceived the chemistry attitudes in 4 orthogonal dimensions and they were clustered in such a way that the first dimension is enjoyment, the second dimension is laboratory work, the third dimension is negative feelings and anxiety, and the fourth dimension is perception of success. The sample of this study consists of 205 science students from Ayranci Super Lycee and Ayranci curriculum laboratory school located in the metropolitan region of Ankara. A questionnaire consisting of chemistry attitude scale and questions about students family, cumulative school grades, chemistry scores was completed by 103 Ayranci Super Lycee and 102 Ayranci Curriculum Laboratory school students. 23 items of the chemistry attitude scale were analyzed in terms of dimensionality of the item content by the Principle component analysis. The dimensions
derived were scores separately and used in the t–test analysis. The variables might differ from one school environment to another. The study investigated the influence of a set of students’ background characteristics and perceptions on their science attitudes and achievement and found that there are significant differences between males and female regarding their verbal numerical and visual spatial ability levels. Throughout the elementary and secondary educational periods, girls schools performance level was greater than the boy’s school performance. The girls were found more successful in verbal attitudes than boys whereas boys were more successful than girls in numerical abilities. The family characteristic that was the most powerful predictor of school performance was socio economic status (SES).

**Orehowsky, Walter (1999)** found the Effect of laboratory based instruction and assessment on student’s attitudes towards the laboratory experience and achievement in chemistry at the high school level. The purpose of this study was to investigate the effects of laboratory based instruction and assessment on acquisition of chemical facts and principles, attitudes toward laboratory experiences, and attitudes toward science among high school chemistry students. This study suggested that the use of laboratory experiences to drive classroom instruction produced more positive student outcomes in the areas of student achievement and attitudes when compared to traditional approaches. Sample were drawn from a diverse, urban population. A quasi – experimental, pre test – post test research design was used in which eight intact chemistry classes at two academic high schools served as the sample.

**Ekpo, Johnson, (1991)** did a study ‘Assessing safety skills and practices in chemistry as perceived by senior secondary and secondary students in Nigeria’. To assess the chemistry laboratory safety skills by students, and to assess the chemistry laboratory safety practices adopted by students were the objectives of he study. The
sample of the study comprised 300 senior secondary students from 30 randomly selected secondary schools in Akwa, Ibom state. A questionnaire was formulated and administered in this study. The collected data were analyzed statistically using percentages and means. The major findings indicated that more than 70% students failed to protect their eyes, face, hands and even their body too. They did not wear aprons and gloves while engages in chemical experimentation. They had poor knowledge about identified emergency facilities and equipment. It also revealed evidence of poor experimental techniques.

**Mc Cune, Dianne Locke, (1989)** found the effect of integrating Bloom’s taxonomy and the scientific method on critical thinking, achievement and attitude towards science. The objective of the study was to measure change in student attitudes, achievement and critical thinking skills due to different types of participation in science teaching methods. A total of 145 sixth grade science enrolled in four rural elementary schools participated in the study. The investigation of cognitive system with the scientific method (ICSSM) was used in the experimental group and control group was instructed according to the material and the methods specified in the teachers manual. No significant changes occurred in attitudes and context achievement between the experimental control groups. However, there were considerable gains made in these areas by participating students in the treatment group.

**Ingham Angela. M (1988)** did a study entitled ‘Models in chemical education an investigation into their uses’. This study described some of the problems encountered by undergraduate chemistry students in dealing with three dimensional structures. A pilot study to gather information in these areas and to suitable research instrument for investigation was described. The pilot study proved useful in highlighting errors in understanding chemical concepts assessing practical model use and considering students perception of the relevance of models. This study dealt with the role of models in
understanding chemistry in relation to the nature of the model, chemistry and understanding and links and interaction between them. It surveyed the literature concentrating purpose of model use in chemistry and described the features of chemical structure models used in the research. This report gave details of the interviews carried out with selected scientists to consider the notion of ‘the good chemist’. It then described the workshop interview with 45 chemistry students relating to their appreciation and use of models in chemistry and the follow up interviews with eight of the participants. Data from these interviews were analyzed. The research findings were discussed in relation to existing literature and the study concluded with the discussion of the implementation for chemistry curricular chemical education and for future research in the teaching – learning of science.

II.4.b. Studies done in India:

For the purpose of conducting research, the investigator also reviewed Indian studies related to the present problem. The related studies are given below.

**Gomathi (2010)** conducted study on ‘A study on the availability and utility of chemistry laboratory facilities and the achievements of higher secondary students in chemistry practicals’. She adopted a survey method. The data were collected from 250 students and 10 higher secondary schools using the Availability and Utilization of chemistry laboratory tool developed by Sudhagar Jesubalan and the state board practical examination questions. Seven background variables were taken ‘t’ test and ‘F’ test were used for data analysis. The significant positive correlation was found between the availability and utilization of chemistry laboratory facilities in the higher secondary schools and the achievement of higher secondary students of these schools in the chemistry practical examinations.
Kumar Sanjeev, Amit Kumar (2010) did a study, *Socio economic status and vocational preference of school students*. The objectives of the study were to study effects of SES on Vocational performance (Vocational education) of rural and urban school students of Bihar. To compare the vocational interest dimension wise of rural and urban school students of Bihar, to study reactions of students towards vocational education, to study the reactions of teachers towards vocational education, and to study reactions of parents towards vocational education were the objectives of the study. For the present study, 50 boys and girls were randomly selected from rural area and 50 students (boys only) were selected randomly from urban area of Patna district. The age groups of students were between 14 to 17 years and they belonged to General, Other Backward Caste (OBC) and Schedule Castes (SC). To fulfill the purpose of present study, 50 teachers were selected randomly from different schools of Patna district. Twenty five teachers were selected randomly from rural area and twenty five teachers were selected randomly from urban area. Seventy parents were also selected randomly from schools of rural and urban areas of Patna district where their children were studying. Thirty five parents were selected randomly from rural area and thirty five parents from urban area. SES could influence the vocational preference of urban students. So, SES is an important factor for urban students’ vocational preference. Urban schools educational and social environment could influence the scientific interest of urban students. So, urban schools educational and social environment is an important factor for urban students’ scientific interest.

Latha and Rasul Mohaideen (2010) conducted “*a study on laboratory facilities available in the college and the achievement of the students of these colleges in chemistry practical*”. The investigators, wanted to study laboratory facilities available in colleges of Thoothukudi area. They also wanted to relate it with the achievement of the
students in chemistry practical. The investigators, being the science teacher and educational researcher, desire to look into the facilities available in the chemistry laboratory and the achievement of students in chemistry practical. The present study was conducted in the arts and science colleges of Thoothukudi area. All five arts and science colleges of Thoothukudi District were taken selected for the study. The marks obtained by 392 P.G., U.G., and ancillary Chemistry students studying in these colleges were taken for this study. Thus 100% population is selected as the sample. Laboratory Facility Available tool developed and standardized by the investigators and the achievement marks collected from the college are the tools used. C R. test, Co. efficient of variation and Person’s product moment correlation were used for data analysis. It was found out that there is positive correlation between the availability and utilization of lab facilities in the colleges and their students’ performance in the chemistry practical. Suitable recommendations and suggestions for further study are also given.

Vijayakumari (2010) did a Study on some correlates of academic achievement of secondary school students. The study was to find out the relationship of academic anxiety and achievement motivation with academic achievement. It also tries to find out the main and interaction effects of academic anxiety, achievement motivation and gender on academic achievement. This study was conducted on a sample of 400 IX standard students of Kerala state. Findings of the study revealed that academic achievement was negatively related to academic anxiety and positively related to achievement motivation. The main effects of the three variables academic anxiety, achievement motivation and gender on academic achievement was significant and the interaction effect of academic anxiety and gender as well as achievement motivation and gender were significant on academic achievement.
Prem Kumari 2009 conducted a study on **Problems of students of state board and central board of education in learning chemistry at higher secondary level in Bangalore city**. The major findings are that there was no significant difference between male and female in achievement of state board school students. There was no significant differentness between male and female in problems of learning chemistry. There was significant difference between students whose mothers are qualified as degree and SSLC in problems of learning chemistry. Also there was significant difference in achievement of chemistry between the state board school students and central board school students. There was significant difference between students whose fathers are qualified as degree and SSLC in problems of learning chemistry.

**Sweetlin Leelavathy, (2007)** did a **study into the scientific aptitude and achievement of higher secondary students in chemistry practical.** The objectives of the study were to find out the scientific aptitude of higher secondary students, to find out the achievement of higher secondary school students in chemistry practical, to find out the significant difference, if any, in the scientific aptitude of higher secondary students with respect to gender, language of instruction and management of school, to find out the significant difference, if any, in the achievement of higher secondary students in chemistry practical with respect to gender, language of instructions and management of school and to find out the correlation between scientific aptitude and achievement of higher secondary students in chemistry practical. The higher secondary students selecting chemistry as one of their subjects form the population for this study. From among them, 244 students from 7 higher secondary schools were taken as the sample. Random sampling technique has been adopted for this study. The tools used in this study were a standardized scientific aptitude scale developed by Chatterjee and M.Mukharjee and the test developed by the board of higher secondary education, Government of Tamil Nadu to
find out of the students achievement in chemistry practical. It is found in the study that only 66.39% of the students have high scientific aptitude and 51.64% of the students are having high achievement in chemistry practical. It is also found that there is positive correlation between scientific aptitude and higher secondary students’ achievements in chemistry practical.

**Seeniammal V. (2007)** conducted a study of problems of high school and higher secondary students in learning chemistry in Tirunelveli District. The objectives of the study were to find out the level of achievement of high school and higher secondary students in chemistry in the three educational districts of Tirunelveli and to find out whether there is any significant difference between the mean scores of high school and higher secondary students in the problems of learning chemistry with respect to sex, age, religion, locality, community, Medium of instruction, type of school, nature of school, parents educational qualification, parents occupation and parents monthly income. The major finding are that there was a significant difference in their mean scores with respect to gender, age, religion, locality, community, medium of institution, type of school, nature of school, parents educational qualification, parents occupation and parents’ monthly income. Problems were discussed and solutions were given.

**Sudhakar Jesubalan 2007** conducted a study of correlation between the availability and utilization of chemistry laboratory facilities in hr. sec. schools and attitude of hr. sec. students towards chemistry practical. To find the correlation between the availability and utilization of chemistry laboratory facilities in hr. sec. schools and attitude of hr. sec. students towards chemistry practical, to find out the availability and utilization of chemistry laboratory facilities in hr. sec. schools, to find out the attitude of hr. sec. students towards chemistry practical, to find whether there is significant difference in the attitude towards chemistry practical with respect to different
variables and to find whether there is significant difference in availability and utilization of chemistry laboratory facilities among the nature of school and type of schools. The major findings were that there was correlation between the availability and utilization of chemistry laboratory facilities in hr. sec. schools and attitude of hr. sec. students towards chemistry practical. The availability and utilization of chemistry laboratory facilities in hr. sec. schools was moderate. Attitude of hr. sec. students towards chemistry practical was moderate. There was significant difference between hr. sec. boys and girls with regard to their attitude towards chemistry practical. There was no significant difference among the hr. sec. schools of different nature such as government, private aided and unaided with regard to the availability and utilization of chemistry laboratory facilities.

_Julia Gnanasundari Rebecca, (2006) did a study of chemistry laboratory facilities available in higher secondary schools in relation with achievement_. The objectives of the study were to find out the significant difference in achievement in chemistry theory, chemistry practical and chemistry in total of students with respect to sex, medium, religion, locality, birth order, caste, type of school, school management, their father’s educational qualifications and their mothers’ educational qualifications, and to find out the relationship between achievement in chemistry theory and laboratory facilities and chemistry in total with respect to selected schools. The sample consisted of 157 students selected from 8 higher secondary schools from Tuticorin and Palayamkottai. The findings follow; there is no significant difference between the mean scores of achievement in chemistry with respect to sex, medium of instruction types of school and management of schools. The students belonging to schools where the laboratory facilities are well equipped were having more knowledge and understanding in chemistry than the students of less equipped schools.
Shrivastava and Preeti Singh (2006) studied an academic achievement in different school climate. The study was conducted on the academic achievement of X grade pupils in different school organizational climates. In this study, School Organization Climate Description Questionnaire by M.L. Sharma was employed on 75% teachers of the school for designating the kinds of school climate. 120 students of X grade were selected randomly and their academic achievements were obtained by their board examination. It is found that there exists a significant difference between academic achievement of closed and open, paternal and open, controlled and autonomous, closed and autonomous, paternal and autonomous and familiar types of school climates. Besides these, the academic achievement did not show any significant difference in the rest school climates.

Annaraja.P, Nirmla Sundaram. (2005) found the effectiveness of power point presentation in teaching chemistry for higher secondary students. It was found that the power point presentation is more effective in teaching chemistry. It has improved that knowledge, understanding, and skill levels of the students. This may be due to the fact that the animation effect of the slider motivated the students in learning. Further the effect of the colour of the slides draws the attention of the learners in learning.

James, J. and Marice, P.V. 2004 conducted a study on achievement in science as related to scientific aptitude and scientific attitude among 11th standard students in Tamil Nadu. To explore the relationship among the variables namely achievement in science, scientific aptitude and scientific attitude, to investigate the association between achievement in science, scientific aptitude, scientific attitude and some selected variables. The sample constituted 470 students of standard XI who had opted for science group drawn from 10 schools of Coimbatore District in Tamil Nadu. The tools used for data collection were the standardized Scientific Knowledge and Aptitude Test prepared by
Chatterji and Manjula Mukerji (1964). The standardized science attitude scale prepared by Mrs. A.Vinash Grewal, (1977) Marks secured by the students in science in the S.S.L.C. or Matriculation Board Examination, as the case may be, as the science achievement score; and personal data sheet prepared by the investigator to collect Information on the selected variables. The data were treated with one –way analysis of variance, ‘t’ – test, chi –square test and coefficient of correlation (Person’s product Moment Method). There was positive relationship between achievement in science and scientific aptitude whereas achievement in science and scientific attitude were not related. Students hailing from rural and urban areas had similar scientific attitude and same type of academic achievement in science. But they differed in their scientific aptitude. Students from Matriculation and State Board schools had same type of achievement score in science but they differed in their scientific aptitude and scientific attitude, favoring students from Matriculation schools. Students from different types of schools (gender wise) differed in their achievement in science favoring girls’ schools. But they were found on par in their scientific aptitude and scientific attitude. There was significant association between gender and science achievement, and gender and scientific attitude whereas no significant association was observed between achievement in science and scientific aptitude. Significant association was observed between residential origin (rural and urban) and scientific aptitude. But students irrespective of their residential origin had similar scientific attitude and same type of achievement in science. School type (syllabus wise) was found to be significantly associated with scientific attitude. Achievement in science and scientific attitude were found to be significantly associated with school type (gender wise) whereas no significant association was found between scientific aptitude and school type. The study cited 17 references.
Pushpam, L.M.A. and Soundararajan, R. (2004) conducted a study of teaching competence of science teachers at higher secondary level. The objectives of the studying were to study the level of teaching competency of science teachers at higher secondary level in Coimbatore Educational District, to study the association of the level of teaching competency of science teachers with their subject of specialization, qualification, experience, age, income, community, size of the family, nature of job, gender and marital status, to compare the level of teaching competency of science teachers with reference to the type of the management of the school, nature of the school and location of the school, to compare the level of teaching competency of science teachers with reference to their extroversion – Introversion behavior, and to find out the relationship of teaching competency of science teachers with their job satisfaction, attitude towards teaching profession and intelligence of the students. The sample consisted of 160 science teachers and 3041 science group students. The data were collected using Indoor Teaching Assessment Scale (ITAS). Job satisfaction scale, Attitude towards Teaching Profession Scale, Extroversion and Introversion Inventory and Group Intelligence test. The data were analyzed for differential and relational aspects. Teachers working in aided and matriculation schools had better teaching competency than teachers working in government and corporation schools. The teaching competency of more experienced teacher was better than the teaching competency of less experienced teacher. Aged and high – income group teachers had better teaching competency. Private unaided school teachers had better teaching competency and post –graduate teachers had better teaching competency than the graduate teachers. Permanent teachers showed better teaching competency that the temporary teachers. Teachers with high income had better teaching competency than teachers with low income. No difference was found between
rural school teachers and urban school- teachers regarding their teaching competency. Positive attitude of teachers towards teaching profession, job satisfaction of teachers and intelligence of students increased the teaching competency of science teachers. In class XII, the teaching competency of science teachers was better than their competency in class XI. The study cited 10 references.

Ahamad, N. Raheem, A. and Hasan, A. 2003 conducted study on “Attitude of secondary school students towards science in relation to sex, socio-economic status and intelligence”. To study the attitude of secondary school students towards science in relation to sex, socio-economic status and intelligence was the objectives of the study. The study was based on a sample of 286 secondary school students of Aligarh district. The tools used for data collection were Science Attitude Scale (SAS) by Grewal, Avinash, Socio- Economic Status Scale (SESS) –Urban by Gyanendra, P.S. and General Intelligence Scale by Mohsin, S.M. The data were treated with factorial ANOVA and scheffe technique. Both boys and girls showed equally positive attitude towards science. The students who were from high socio- economic background showed better positive ATS than middle as well as lower level SES background students. The students with high intelligence groups. The students from middle intelligence level also showed better positive ATS than the lower one. The study cited 20 performances.

Karthikeyan and Rasul (2003) found the correlation between the availability and utilization of physics laboratory facilities in higher secondary schools and attitude of these school students towards physics practical. The objectives were to find out the correlation between the availability and utilization of physics laboratories facilities in higher secondary schools and attitude of higher secondary students towards physics practical, to find out the availability and utilization of physics laboratory facilities in higher secondary schools, to find out the difference in the attitude of higher secondary
students towards physics practical with reference to gender, type of school, parental education, occupation of parent and students studying different combination of subjects (Maths group & Pure science group). The sample consisted of 420 students randomly selected from 10 higher secondary schools in Tuticorin District. The investigator used two tools i.e. “Attitude scale” developed by the investigator to find out the attitude of higher secondary students towards physics practical and the “Questionnaire” developed by the investigator to collect the data regarding the availability and utilization of physics laboratory facilities in higher secondary schools. There was significant correlation between the availability and utilization of physics laboratory facilities in higher secondary schools and attitude of higher secondary students towards physics practical. The availability and utilization of physics laboratory facilities in higher secondary schools was moderate. The attitude of higher secondary students towards physics practical was moderate. The significant difference was found between boys and girls, urban and rural students, and among the students of different type of schools such as government, private aided schools and self–financing schools.

Amaladoss Xavier and Amalraj 2002 did a study “Teaching competency and its dimensions in post–graduate chemistry teachers – a correlational study”. There are four components of competencies: Knowledge, performance, behavior and consequence. Consequence competency refers to the pupil’s outcome or achievement. The other three competencies refer to the activities of the teacher in and outside the classroom. Knowledge competency includes the content of the subject matter and the knowledge of the teacher over the subject. Performance competency characterizes organization, clarity, communication and audiovisual aids. Behavior competency refers to rapport and the personality of the teacher. The data were collected from 89 higher
secondary post graduate chemistry teachers. Using their scores in teaching competency and its dimensions, Chemistry teachers were classified into high, average and low level teachers. To study the teaching competency and its dimensions, a teaching rating scale was constructed and validated by the investigator. The study revealed that teaching competency and its dimensions in postgraduate chemistry teachers were average. The study indicated that there was significant relationship between the low – level of postgraduate chemistry teachers as regards competency and the dimensions of teaching competency – (a) Content; (b) Organization; (c) Knowledge; (d) Clarity; (e) Communication; (f) Rapport; (g) Audiovisual aids; and (h) Personality. The study revealed that there was significant relationship between the average level of postgraduate chemistry teachers as regards competency and the dimensions of teaching competency – (a) Content; (b) Organization; (c) Knowledge; (d) Clarity; (e) Communication; and (h) Personality. At the same time the study indicated that there was no significant relationship among the average level of postgraduate chemistry teachers as regards competency and the dimensions of teaching competency (a) Rapport and (b) Audiovisual aids. The study indicated that there was significant relationship between the high level of postgraduate chemistry teachers as regards competency and the different dimensions of teaching competency (a) Content; (b) Organization; (c) Clarity; (d) Rapport and (e) Audiovisual aids. The study also revealed that there was no significant relationship between the high level of postgraduate chemistry teachers as regards competency and some of the dimensions of teaching competency. (a) Knowledge; (b) Communication and (c) Personality.

**Annadurai and Arivlan, 2002** did a critical study on the problems related to chemistry practical in higher secondary level. The objectives were to study the physical condition of chemistry laboratories of higher secondary schools, to study the availability of adequate apparatus to teach chemistry in higher secondary classes, to study
the availability of adequate chemicals in school laboratories, to study the opinion and problem of students in doing practical, to study the facilities provided in laboratories of government schools, private schools, mission schools and matriculation schools, and to study the facilities of chemistry laboratory of urban schools and rural schools. A sample of 13 higher secondary schools in Thanjavur educational district in Tamil Nadu was selected using stratified random sampling techniques. The findings follow; the basic facilities of chemistry laboratories were not satisfactory. The apparatus found in chemistry laboratories of higher secondary schools of Thanjavur educational district were not sufficient for conducting practical. Adequate apparatus facilities were found in 30.7% Schools. The chemicals in chemistry laboratories were not sufficient. Only 7.6% schools had adequate facilities relating to chemicals. The students were facing various problems in doing practical in chemistry laboratories such as lack of basic faculties, unable to complete the practical within the stipulated time, compulsion in taking tuition by their subject teachers to get maximum marks in the practical examination and in completion of the record work within a short span of time. Boys’ schools had better laboratory facilities than the Girls school and the co –education schools. Laboratory facilities available in urban schools were better than the rural schools. Matriculation schools had better laboratory facilities than other type of schools. A single teacher had to look after all the students. Out of 13 schools, two schools had no separate building for chemistry laboratory.

Rao, P.M. (2002) conducted a study on “Teacher competencies and learning achievement in tribal areas of Karnataka”. To study the achievement level of students in language, Mathematics, Social Studies (EVS- I) and Science (EVS-II), to study the existing level of competencies of primary school teachers in language, mathematics, EVS –I and EVS –II, to study the achievement difference between the tribal students studying in government schools and ashram school, to study the classroom practices of teachers in
different subject areas and to study the relationship between teachers competencies and students achievement in Language, Mathematics, EVs –I and EVS-II, were the objectives the study. The study was based on a sample of 261 students of III standard and 31 teachers from 20 schools located in 3 Taluks. The tools used for data collection were achievement tests teachers’ competency tests and Teachers Classroom Observation Schedule. The statistical techniques, mean, S.D. and percentages were used to analyze the data. Students achievements were found to be low and their performance in language and mathematics was of average level. Classroom practices of teachers were found to be below average in all subjects and it was found that the teachers had exhibited an average performance in language and mathematics, when compared to EVS- I and EVS –II. A significant relationship was found between the teachers’ competencies and learners’ achievement in language and EVS –II in Chamaraja Nagar District whereas in Mysore district the relationship was found in case of language and mathematics. The study cited 10 references.

Suneetha, B. and Mayuri, K. (2001) conducted a study on age and gender difference on the factors affecting high academic achievement. The objectives were to find out the effect of IQ variables on the high academic achievement (HAA) among boys and girls. (2) to assess the variations in the personality dimensions that directly affects the high academic achievement among boys and girls, (3) to find out the effect of IQ variables on high academic achievement among different age groups, and (4) to assess the variations in the personality dimensions that directly affects the high academic achievement among different age groups. The sample consisted of six top ranking students from classes IX and X respectively totaling to 120 students, from 10 private schools of six zones covering nine ranges of Hyderabad district, recognized by State Education Board, Andhra Pradesh. Malin’s Intelligence scale for Indian Children (MISIC), Study Habit Inventory (SHI) by De. Mukhapadhyaya and D.N. Sansanwal
(1983) and Multidimensional Assessment of Personality Inventory – Teenage form (MAP Series – form T) were used for the data collection. The collected data were analyzed with ANOVA. All the three dimensions of IQ (verbal, performance and total) were not found different among the boys and girls. Gender was found to be the more important variable than IQ in deciding high academic performance as more girls were found among top ranking students. Girls were found better in interaction and concentration while boys were found better than girls in language, and drilling dimensions. Both girls and boys exhibited very high significant differences in almost all dimensions of MAP series except in self-control and tension. With regard to effect of age differences on the academic achievement, all the three types of IQs differed significantly among different age groups. Girls were significantly superior to boys in almost all except in morality and self-sufficiency. With regards to the difference of study Habit, girls and boys were found different only on one dimension, i.e. Support. It was found that adaptability increases with the increase in age whereas tension decreases with the increase in age. Significant differences were observed among four age groups, i.e., 12’, 13’, 14’, 15’ in creativity and morality dimensions of MAP series. The study had 16 references.

Dhakshinamoorthy, R. (2000) did a study of chemistry laboratory facilities available in the higher secondary schools in relation with achievement. The objective of the study was to find out the relationship between laboratory facilities available and achievement of students with respect to gender, medium and birth order. 273 students from Tuticorin Educational District (100 boys and 173 girls) were selected randomly for the study. The investigator had developed the questionnaire to measure achievement of the students in chemistry and availability of chemistry laboratory facilities. The significant relationship was found between laboratory facilities available and students’ achievement in chemistry with respect to gender, medium and birth order.
Megm Gakhar (2000) did a study, “Academic achievement as determined by their preferred learning and thinking styles and study skills”. The objectives of the study were to know the significant difference in the academic achievement of physiotherapy students due to different learning styles namely understanding, movement of action v/s verbal explanation, open ended content v/s structural content, performance, linking for concrete learning v/s liking to learn in abstract way; divergent learning style v/s convergent learning style and artistic aesthetic v/s temporal interests, to know the significant difference in the academic achievement of physiotherapy students due to different thinking styles namely logical v/s fractional, divergent v/s convergent, creative v/s intellectual, optimistic v/s pessimistic view of problem solving style, imaginary v/s analytical, and to know the significant difference in the academic achievement of physiotherapy students due to low and high study skills namely goal orientation, activity structure, scholarly skills, lecture mastery, text – book mastery, examination mastery, self mastery and over all study efficiency. The samples consisted of 136 final year BPT students from Punjab, Haryana and Delhi. The result revealed that academic achievement of students did not differ significantly due to preference of learning styles, thinking styles and study skills. The study skills can be interpreted as a planned programme of subjects’ mastery. Good study skills result in the form of good scholastic achievement. The study skills play two fold functions in education. They assist in acquisition of knowledge to the best of one’s capacity and to learn, to study effectively, which is far more important than to acquire particular body of information.

Thangeswari.M (2000) investigated the problems of XI standard students in learning chemistry in the Tuticorin educational district. The objectives of the study were to identify the areas in theory as well as in practical part of XI standard chemistry curriculum which the pupils find difficult to comprehend, to find out whether there is any
significant difference in the performance of the pupils differing in sex, medium, kinds of
institutions, parental status and parents educational qualification because of the
difficulties in learning chemistry and to find out whether there is any significant
relationship between problems and achievement in chemistry in terms of sex, medium,
locality, type of institutions, parents’ educational qualification and occupation were also
the objectives of this study. The sample consisted of 300 students of XI, from all the hr.
sec. schools of Tuticorin educational district. In this study 125 Boys and 175 girls were
studied. In XI standard chemistry learning practical there is a significant difference in
their mean scores with respect to the following variables.

1. Medium of instruction.
2. Hindu and Non- Hindu.
3. Rural and Urban.
4. Birth order.
5. Types of administration.
6. Fathers and mothers occupation.
7. Types of institution.

There is no significant difference in the mean scores in XI standard chemistry
theory with respect to gender, birth order, types of school, fathers and mothers
educational qualification . The mean scores for the whole sample in the opinionnaire were
187.27 which was slightly above the actual mean of range of scale values (60 + 300)/2
=180. The category wise breakup of the obtained mean score was, General – 65.55 (66),
Theory – 77.85 (78), Practical – 41.57 (42). The values within the parenthesis showed the
mean of the opinionnaire. Thus it was clear from the study, that students met difficult
areas especially in the theory part of the chemistry curriculum in XI standard.
Vigneswari M. 2000 conducted a study *an investigation into the problems of XI standard students in learning chemistry in the Tuticorin educational district*. The objectives of the study were to identify the areas in theory as well as practical part of XI standard chemistry curriculum which the pupils find difficult to comprehend, to find whether these is any significant different in the performance of the pupils differing in sex, medium, kinds of institutions, parental status and parents educational qualification because of the difficulties in learning chemistry and to find out whether there is any significant relationship between problems and achievement in chemistry in terms of sex, medium, locality, type of institutions parent’s educational qualification and occupation. The major findings were that in XI standard chemistry learning, there was a significant difference in the variables medium of instruction, religion, local, types of school, types of administration, father’s and mother’s educational qualification and occupation. There was no significant difference in the mean scores with respect to the gender, religion, Birth order, Types of school, Father and Mother educational qualification. Thus it was clear from the study, that students met difficult areas especially in the theory part of the chemistry curriculum in XI standard.

Sundararajan.S and Rajasekar.S. (1998) found the *correlation between higher secondary students perceptions of the effectiveness of their chemistry teachers and their attitude towards the study of chemistry*. The objectives of the study were to find out the nature of relationship excising between the higher secondary students perceptions of the effectiveness of their chemistry teachers and their attitude towards the study of chemistry, and to find out if there is any significant difference between (a) boys and girls. (b) students studying in private and those studying in government schools and (c) students studying in the urban and rural schools in respect of their perceptions of the effectiveness of their chemistry teachers and in respect of their attitude towards the study of chemistry. As many as 563 second year higher secondary students of chemistry optional were
selected using random sampling technique (281 boys and 282 girls). The students perceptions scale was constructed. It has as many as 35 items. This study had clearly shown that effective teaching behavior in the classroom influenced the attitudes of the students towards the subject taught by the teachers. This highlights the importance of teacher behavior in teaching any subject in schools. It was seen further that the students’ perceptions of teacher effectiveness and also their attitude towards the subject were not affected by the gender of the students, the type of schools where they were destined to study or the locality of the schools.

Pandia Raja. R. (1992) did a study on scientific interest and scientific attitude of prospective science teachers. The objectives of the study were to study the scientific attitude of the prospective science teacher. To study the relationship between science interest and achievement of prospective science teachers and to study the relationship between scientific attitude and achievement of prospective science teacher were the objectives of the study. About 200 science teacher trainees were selected. The sample represented physical science namely physics and chemistry and biological science namely botany & zoology. The sample contained both men and women teacher trainees. The scientific attitude scale was constructed as a five point scale. It had 25 statements. Each statement was followed by responses like highly agree; ‘agree’, undecided ‘disagree’ and highly disagree. In the 25 statements 11 statements were positive and 14 were negative. Maximum scores would be 125 (25X5) and minimum will be 25 (25X1). The findings of the study showed that regarding science interest, religion, branch of science physics, chemistry, botany and zoology), place of residence and caste, did not have any impact on it. Caste, branch of study, level of study and religion did not have any influence over the relationship between science interest and achievement. But the factor, the place of residence influenced the above relationship to some extent. The respondents of the urban area showed a significant relationship between achievement in science and their science interest.
Aziz, Talat (1990) found the comparative effectiveness of the information processing models of teaching in developing certain concepts in chemistry at the secondary stage. The objectives of the study were to develop teaching programmes in specified content areas in chemistry to teach inductively through concept attainment and inductive thinking models, and to compare the teaching programme based on information processing models with the traditional teaching programme in chemistry with regard to the concept attainment model. The sample comprised 280 students of class IX selected randomly from the schools in Delhi. It was, however, seen that the students were divided into the control group and experimental group. The tools of the study included an achievement test in chemistry developed by the investigator and the group test of General Mental Ability by S.S.Jalota. The collected data were analyzed by analysis of covariance technique (ANCOVA). It was observed that the pupils exposed to the teaching programme based on information processing model of teaching performed significantly better than the pupils taught the traditional lecture method. Chemistry could be effectively taught through the model approach. Model approach of teaching was better than the traditional approach of teaching. Concept attainment model and inductive thinking model were effective for teaching strategies and were used as suggested by Taba. Thinking could be taught if appropriate teaching strategies were used as concepts. Bruner’s concept attainment model was effective for attainment of concepts. Mental abilities of the students had no bars on the concept attainment so far as the students of higher average mental ability were concerned. Both information processing models were found superior to the traditional approach for teaching concept based chemistry.
Singh.S. (1988) did a study “An investigation in to the relationship between achievement of certain concepts of physical chemistry, cognition and convergent production of semantic classes, relations and implications of the morphological model of structure of intellect. The objectives of the study were to analyze the concept, conceptual hierarchies of the concepts of atomic structure, periodic properties of elements and chemical bonds and molecules according to the sequential learning model of gange, to construct an achievement test in order to assess achievement in concepts of physical chemistry selected for study, to study the relationship between composite concept, achievement composite and convergent production of semantic classes, relations and implications, to identify the factors that would explain the common variance and to study the contribution of various measures or reasoning abilities to the variance in various tests of concepts achievement in physical chemistry. The sample of the study consisted of 200 students of class XI. In order to collect relevant data, two test batteries, one constructed by the investigator, i.e. concept achievement test, battery and the other Bala’s battery or Reasoning Ability Tests were administered to class XI Students when they completed the selected physical chemistry components of the curriculum. The data obtained from this sample were tabulated and analyzed in order to identify the relationship between these variables. Coefficient of correlation was computed in order to identify the relationship amongst variables. On the basis of an inter- correlation matrix, factor analysis according to variance criterion was carried out. Finally multiple, regression analysis was carried out to determine the contribution of reasoning abilities to the variance in achievement. The findings of the study showed that a significant positive relationship was found between reasoning ability and achievement of concepts in physical chemistry. A significant positive relationship was found between concept achievement composite and reasoning
abilities represented by six SOI categories. In the correlations between 19 reasoning ability tests and composite of concept achievement in physical chemistry, except for apparatus test (CMI) word grouping and figure concepts (NMC), all the other correlations were significant at 0.05 level. Out of 190 correlations between 19 reasoning ability tests and ten concept achievement tests 149, correlations were positive and significant at 0.5 levels.

Ghosh, G.P. (1985) did a study on the achievement of the students in chemistry and findings in relation with some of the determinants. The objectives of the study were to appraise the achievement of the students in physical science, to appraise the extent of academic motivation, intelligence and socio-economic status of the students, to find out sex-wise and strata-wise differences to determine relationship among the scores of the achievement test in physical science and to develop regression equation of the achievement in science on intelligence, academic motivation and socio-economic status. The urban students did not show better performance in the achievement test in chemistry (ATC) than rural students. Boys did not show superiority in ATC over girls. There was a positive correlation between the scores in ATC and academic motivation, ATC and group intelligence test, Urban and Rural students’ scores in ATC and “Education of the parents” as well as “Occupation of the parents”. In scores of ATC and SES (Socio Economic Status) of the parents through multiple regression equation, the ATC was reliable and valid. Norms were also satisfactory.

II.5. Analysis of the studies Reviewed:

The investigator reviewed related studies 28 of them are Indian studies and 20 from foreign studies. Each study had been discussed with investigator’s name(s), the year of investigation, title, objectives, methods and major findings.
of academic dishonesty in a chemistry classroom laboratory, George, M. Bonder (2001), Bloom’s taxonomy and the scientific method on critical thinking achievement and attitude towards science, Mc. Cune, Dianne Locke (1989).

These studies included different background variables such as gender, locale, qualifications, religion, management of schools, educational qualification of parents, age, standard and year of study.

In some students, the standised tools are used and for the rest, the investigators developed their own tool (s). The different random samples techniques have been adopted. The statistical techniques applied normally were ‘t’ test ‘f’ test, and correlation. The findings are mixed.

Apart from chemistry, some studies attempted to find out the factors determining the academic achievement of different subjects. Such as language, social science and mathematics.

II.6. The Gaps Identified:

From the studies reviewed by the investigator, the following gaps have been identified.

- The academic achievement of higher secondary students has not been found out in the dimensions such as study habit, attitude, aptitude, socio economic status, study habit and teaching competency of teachers at higher secondary level.

- The factors affecting the different specifications of the academic achievement. Such as knowledge, understanding, application and skill have not been studied so deeply.

- Only a few studies have been undertaken to find out the academic achievement of higher secondary students in chemistry in Ramanathapuram District.
II.7. The present study:

In order to bridge the gap mentioned above, the present study is undertaken to find out the academic achievement of higher secondary students in chemistry in Ramanathapuram District including different factors as the variables. Besides, the researcher endeavours to study the specifications of academic achievement separately,

II.8. Conclusion:

In this chapter the investigator reviewed forty eight related researches for the present investigation. The next chapter deals with the plan and procedure of this study.