Chapter II

REVIEW OF RELATED LITERATURE

2.1 STUDIES CONDUCTED ABOUT ACQUISITION OF CONCEPTS

2.2 STUDIES CONDUCTED ABOUT THE INFLUENCE OF SELECTED PSYCHOSOCIAL CORRELATES ON ACHIEVEMENT
CHAPTER II

REVIEW OF RELATED LITERATURE

The review of related literature forms an important part in any investigation and a thorough knowledge of past research helps an investigator to carry out effective research. An investigator should examine each and every reflective process of every researcher in his field of investigation. This will provide a proper base and direction to the investigation. Best and Kahn (1995) remarked that "a summary of the writings of recognized authorities and of previous research provides evidence that the researcher is familiar with what is already known and what is still unknown and untested. Since effective research is based upon past knowledge, this helps to eliminate the duplication of what has been done and provides useful hypotheses and helpful suggestions for significant investigation". According to Good (1973) "a systematic canvas of related literature is the means of determining whether the proposed study unnecessarily duplicates some earlier investigation".

The title of this study reveals that it is an attempt to find out the influence of certain selected psycho-social correlates such as Intelligence, Attitude towards Science, Study habits and Home environment of secondary school pupils on their acquisition of Biological concepts. After going through the literature available on the present topic, the investigator selected only those, which are relevant to the present problem. The review of related literature is attempted below under two broad sections.
2.1 Studies conducted about Acquisition of concepts.

2.2 Studies conducted about the influence of selected psycho-social correlates on achievement.

Review about the studies under each section is given below.

2.1 STUDIES CONDUCTED ABOUT ACQUISITION OF CONCEPTS

Studies conducted reviewed under this section are further subdivided into following sub sections.

2.1.1 Studies conducted about the acquisition of concepts in different subjects

2.1.2 Studies conducted about the acquisition of concepts in Biology.

Review about the studies under each sub section is given below.

2.1.1 Studies conducted about the acquisition of concepts in different subjects

Shore and Sechrest (1961) conducted a study on "concept attainment as a function of number of positive instances presented". Two experiments were conducted to determine whether concepts are more easily discovered from the repeated examination of a few instances of the concept or from single examination of larger numbers. Additionally an attempt was made to verify the difficulty level of the concept studied. The material used consisted of concepts based upon non-sense syllables. In the first experiment there were no significant
effects attributable to the number of different instances presented; but the conditions were thought to be confounded with varying numbers of negative instances. A second experiment was done in which number of instances and type of concept were varied in factorial design with number of negative instances being constant across conditions.

The results indicated that where a concept is based upon less obvious characteristics of instances or required some mental transformation of stimuli, repetition of instances is desirable. Repetition may be less necessary with relativity obvious concepts.

Freyberg (1966) conducted a two year longitudinal study involving 151 New Zealand children aged 6-9 years on the relationship between general intellectual ability, conceptual development and attainment in arithmetical computation and arithmetic problem solving and spelling. Conceptual development was measured by a 72 items objective test, was more highly correlated with primary mental ability test. Regression analysis showed scores with mental age accounted for a significantly large proportion of attainment score variance in most cases. The study confirmed that children's school performance was associated with aspects of conceptual development and not adequately assessed by conventional intelligence tests.

Eustace (1969) examined the aspects of the way children in the classroom learn complex concepts as a function of their hierarchical nature. Incorporating some ideas from Gagne and his collaborators, this
study theorizes that learning of concepts consists of lower conceptual levels acting as mediators of positive transfer to higher behavioural levels. The higher level thus produced qualitatively different from the behaviour designated by the tasks on the lower level. All the subordinate sets comprise necessary element for problem solving at a given level, immediate subordinate set serves to lay the course for solution by showing the relevance of the subordinate sets, and thus making it possible to integrate them into new conceptual understanding.

The result of this study shows that a child who learns a definition can use it systematically to identify the concept defined. It is agreed that a child's concept will not be raised to higher levels by a random exposure to characteristics of the concept, but rather higher levels will be reached when certain characteristics has been preceded by specific essential prerequisites.

Paul (1984) conducted a study to determine the prerequisites for learning certain concepts in the tenth standard chemistry syllabus. The major objectives of the study were to determine the prerequisites essential for learning certain concepts selected and the effectiveness of prerequisites on concept attainment. The important findings are (1) Pupil's concept attainment and prerequisite achievement were far from satisfactory (2) There is significant relationship between concept attainment and prerequisite knowledge (3) The attainment of concept is dependent on pupil's prerequisite knowledge essential for those concepts.
Khalwania (1986) conducted a study to find out the effectiveness of concept based science curriculum in developing cognitive structures and acquisition of process skills among, high school students. The finding of the study is:

The concept-based curriculum was more effective than the conventional curriculum in terms of acquisition of process skills as well as in developing better cognitive structure.

Ambili (1993) attempted to find out the levels of attainment of certain basic skills in mathematics of pupils in standard V. The tool used for the study was concept attainment test for standard V. The study was based on a sample of 400 pupils selected by stratified sampling procedure from schools in Kollam district of Kerala. The findings of the study are,

1) The performance of pupils in concept attainment test is satisfactory

2) The level of concept attainment is good or very good in the case of 18.68% of boys, 18.31% of girls, 24.20% of pupils in rural areas, 17.13% of pupils in urban areas, 26.56% of pupils in government schools and 24.9% of pupils in private schools.

3) The performance of boys in rural areas is better than that of girls (C.R = 2.82) in concept attainment test.

4) Performance of pupils in government schools is better than that of pupils in private schools (CR=2.37) in concept attainment test.
Varghese (1987) conducted a study on the determinants of prerequisites for learning certain concepts in mathematics for standard VIII and their effect on achievement. The sample consisted of 462 pupils from schools in Quilon and Kottarakkara educational districts in Kerala. The important findings of this study are,

1) The level of attainment of concepts of pupils of standard VIII in concept attainment test is poor.

2) Every concept in mathematics is based on certain prerequisites.

Lemke (1965) studied the relationship of selected abilities of concept attainment and information processing tasks. The sample selected consisted of 94 females from 2 classes in Educational psychology at the University of Wisconsin. He found that the span and rote memory factors, representing the memory domain, were isolated and found to be clearly unrelated to the task factors. The results generally supported studies using stimulus materials and presentation modes.

The factors of the reasoning domain were all related in degree to the task factors; however, deduction and spatial scanning factors thought to be related to the domain were only marginally related to the concept attainment and information processing tasks. The verbal comprehension factor was found to be related to the task factors.

Sechrest and Kass (1965) investigated the effect of stimulus similarity on case of concept attainment using two sets of materials which
differed only in the degree of similarity, among the specific value on each dimension, the values in one set differing more markedly than in the other. Materials consisted of various triangles of different shades of red. It has shown that even though stimuli were clearly discriminable from each other, small differences resulted in greater difficulty of concept attainment that did larger differences.

A study of Butts (1968) described below is an example of empirical studies to support deep theoretical analysis of concept processing. He had made a clear analysis of the understanding of the concepts in children. According to him, the student must have such understandings as the foundations for further study or interpretation of his environment. To develop conceptual understanding in children first, the teacher must know what a concept is and how it develops. Butts gives a working definition of concept as an interpretation of an event by an individual. The teachers must see whether they can begin the event and work forward for the concept. Butts also adds that the more the student is permitted self direction within his experiencing of an event the greater the meaning the experience will have for him. For attainment of conceptual understanding, first hand experience and independence in handling the experience seem to be the necessary condition.

Stones and Heslop (1968) conducted a study on “the formation and extension of class concepts in primary school children”. The aims of the investigation were,
1) To establish, the extent to which Vygotsky’s model of concept formation applied to primary school children

2) To examine the relationship between age, verbal ability, non verbal ability and level of thinking

3) To examine the relationship between levels of thinking and performance in tests of transfer.

60 primary school children aged 6 years to 11 years were given the Vygotsky sorting task and specially constructed tests of extension (or transfer).

It was found that Vygotsky model was appropriate although the subjects showed little evidence of thinking at the lowest level. Verbal ability was associated more closely with conceptual thinking and other measures. Performance on tests of transfer was highly correlated with levels of thinking and concept forming situation.

Mills (1973) studied the effect of a proposed model for motivation on the concept attainment of selected high school and college students. The sample consisted of high school and college population of Foudtain Central High school and Indiana State University. It was found that,

1) For the high school population, the instructional use of the proposed model for motivation was effective in increasing concept attainment
2) For the undergraduate college population, the instructional use of the proposed model for motivation made no difference in concept attainment.

3) For the graduate college population, the proposed model for motivation had a positive effect on the concept attainment of the students.

Mouw and Hecht (1973) conducted a study on "transfer of the 'concept' of class inclusion". The major purpose of this study was to examine the notion of mentally visualizing a number of selected objects into a hierarchy of classes, which Piaget has referred to as the formal operation of "Class inclusion", as if it were a concept.

Twenty four subjects were selected from the third and fourth grades of a university grade school in the Mid Western United States. A psychomotor task was utilized as an attempt to teach the ability of organizing elements into a hierarchical system. A pre-test - post-test assessment indicated that students, so trained did learn the concept of class inclusion when compared to a match control group.

It was concluded that the results supported Gagne's cumulative learning rather than the notion that operations are primarily dependent upon maturation.

O'keefe (1992) investigated the effect of using dynamic representation to enhance student's understanding of the concept functional. An exploratory research was conducted with high school and
college students. The study found that key features of functions were accurately conveyed to students in the context of dynamic parallel number lines.

Marie (1991) conducted a study on “students conceptualization of mathematical functions: The effect of a pedagogical approach involving multiple representation”. This research examined the conception of function developed by high school students as they used dynamic multi-representation software to co-ordinate tabular, graphical and algebraic representation of mathematical functions in the solution of contextually based problem solving problems in a pure calculus classroom.

Thomas (1971) revealed that the medium of instruction will not considerably affect the development of science concepts. Here the analysis was done for 54 equated groups based on intelligence, sex and socio-economic status. The critical ratio obtained was 0.19. The value is far less than the critical limit at 1% level.

Sajitha (1996) conducted a study of the attainment of concepts in mathematics of standard III pupils. The result of the study showed that the level of attainment of concepts is good or very good in the case of 49.6% of pupils and satisfactory in the case of 31.2% of pupils. The level of concept attainment is poor or very poor in the case of 19.2% of pupils. There is no significant difference in concept attainment of boys and girls (CR=0.032, P>0.05). Also there is no significant difference in the attainment of concepts in mathematics between pupil studying government
schools and private schools (CR=0.92, P>0.05). The concept attainment of pupil studying in urban areas is better than that of pupil studying in rural areas (CR=5.36, P>0.05).

Thara (1994) in her study of the attainment of concept in mathematics of pupil in standard V found that,

1) The level of concept attainment is very good in the case of 19.6% of boys and 15.6% of girls. The level of attainment of concepts is satisfactory in 38.4% of boys and 39.2% of girls. Very poor attainment of concepts is reported in the case of 42% of boys and 45.2% of girls.

2) There is no significant difference in the attainment of concepts between boys and girls, government school students and private school students, pupil belonging to high study habit group and pupil belonging to average study habit group.

3) The concepts attainment of pupil studying in rural areas is better than that of urban areas. Similarly concept attainment of high study habit group is better than that of low study habit group. The average study habit group has better concept attainment than that of pupils with low study habit.

Gakhar (1981) studied the influence of educational environment on the acquisition of mathematics concepts at junior secondary stage. The
study revealed that educational level of parents and income of family had positive effect on mathematics performance.

Phalachandra (1989) found a positive relationship between concept-based achievement in chemistry and environment. Sex differences in achievement favouring boys existed. Parent’s qualification, sex and place of birth (urban areas) contribute substantially to achievement.

Anilkumar (1999) in his study on the influence of mental health on achievement of select concepts in chemistry of secondary school using a sample of 600 standards IX students of Kozhikode and Malappuram district of Kerala found that,

1) There is significant difference between rural and urban students, boys and girls in the achievement of select concepts in chemistry.

2) There is significant difference between high, average and low mental health groups for their achievement in select concepts in chemistry.

3) There is marked relationship between achievement of select concepts in chemistry and mental health of total sample, rural students, urban students, boys and girls. The coefficient of correlation is 0.556 for the total sample.

Raghavan (1991) stressed the importance of concept mapping in learning physical science. He showed the relationship between concept
mapping and other variables such as achievement, cognitive ability and attitude towards science.

A study conducted by Sheeba (1994) on some social familial variables in relation to attainment of basic mathematics concepts by standard VIII Backward area pupil of Malappuram district of Kerala revealed that,

1) Significant relation exists between each select social familial variable and concept attainment in mathematics in both backward and non backward areas.

2) There was significant difference existing in the mean scores of concept attainment in mathematics between pupil of backward and non-backward areas; higher mean score for girls was reported in backward areas.

3) Mean score differed between private and government schools in backward and non -backward areas.

4) Significant difference in correlation existed only in the case of relation of home environment with concept attainment in mathematics between pupil of backward and non - backward areas.

Asokan (1994) made a study on the achievement in basic concepts in social studies of pupil of standard VIII of backward areas of Malappuram district in Kerala. The results of this study showed that,
1) There is no significant difference between boys and girls in the achievement of basic concepts in social studies.

2) There is significant difference in mean score of achievement in basic concepts of standard VIII pupils belonging to forward caste and backward caste. The forward caste pupil differed significantly than backward caste pupil in the achievement of basic concepts in social studies in easy items, average items, difficult items and total score. High mean score of achievement was associated with forward caste pupils.

3) High parental education group is associated with high mean scores over low parental education group.

4) High parental occupation group differed significantly to the score of low parental occupation group. High parental occupation group had advantage over the low parental occupation group.

5) High socio-economic group differed significantly from low socio-economic group in easy items, average items and total scores. In difficult items no significant difference was there between the two groups.

Manojkumar (1996) conducted a study of certain mathematics aptitudinal variables as predictors of achievement in select concepts in chemistry of vocational higher secondary school pupils. It was fond that,
1) There existed significant relationship between select concepts in chemistry and four out of five independent variables (components of mathematics aptitudinal variables namely, numerical ability, numerical reasoning, ability to use symbols, spatial ability and abstract reasoning).

2) The coefficients of correlation obtained were significant beyond 0.01 level and three of them showed negligible and one showed low relationship.

3) There was positive correlation between achievement in select concepts in chemistry and five components of mathematics aptitude. It was found that numerical ability and abstract reasoning are independent variables, which are best predictors of achievement in select concepts in chemistry.

4) The comparison of mean scores of pupil belonging to three different levels of achievement in select concepts in each of the selected mathematics aptitudinal variables indicate that the discrimination between low achievers group and high achievers group is maximum whereas discrimination between average achievement group is found to be comparatively low.

Chandran (1997) is her study of home learning facility, family acceptance of education and socio-economic status in relation to the attainment of scientific concepts of upper primary school pupils could find a positive and significant relationship between home learning facility and
attainment of scientific concepts. Similar relationship was found between education acceptance by family and attainment of science concepts and also between socio-economic status and attainment of concepts in science for the whole sample. This study made use of a sample of 300 from Thiruvananthapuram and Kollam districts of Kerala. The study could also make out that boys and girls do not differ significantly with respect to attainment of scientific concepts. But significant difference in mean scores of concept attainment test scores is significant between rural and urban pupil, private and government school pupils. Significant difference in mean scores of concepts attainment was found between pupils belonging to high and average home learning facility and between pupils belonging to high and poor home learning facility.

Gopalakrishnan (1996) conducted a study of the attainment of select concept in physics in relation to parental behaviour towards physics of standard X pupils. The study made use of a sample of 520 from Calicut and Malappuram revenue districts of Kerala. The results showed that,

1) Significant difference exists in the mean scores of attainment of select concepts between English and Malayalam medium pupils.

2) Significant difference does not exist in the mean scores of attainment of concepts between boys and girls.

3) The coefficient of correlation between attainment of select concepts in physics and parental behaviour towards physics is positive for the
total sample and sub samples based on sex and medium of instruction.

4) There is no significant difference in the relation of attainment of concepts in physics to parental behaviour towards physics.

5) The main effect of medium of instruction ($F=40.20; p<0.01$) and parental behaviour towards physics ($F=88.6; p<0.01$) on attainment of concepts in physics is significant.

6) The interaction effect of parental behaviour and medium of instruction and parental behaviour and sex on attainment of select concepts in physics is not significant ($p>0.05$).

Aykkareth (1998) in his investigation on utility awareness of students of standard IX towards concepts learned in economics arrived at the conclusion that students have an average awareness in theory as well as utility in concepts learned in economics. This may be due to,

1) Theoretical concepts are very difficult.

2) Students are less interested to study the theories.

3) Knowledge imparted in class room is not linked to life situation.

Marykutty (1969) made an analytical study of errors in concepts in general science committed by pupils of standard IX. The important findings of the study are,
1) Pupils in standard IX in the educational district of Kottayam made a large number of errors in the area of general science. On an average they know only 16 concepts out of 50 tested.

2) Concepts seen to be weakest in chemistry followed by botany, physics and zoology.

3) Errors are most in question involving application, second comes understanding and least number of errors are committed in knowledge type.

Mathew (1984) conducted a study to determine the prerequisites for learning certain concepts in physics of standard IX in high schools of Kerala. A test of concept attainment was conducted to 460 pupils. It was found that,

1) The use of every concept in physics at high school is based on certain essential prerequisites.

2) Concept formation in physics is dependant on pupil’s prerequisite knowledge in the respective concept.

Bawa (1991) attempted to review the research possibilities on conceptual learning (Bruner’s view) and indicated that there is a dearth of research studies in the area of concept learning.

Gibson (1986) found that the use of counter examples facilitated the learning of more difficult mathematical concepts in the performance of more difficult mathematical tasks.
Judson and Nishimori (2005) conducted a study on above average high school calculus students from Japan and United States in order to determine any differences in their ability to use algebra to solve traditional calculus problems. The study examined and interviewed 18 students from the United States and 26 students from Japan. Each student needed to complete two parts of a written examination. The first (part I) consisted of problems emphasizing conceptual understanding but requiring little or no algebraic computation. Problem in the second part (Part II) required sound algebraic skills in addition to conceptual understanding. Each student was interviewed after the written examination, to assess their mathematical and educational background, their college and career plans, their thinking on the examination problems, their understanding of concepts and their computational and reasoning skills. It was found that little difference exists in the conceptual understanding of calculus between the two groups of students. But the Japanese students demonstrated much stronger algebraic skills than their American counterparts.

Sarala (1990) analysed the conceptual errors of secondary school students in learning selected areas in modern mathematics and found that the number of errors are quite large, and these errors are influenced by sex, locality of school, management of school, intelligence, study habits and socio-economic status. It is found that the errors decrease with intelligence.

Joshi (1989) found that all the five aspects of school characteristics contributed significantly to the acquisition of concepts in chemistry.
Mohan (1991) suggested an effective instructional model for concept-based learning in science.

Agarwal (1998) conducted a study on the effect of teaching strategies in relation to creativity on conceptual learning of class XI students of commerce. The sample consisted of 96 students from three government boys' senior secondary schools. In this experimental study the total sample is divided into 3 groups numbering 32 each. One group is taken as the control group and the other two groups are taken as the experimental group. The same selected concepts were taught to the experimental and control group for the same time duration. One of the experimental group was taught by the advance organizer model and the other experimental group was taught by the concept attainment model. The control group was taught by the conventional method. The results of the study showed that advance organizer model and concept attainment model are effective than conventional method in fostering concept learning. It is found that high creative group showed better concept learning when taught by advance organizer model. The study also showed that concept retention of the pupils was not significantly influenced by their creative abilities. But it was actually influenced by the teaching strategies they were exposed to.

2.1.2 Studies conducted about the acquisition of concepts in Biology

Valsala (1986) conducted a study on the determination of prerequisites for learning certain concepts in botany of first year pre-
degree students and their effect on achievement. The major findings of the study were,

1) Pupils' pre requisite score and actual scores do not differ significantly.

2) There is significant relationship between prerequisites and achievement (correlation coefficient r=0.58).

3) The actual scores for high pre requisite group and for low prerequisite group differ significantly.

4) The achievement and prerequisite of high socio-economic status group pupils is not higher than that of low socio-economic status group.

Alparslan, Tekkaya and Geban (2003) investigated the effect of conceptual change instruction on Grade 11 student's (aged 16-17 years) understanding of respiration. The total sample consisted of 68 Grade 11 students of an urban high school. Of this 34 students, 18 boys and 16 girls were taken as experimental group and were given conceptual change instruction. The control group consisted of 34 students, 19 boys and 15 girls. The control group was given traditional instruction through lecture and discussion method. Prior to instruction, students of the experimental group and control group were pre-tested in order to determine their previous understanding of respiration. The results of pre-test showed that the both groups had an equal understanding of
respiration. After the instruction, Respiration concept test was administrated to both the experimental group and control group. The data thus obtained were analysed with two-way analysis of covariance (ANCOVA) using science process skills as a covariate. Results indicated that student’s science process skills accounted for a significant portion of variation in respiration concepts achievement. The conceptual change instruction, which explicitly dealt with student’s misconceptions, produced significantly greater achievement in the understanding of respiration concept. This analysis also revealed a significant difference between the performance of females and that of males in favour of the females but there was no significant interaction between treatment and gender difference.

Saseendran (1990) found that no student even at the completion of secondary level is attaining essential biological science concepts at \( P_{100} \) level. High intelligence students are attaining more essential biological science concepts than low intelligence students. Similarly high socio-economic status students are attaining more essential biological concepts than the low socio-economic status students. None is getting hundred percent correct answers even for knowledge type questions. High intelligence students are getting only 72.47% attainment of concepts; the low intelligence student have 49.73% attainment of concepts; and for the low SES students 55.85% attainment of concepts and for high SES student 63.38% attainment of concepts
Rosily (1994) studied the relationship of attitude towards science and achievement motivation on attainment of biological concepts of tribal and non-tribal pupils of standard VIII. It was found that the relationship of attitude towards science and achievement motivation in combination to attainment of biological concepts is significant for both tribal and non-tribal pupils.

Skaria (1984) conducted a study on the attainment of essential concepts in biology in relation to science aptitude of secondary school pupils. The total sample was 1000 students of standard X. In this study the correlation between attainment of essential concepts in biology and science aptitude was found to be 0.65 for rural students, 0.56 for urban students, 0.50 for high science aptitude level students, 0.51 for average aptitude level students, 0.22 for low science aptitude level students and 0.65 for the total sample.

Varghese (1983) conducted a study on construction and standardization of test of essential biological science concepts for secondary school pupils. The test was administered on 800 students of 10th standard. The major findings of the study were,

1) Girls performed better than boys in the test of essential biological concepts

2) The urban students were found superior to rural students in the mastery of essential concepts in biology.
3) There was significant difference in the mean score of attainment of biological concept between high achievers and low achievers in biology with mean scores 39.64 and 25.19 respectively and critical ratio 15.53.

4) The mean score of test of essential biological concepts for high intelligence and low intelligence groups were 39.09 and 24.09 respectively.

5) There was significant difference in mean score of essential biological concepts between high socio-economic status group and low socio-economic status group, with mean scores 36.52 and 27.18 respectively and with a critical ratio 8.73.

Okeke and Robinson (1980) investigated the nature of Nigerian Secondary school pupils’ (N=120) difficulties in understanding the biological concepts of growth, reproduction and transport mechanisms within living organisms. The study also identified examples of common misconceptions in biology.

Samson (1984) made a study on conceptual attainment in Biology of scheduled caste students in secondary schools. The following are the main findings of the study.

1) There is significant difference in the mean score of attainment of biological concepts between forward caste students, scheduled caste students and backward caste students. In all cases, mean difference was beyond 0.01 level.
2) There is significant difference in the mean scores of concept attainment in Biology between relevant sub samples of scheduled caste students based on sex, locality and three levels of intelligence (high, average and low). The mean difference obtained was beyond 0.01 level.

3) There is no significant difference in the mean scores of attainment of concepts between equated groups of scheduled caste students and non-scheduled caste students. The equated groups formed on the basis of equating the variables - intelligence, age, sex and locality.

Sunilkumar (1995) based on his study on levels of attainment of essential biological science concepts of upper primary school pupils could find that,

1) No student is getting 100 percent mastery of essential biological concepts at the upper primary school level. In the case of knowledge type questions boys are getting 41.33 percent where as for girls it is less than that of boys, i.e. 36.65 percent.

2) Boys are getting more essential biological science concepts than girls. High scorers in socio-economic status attained fewer concepts than low socio-economic status students. Also rural pupil attained more essential biological concept than urban pupils.
3) Difference in attainment of biological concepts between boys and girls were found to be significant at 0.01 level in synthesis type questions.

Sheeja (1994) studied about the concept attainment in Biology in relation to some social-familial variables of secondary school pupils of backward areas of Malappuram district. It was found that,

1) There is significant difference in mean score of concept attainment in biology for backward area and non backward area samples

2) There was significant relationship between concept attainment in Biology and home environment for backward and non backward area sample ($r=0.325$, $p<0.01$ for backward area sample and $r=0.420$, $p<0.01$ for non backward area sample).

3) The main effect of home environment and socio-economic status on concept attainment in Biology is significant.

Puthenpurayil (1994) analysed the achievement of basic concepts in Biological science in relation to classroom climate of secondary school students in backward region of Malappuram district. It was found that,

1) Mean scores in basic concepts in biological science (easy items and difficult items) between pupils of good classroom climate school and moderately good classroom climate schools were significantly different. The critical ratios were 2.40 and 2.58 respectively.

2) Achievement of basic concepts in biological science is significantly related to classroom climate is substantiated partially. $X^2$ value
obtained for achievement in easy items and classroom climate is found to be 11.36 and that of achievement of concepts in biological science (difficult items) and classroom climate is 9.67. But the magnitudes of C-coefficient (0.146 and 0.078) are low.

Beevi's (1984) study of attainment of essential concepts in Biology in relation to scores for verbal and non-verbal intelligence tests for secondary school pupils showed the following results.

1) The coefficient of correlation between attainment of concepts in biology and verbal intelligence was found to be 0.5817 for the total sample, 0.5677 for boys, 0.590 for girls, 0.5627 for rural subjects, 0.5091 for urban subjects, 0.4626 for high verbal intelligence level, 0.370 for average intelligence level and 0.2027 for low intelligence level. In all cases the 'r' value were positive and significant at 0.01 levels.

2) The coefficient of correlation between attainment of concepts in biology and non-verbal intelligence was 0.5412 for total sample, 0.6325 for boys, 0.60 for girls, 0.610 for rural subjects 0.60 for urban subjects, 0.2412 for low non-verbal intelligence level, 0.580 for average non-verbal intelligence level and 0.6128 for high non-verbal intelligence level. All the 'r' values were positive and significant at 0.01 level.
3) There is no significant difference in 'r' (showing relationship between concept attainment in biology and intelligence – both verbal and non-verbal) between boys and girls.

Summary of Major trends: The review of related literature indicates certain major trends in the field of acquisition of concepts in different subjects, including biology. They are,

(1) Too much number of studies was not available for review. This shows the need for more studies in this very important field on learning.

(2) The nature of studies reviewed was not similar to the present study. The nature of sample, the type of subject, the variables considered, the objectives of the study etc. were much different from the one attempted in the present study. These factors further necessitate the investigator to take up this study to reach at more valid and generalizable results.

2.2 STUDIES CONDUCTED ABOUT THE INFLUENCE OF SELECTED PSYCHO-SOCIAL CORRELATES ON ACHIEVEMENT

Here achievement is taken into consideration because of two reasons. (1) Acquisition of concepts is closely related to achievement. (2) Very small number of studies could be located about the influence of selected psycho-social correlates on the acquisition of concepts in biology and other school subjects. Studies reviewed in this section are further subdivided into following subsections.
2.2.1 Studies conducted about the influence of intelligence on achievement

2.2.2 Studies conducted about the influence of Attitude towards Science on achievement

2.2.3 Studies conducted about the influence of Home environment on achievement.

2.2.4 Studies conducted about the influence of Study habits on achievement.

2.2.1 Studies conducted about the influence of intelligence on achievement

Maqsud (1983) investigated about the effect of I.Q. on academic achievement of Nigerian secondary school pupils and revealed that I.Q. had a significant positive effect on academic achievement.

Oakland (1983) determined the influence of I.Q. on reading and mathematics achievement using multiple linear regression analysis. Subjects consisted of 345 children stratified on racial ethnic characteristics, SES, gender and age. Data were obtained from subjects' scores on the WISC-R adaptive behaviour inventory for children and California achievement test. The variance accounted for by the full model, was highly significant for reading (0.45) and mathematics (0.35).

Deshpanda and Lodhi (1981) studied academic achievement in SSC examination and its relationship with intelligence, study habits,
adjustment and anxiety on a sample of 60 high achievers and 60 low achievers. The study revealed that in the case of boys, intelligence, study habits, anxiety and adjustment values are related to academic achievement.

Nair (1968) while standardizing his non-verbal test of intelligence for secondary school students of Kerala obtained the following correlation of intelligence with secondary school marks in different school subjects. They are English (0.26), Malayalam (0.21) Hindi (0.23) Social studies (0.34) mathematics (0.43) General Science (0.43) and total school mark (0.05).

While constructing a non-verbal group test of intelligence for high school students, Bhavsar (1967) obtained varying correlates against achievement in different school subjects. The obtained values were Hindi (0.46), Gujarati (0.51), Social studies (0.33), English (0.37), Science (0.70), Mathematics (0.66) and total school marks (0.49).

Joseph (1998) in a study of process outcomes in physics in relation to some select cognitive, affective, social and environmental variables could find that there is significant and positive correlation between intelligence and process outcomes in physics.

Sabeena (2000) reported that there is a positive and significant relationship between verbal comprehension, numerical reasoning, spatial ability and achievement in chemistry.
Jayalakshmi (2000) found a significant correlation between achievement in problem solving in science and intelligence ($r=0.627$).

Simpson (1999) made a study to describe the relationship between academic achievement and intelligence, creativity, motivation and gender role identity of gifted children. Then study revealed that intelligence was a significant predictor of mathematics and reading achievement.

Pillai and Kumar (1996) designed a study to find out the magnitude of direct, indirect and causal relationship of intelligence, cognitive style and approaches to studying on achievement in Biology of standard IX pupils. They found that among the 3 variables, intelligence shows maximum total effect on achievement in secondary school biology.

Meera (1995) conducted a study to determine the interrelationship among intelligence, chemistry learning approach and achievement in Chemistry. The study revealed that there is a significant positive relationship between intelligence, chemistry learning approach and achievement in chemistry.

In a study by Minikumari (2002) about the effect of intelligence, adjustment and anxiety on process outcomes in science of secondary school children, using 800 standard IX students as sample, it was found that a positive and significant correlation ($r=0.5503$) exists between intelligence and process outcomes in science of secondary school pupils.
Gakhar (1985) in his study came to the conclusion that intelligence and achievement in mathematics, free from creativity, remain significantly correlated.

Basu (1982) found that there existed a significant and positive correlation between intelligence and achievement \( r=0.92 \). Similarly, Usha (1985) studied certain factors related with high and low achievement in college students. She reported that high achievers were found significantly superior in intelligence.

Pandey and Singh (1978) conducted a correlational study of school examination marks, intelligence and achievement scores. The results of the study revealed significant positive correlation between verbal intelligence, test scores and school examination marks.

Joseph (1977) in her study on intelligence, science aptitude as determinants of achievement in Biology obtained a correlation of 0.725 between intelligence and biology achievement.

Makhija (1973) studied the interaction among values, interests and intelligence and its impact on scholastic achievement. The study revealed that intelligence has a significantly positive influence on scholastic achievement.

Masih (1975) made a study to determine the relationship between intelligence, socio-economic status and achievement in Biology. She
found positive correlation between intelligence and achievement in Biology.

Mehna (1986) studied the predictors of achievement in science. From this study it was found that verbal intelligence is a significant predictor of achievement of class IX students in General science \( (r=0.58) \).

Kaile (1989) in a study on the relationship of intelligence, creativity and language usage with achievement in languages at three levels of socio-economic status reported that a significant and positive correlation exists between intelligence and achievement in languages.

Manjulata (1989) conducted a study to find out the relationship of cognitive style with scholastic achievement and intelligence. She found that significantly high and substantial correlation exists between academic achievement and intelligence.

Kaile and Sharma (1990) found that verbal and non-verbal intelligence are significantly and positively correlated with the achievement in mathematics at 0.01 level of significance.

Thakur (1972) made a study to investigate whether academic and non-academic correlates such as intelligence, aptitude, interest, achievement motivation, sex, socio-economic status and age were significantly related to scholastic levels. He found out that scholastic achievement and intelligence were significantly associated.
Mohandas (1978) conducted a study on certain cognitive correlates of mathematics achievement and found that verbal and numerical abilities had greatest importance and influence on mathematics achievement.

Kumar's (1980) study on intelligence as a determinant of affective outcomes in secondary school biology showed that intelligence was not playing a major role in driving one's affective achievement.

Kumar (1993) studied the interaction effect of intelligence, cognitive style and approaches to studying in achievement in Biology of secondary school pupils. One of the important finding was that the main effect of intelligence on achievement in Biology (total and objective wise) was significant for the total sample and sub samples.

Atheendran (1990) conducted a study on the science knowledge of high, average, and low intelligent pupils of secondary schools. He concluded that mean science knowledge scores of high, average and low intelligent groups differed significantly.

Nair (1970) in his study on the efficiency of verbal and non-verbal intelligence in predicting scholastic achievement came to the conclusion that there existed significant relation between intelligence and achievement. The correlation coefficient was found to be 0.528.

A study of Ames (1943) is indicative of the factors, which operate to reduce the predictive value of intelligence tests. She studied groups of
high school students who showed low scores in intelligence test, but whose achievement was higher than average.

Gakhar's (1981) study revealed that intelligence was significantly and positively related with acquisition of mathematical concepts individually and in unique constellation with other variables.

Beevi (1984) found that the scores for both verbal and non-verbal intelligence test are significantly correlated to the attainment of essential concepts in Biology.

Sanandaraj and Krishnan (1980) studied the relationship between achievement and intelligence using a sample of 300 (149 boys and 151 girls) pupils studying in standard VII in Trivandrum district and found that the coefficient of correlation between academic achievement and intelligence was 0.631.

2.2.2 Studies conducted about the influence of attitude towards science on achievement

Price (1975) studied the children's attitude towards science. It was found that there were no difference in science attitudes of males and females.

Ambili (1991) found out a very close and considerable relationship between process outcomes and scientific attitudes among all samples of university entrants.
Sreelathamma (1992) in her study on some affective correlates of achievement in secondary school biology found that relationship between achievement in Biology and attitude towards science is positive and significant.

The result of the study by Pillai (1990) indicated that attitude towards science of subjects at high, average and low levels of achievement differed significantly in their biology achievement.

Mitchell and Simpson (1982) in a study to find out the relationship between attitude towards science and achievement in science among college Biology students reported that correlation between attitude and achievement was notably lower and in certain cases negative.

Nair (1984) in a study on the factors related to under-achievement in Biology of secondary school students revealed that attitude towards science and problem solving discriminated significantly between over, normal and under-achievers.

Talton and Simpson (1987) conducted a study on the relationship of attitude towards classroom environment with attitude towards and achievement in science among tenth grade Biology students. The study showed that eighteen percent of variance in achievement in science was found to be attributable to attitude towards science.

Jayasree (1991) in a study on the influence of attitude towards science and science learning environment on Biology achievement of
secondary School pupil of Kerala, showed a significant relation between attitude towards science and biology achievement.

Pillai’s (1981) study showed that high school students showed low correlation between achievement in Biology and attitude towards science. In the case of attitude towards problem solving with achievement, girls showed low correlation, whereas boys showed negligible correlation.

Valsamma (1984) in her study of certain personality variables differentiating under achievers and non-under achievers found that among many other personality variables, attitude towards science also plays a significant role in determining Biology achievement.

The study by Sujatha (1987) on relative efficiency of science aptitude, science interest and attitude towards science in predicting biology achievement of secondary school pupils showed a positive and significant relationship between attitude towards science and achievement in Biology. It was also found that attitude towards science could not predict the achievement in Physics.

In a study by Thumpy (1984) of the interaction of Science aptitude and attitude towards Science on Biology achievement, it was found that the relationship between attitude towards Science and achievement in Biology was substantial and positive.

Geethanjali (1984) in a study on some of the variables which discriminate high intelligence under-achievers and low intelligence under-
achievers in chemistry revealed that achievement of pupils in chemistry was influenced by attitude towards Science and problem solving.

The findings of the study by Sarah (1983) indicated that about thirty percent of the variance in Science achievement was attributable to one's attitude towards science education and socio-economic status, in the case of high school pupils.

Baker (1985) in his study using Scientific Attitude Inventory (SAI) could find that middle school students with A and B grades in Science had negative attitude towards Science. At the same time students with C and D grades had a more positive attitude towards Science. He thinks that higher ability middle school students might find science as boring and which in turn adversely affected their attitude towards science.

The results of the analysis by Joseph (1979) of some predictors of achievement in Chemistry at the Pre-degree level showed a significant and positive correlation between attitude towards science and achievement in chemistry.

About the attitude of higher secondary students towards the study of physics and their achievement in it, Rajan and Rajasekar (1988) conducted a study and could find a positive correlation between these two variables.

Prameela (1993) studied the efficiency of some cognitive and affective variables in predicting achievement in Physics of secondary
school pupils and could find that there was significant relationship between attitude towards science and achievement in Physics. Further the study pointed out that the attitude towards science acted as a significant predictor of achievement in Physics.

Barrington and Hendricks (1988) in their study could find that knowledge of science terms and concepts, attitude towards science very well differed in the intellectually gifted and average subjects. However, any significant difference was not observed between males and females on Science knowledge or on attitude towards Science.

Hough and Piper (1982) conducted a study to find out the relationship between attitude towards science and science achievement. Residualized gain scores were used for controlling the individual differences. The study revealed that a significant relationship exists between attitude towards science and achievement in science of pupils.

Akubuiro and Joshua (2004) investigated the influence of self-concept and attitude on academic achievement in science of secondary school students in Southern Cross River State of Nigeria. The study revealed that the students' academic achievement in science was significantly predicted by their attitude, academic self concept and science self-concept, with attitude contributing most to the prediction.

Schibeci and Riley (1986) in their study on the influence of student's back ground and perception on science attitudes and achievement could find that at the higher grade levels, where science instruction tended to
have stronger mathematical emphasis, low and positive attitude towards science was present in females.

The findings of the investigation by Varghese (1986) into the relationship between Science interest, attitude towards science and achievement in chemistry of secondary school pupils in Kerala, show that attitude towards science of high achievement and low achievement group differed significantly.

Cannon and Simpson (1985) in their study on relationship among attitude towards science, motivation and achievement of ability grouped, seventh grade life science students revealed that the relation between attitude towards science and achievement in science was positive and significant.

Kadeeja's (1991) study on the effect of socio-economic status and attitude towards science on achievement in chemistry of secondary school pupil showed significant correlation between attitude towards science and achievement in chemistry.

George (1997) studied the relationship between attainment of Biological concepts and attitudes towards science of urban and rural secondary school pupils. The study could reveal that there is positive and significant relationship between attainment of biological concepts and attitude towards science for both the rural and urban secondary school pupils, with the exception of rural school girls, whose 'r' values though positive, were not statistically significant.
Kar (1990) in a study of relationship between attitude and achievement in General science of class IX students of Cuttack city found a significant relationship between attitude and achievement in General Science.

Balleh and Zachariadas (1975) based on their study arrived at the following conclusions,

1) The amount of science knowledge or general exposure to science affects positively a person’s scientific attitudes.

2) A low positive relationship exists between scores on scale of scientific attitude (SSA) and marks (grades) received by the student in science.

2.2.3 Studies conducted about the influence of Home Environment on achievement

Mishra (1960) conducted a study on the influence of home environment on school achievement. The major findings were,

1) Correlation between home environment and achievement was found to be positive.

2) Correlation between home environment and achievement was more than the correlation between intelligence and achievement.

Douglas (1965) conducted a study on "Home and school: A study of the ability and attainment in primary school". The objective of the study
was to find out the influence of home environment on achievement. The conclusion drawn out the study were,

1) Middle class children showed improvement in their studies.

2) The performance of working class children showed deterioration at different levels of ability.

3) Middle class parents showed more interest in their children’s progress.

Jain (1965) investigated the relationship between home environment and scholastic achievement taking a sample of 504 students of age group 13 to 15 from higher secondary schools of Allahabad. The study showed that the influence of home environment on achievement is positive and significant.

Pavithran and Feroze (1965) studied the influence of learning facilities and socio-economic factors on the academic achievement of tenth standard students. The major findings of the study are,

1) There existed a significant relationship between the scholastic achievement of pupils and educational status of the families.

2) Pupils in the urban areas scored better marks than pupils in the rural areas.

3) The facilities in the home environment seemed to influence the scholastic achievement of pupils, but not too seriously.
Wade (1967) conducted a study on learning science by children whose parents engaged in the study of science with them by helping them to conduct simple experiments and demonstrations and provided materials to assist them, in participating at home, taking a sample of 276 fourth, fifth and sixth grade pupils from California. The study revealed that parent help at home was able to contribute to an advance in the science learning of their children.

Subha (1975) conducted a study on the relationship between home environment and achievement in science. The study found that,

1) The pupils coming from urban areas scored better in the achievement than the pupils in rural areas.

2) There is positive and significant relationship between facilities for study and achievement in science.

3) The performance of pupils who are having equipments for study performed better than others.

4) There is significant difference in scores in the performance of pupils in small and average families, and the difference is seen in favour of pupils in small family.

Chandy (1980) has studied the relationship of family environment to achievement in English. The following were the conclusions,

1) The socio-economic status and achievement in English are related.
2) Family stability, physical facilities, co-curricular activities, parental involvement and motivation for studies and achievement in English are positively related.

Usha (1982) studied about the parental involvement in studies and science achievement of secondary school pupils. The main objective of the study was to compare the parental involvement of boys and girls, pupils studying in private and government schools.

This study concluded that boys and girls do not differ significantly in their parental involvement in studies. Urban pupils were found to be superior to rural, in parental involvement. Parental involvement of high, and middle S.E.S. group was higher than that of low S.E.S. group.

Jagannadhan (1986) conducted a study on home environment and achievement. The sample selected was 200 children of V, VI and VII standards. The study had shown that home environment has got a strong association with academic achievement.

Nair (1987) in a comparative study on certain cognitive, affective and social variables which discriminate between high and low creative underachievers in secondary school science, found that the following familial variables are capable of discriminating the different groups of creative subjects.

1) Father's education and family cultural level.

2) Family environment.
3) Socio-economic status of fathers – fathers’ income level, father’s occupational level, and family acceptance of education.

Majoribanks (1987) has studied the ability and attitude correlates of academic achievement and family group difference. The results indicated that,

1) There are moderate family group differences in children’s word performance and more modest variation in their ability, attitude towards school and mathematics achievement.

2) Ability and school attitudes had differential linear and curvilinear relation to academic achievement for boys and girls from different family groups.

Sreekala (1990) has studied parental involvement in studies and mathematics achievement of secondary school students. The major findings are,

1) Parental involvement in studies of pupils in urban areas is better than that of pupils in rural areas.

2) Parental involvement in studies of pupils studying in private schools is better than that of pupils studying in government schools.

3) Performance of pupils who have discussions with their parents about their studies is better than that of pupils who have poor discussions with parents.
4) Performance of pupils who get good academic help at home is better than that of pupil who get poor academic help at home.

5) Facilities provided for learning mathematics have a positive influence on mathematics achievement.

Sanchez (1991) has studied about parental support and academic achievement. The study explored the ways in which parents encouraged education as a goal, and facilitated and sustained their child's academic achievement from the elementary level through high school. The study showed that academic achievement was a combination of student ability, parent belief and parent support for education.

The study by Ajitha (1992) showed that the relationship between home environment and achievement was negative but for three sub samples, rural, government and private, the relation was significant.

Marope (1992) has studied the determinants of academic achievement and found that home support was an important factor that determines achievement.

Rekha (1994) conducted an investigation into the relationship between home environment and achievement in science of lower primary pupils. The major findings are,

1) There is considerable negative relationship between rejection and science achievement.
2) There is no relationship between family environment and science achievement for the whole sample, boys, girls, rural urban subjects, and government school pupils.

3) There is no considerable relationship between family atmosphere and science achievement for boys, urban subjects and government school pupils.

4) There is no considerable relation between protectiveness and science achievement for the whole sample of boys, girls, urban subjects and government school pupils.

5) There is no considerable relation between behavioural control and science achievement for girls.

6) There is considerable positive relationship between home learning facility and science achievement.

7) There is considerable positive relation between democratic family climate and science achievement.

8) There is considerable negative relationship between authoritarian family climate and science achievement.

9) There is no considerable relationship between family acceptance of education and science achievement.

Vaheeda (1990) conducted an investigation into the relationship between certain biographical factors and mathematics achievement of pre-
degree students. The sample selected was 500 second year pre-degree students. It was found that a significant positive relationship exists between facilities for learning mathematics at home and achievement in mathematics. Also there was significant positive relationship between parental involvement in studies and achievement in mathematics.

Pillai (1987) investigated certain environmental variables causing under achievement in mother tongue of secondary school pupils. The sample consisted of 830 students studying in standard IX of 20 secondary schools from five revenue districts in central and northern Kerala. The study found that the socio-economic status of parent, family environment condition, family cultural level, home learning facilities (though a low extent), caste affiliation and family size are the possible causes of under achievement in Malayalam.

Hannon (1987) has studied the effects of parental involvement in the teaching of reading on children's reading test performance, taking sample of 76 primary school children in a social priority area in North England. The finding of the study was that the parental involvement influences the children's reading test performance positively.

Soto (1986) examined the differences in home environment between higher achieving and lower achieving children. Statistical analysis revealed that significant differences in home environment between higher and lower achieving students. There was significant difference in motivational orientation of two groups also.
Subramanyan (1982) conducted a study to identify the contributing factors of reading achievement, taking a sample of 1200 pupils studying in classes III to VII from Andhra Pradesh. The study showed that home environment plays a prominent role in reading comprehension of children.

Mathew (1998) made a study of the association between home learning environment and socio-economic status on achievement in Mathematics of higher secondary school students of Kollam district of Kerala. The total sample was 600 higher secondary school students. It was found that the obtained correlation coefficient (0.0724) between home learning environment and achievement in mathematics for the total sample was not significant. But significant coefficient of correlation was found among boys (0.1271) and private school students (0.1898), significant at 0.01 level.

Ponnamma (1992) studied the influence of certain family related variables on high and low achievement in Biology at higher secondary level. The study revealed that family climate has an influence on high and low achievers in Biology.

Kumari (1987) conducted a study of the environmental conditions of high and low achievers in social studies in the secondary school pupils. The study helped to realize that environmental factor play a vital role in influencing the academic achievement of students.

A study by Joseph (1998) on process outcomes in physics in relation to some select cognitive, affective, social and environmental
variable showed that coefficient of correlation between home environment for science learning and process outcomes in physics is positive but not significant statistically.

Fehrman, Keith and Reimers (1987) conducted a study on home influence on school learning. The study revealed that environment in home has a meaningful direct influence on school learning.

Joseph (1971) conducted a study on certain factors influencing achievement of high school pupils. The study revealed that there is slight and negligible relationship between achievement and home environment.

2.2.4 Studies conducted about the influence of study habits on achievement

Jain (1967) conducted a study on the study habits and academic achievement of students in Uttarpradesh Colleges. The aim of the study was to develop a study habits inventory of University students of Uttarpradesh. The study also aimed at exploring the relationship between study habits and student's attainment.

A study habits inventory was developed from 8 areas such as understanding, planning, working habits, notes taking, concentration, interest in studies, memorization and consultation habits. Based on face validity preliminary list was tried on a sample of 62 students. Second tryout was carried out on a sample of 100 college students. The final draft contained 90 items. The normative data was collected from a sample of 960, drawn from Universities of Uttarpradesh. The main findings are,
1) Most of the items discriminated sufficiently between various attainment levels.

2) The scores on study habits inventory correlated with attainment.

3) The coefficient of correlation ranged from 0.29 to 0.59 for working habit.

Simon (1970) conducted a study on study habits of high and low achievers in English among secondary school pupils of Aleppey district of Kerala.

The tool used for the study was a questionnaire and sample consisted of 450 students of standards VIII, IX and X. The following were the major findings,

1) There was a difference between high and low achievers in study habits.

2) Study habits of high achievers were better than low achievers.

3) High achievers have a fixed timetable for study.

4) High achievers read silently with concentration and they read at intervals.

5) They also studied their lessons daily.

Seetha (1975) made a study on the psychological and social factors affecting academic achievement. The aim of the study was to examine the psychological and social factors affecting academic achievement and to
examine whether non-achievers as a group differ from the achievers on these factors. The study shows that study habits had a positive relationship with academic achievement, in that high achievers had poor study habits.

Sunderrajan and Lilly (1991) made an investigation about the study habits of 9th grade pupils. Study habits inventory was administered on 480 students from rural and urban areas. Important findings were, Girls are better than boys in respect of their study habits. No significant difference between urban and rural students and also between government and private school students, in respect of their study habits.

Sing (1984) made an enquiry into the study habits of high, middle and low achieving adolescents in relation to their sex, intelligence and socio-economic status. The major finding of the study was, study habits of boys and girls differed significantly at different levels of academic achievement.

Krishnamurthy (1968) conducted a comparative investigation of the study habits of suburban and urban children in some high schools of Coimbatore. The study found a significant correlation between study habits and academic achievement of suburban students.

Jha (1970) examined the nature of relationship between intelligence, study habits, anxiety and S.E.S. on one hand and achievement on the other. This study conducted on a sample of 342 boys and 104 girls found that, there was a significant positive relationship
between achievement in science and study habits in the case of boys and combined samples, but not so in the case of girls.

The study of Prosser and Trigwill (1990) revealed significant relationship between approaches to learning and learning outcomes at the course level.

Kapoor (1987) conducted a study on 695 boys and 700 girls to analyse the factors responsible for high and low achievement and observed that study habits and achievement were positively correlated.

Stanly and Nolen (1985) examined academic performance, study habits, and socio-emotional adjustment of 117 Chinese and Chinese American University students. They found that high achievers have better study habits.

Singh (1986) investigated study habits of adolescents and observed that adolescents whose mothers were employed have significantly better study habits than the adolescents whose mothers were unemployed.

Frust and White (1984) administered the Wrenn study habit inventory to 1128 freshmen of college in order to help to identify subjects needing academic assistance. It was reported that academically successful students responded differently to study habit inventory than the less successful subjects.
Omana (1982) analysed the problem solving habits of college students. She observed positive correlation between study habits and achievement.

Lalithamma (1975) conducted a study on some factors affecting achievement of secondary school pupils in Mathematics. It was observed that achievement in Mathematics was positively correlated to study habits – studying lessons daily, studying mathematics by writing, repetition in learning, speed learning etc.

Mandgil and Handa (1979) conducted a study on nursing students and compared the scores with examination scores. They observed that the student who scored high in University examination also scored high in study habit score.

Patel (1986) made a psychological study on high achievers. The sample consisted of 94 boys and 76 girls studying in medical colleges and found positive relationship between study habits and achievement.

Shivappa (1980) in his study on factors affecting academic achievement of high school pupils found that study habits was positively associated with academic achievement of high school pupils.

Lin and Makeachie (1973) investigated with Brown and Holtman Instrument in America and in Britain revealed that study habits are important factor in academic achievement.
Banerjee et al (1975) analysed the relationship between motivational pattern and study habits of selected college students. He observed that bright students had significantly better study habits.

Joshi and Chaudhari (1972) conducted a study on the study on the study habits of industrious students. It was reported that industrious students have better study habits.

Samuel and Rao (1967) conducted a study on the study habits of Pre-University College students in Coimbatore. The study was based on information gathered from sample of 500 college students of both sexes. The main findings are,

1) There is no difference between study habits scores of boys and girls of Pre-University class.

2) There is statistically no significant correlation between study habits scores and economic background of parents.

3) Silent reading is preferred by 55.8% of the sample while 32% like reading aloud and 12% like group discussion.

Abraham (1970) conducted an investigation into the study habits of high school students in Quilon district of Kerala. The main findings of the study are,

1) The group as a whole had not developed satisfactory study habits.
2) The subgroups, boys and girls on the whole have not developed adequate study habits.

3) The rural and urban group students have not developed satisfactory study habits.

4) Boys and girls do not show any difference in their study habits.

5) Better study habits co-exist with better achievement.

6) There is no significant relationship between study habits and socio-economic status.

7) Older students have better study habits and vice versa.

Nettar (1970) conducted a study on the study habits and achievement of high school pupils in science. The main objective of the study was to explore those habits of studying which are related to high achievement in science and which are the study habits of our pupils. The major findings of the study are,

1) Majority of high school pupils wake up before 6 a.m. and go to bed after 10 p.m.

2) Only 40% of the pupils have a time table for study.

3) Most of the students study their lessons daily.

4) A good number of pupils are in the habit of reading silently and others resort to loud learning.
5) The pupils are to a great extent found to follow the habit of continuous study without indulging in other activities.

6) More than half of the pupils study a subject from beginning to end while others study only those portions that they consider important.

7) Many pupils are in the habit of repeating what they have just learnt.

8) They also revise lessons once in a week and 65% of them prefer textbooks than notes.

In his study Suresh (1991) made an attempt to identify the influence of learning approach on process outcomes in secondary school Biology. He found that there was positive and significant correlation between Science learning approach and process outcomes in Biology. He conducted the study using a sample of 900 standard IX pupils. He concluded in his study that process outcomes can be predicted by employing four independent variables viz. intelligence, parental education, parental occupation and science learning approach.

Stell and Purushothaman (1993) made an enquiry into the study habits and to find out whether study habits of high and low intelligence quotient pupils differ significantly. Important findings of this study were: the under achievers who needed extra attention with reference to the development of better study habits. If suitable instructional strategies are used to develop better study habits among those specific group of under achievers, it will enable the learners to utilize their potential in full.
Otherwise under achievement will continue to obstruct the path towards progress, and the talent and resources of the nation will be wasted.

Beena (1995) conducted a study about the relationship between study habits and academic achievement of secondary school students. A sample of 400 secondary school students were taken for the study. The major findings were,

1) Students from rural schools do not differ significantly from students in urban schools in terms of their study habits.

2) Study habits have a positive and significant relationship with academic achievement.

Chopra and Tiwari (1982) made an investigation into the study habits and academic achievement, and came to the conclusions that there exists a positive relationship between study habits and academic achievement.

Sirohi (2004) conducted a study of underachievement in relation to study habits and attitudes using a sample of 1000 elementary grade students of South district, Delhi. The study indicated the need for guidance programme specially in the area of study habits as this area was found to be deficient in most of underachievers.

Krishnamoorthi and Rao (1969) conducted an investigation on the study habits of the suburban and urban children, to compare the study habits of boys and girls and to find out which of those habits differentiate
high achieving students from low achieving students. Check lists and questionnaires were administered for the study. The results of the study are,

1) High achievers are punctual in going to class.

2) They studied their lessons without postponing and discussed their lesson with their friends during spare time.

3) There was significant correlation between study habits and academic achievement of urban pupils.

Patel (1981) conducted a study on the impact of study habits of intellectually backward pupils upon their academic achievement. He found that, mean scores of study habits of intellectually backward pupils from rural and urban areas do not differ significantly. Mean scores of study habits of boys and girls differ significantly. Both rural as well as urban girls were significantly superior to boys of their respective areas at 0.01 level of significance. The correlation analysis showed that the educational performance of pupils was positively correlated to their study habits.

Pande and Geethadevi (1984) conducted a study on the relationship between study habits and scholastic achievement of secondary school students. The tool used for the study was study habits inventory. They found that study habits have a relationship with scholastic achievement.
Premiata (1986) conducted an enquiry into the study habits and academic achievement among rural girls. The sample selected were 1225 rural girls from std IX and X. Hindi adaptation of Wrenn study habit inventory revised edition was used for measuring study habits. Main conclusion of the study was study habits were highly associated with academic achievement.

Rao, Parvathy and Swaminathan (1983) analysed the study habits of adolescent boys and girls of employed and unemployed mothers. This was conducted as psychological study. The major finding of the study was that boys and girls do not differ significantly with regard to study habits.

Beena (1997) found that there existed a positive relationship between study habits and academic achievement irrespective of sex and management of school. It was also found that in the case of rural students there was no real relationship between the two variables.

Ambili (2001) found that there is significant relationship between study habits and academic achievement for the total sample and relevant sub samples at 0.01 level. The sample for the study was 420 secondary level students participating in sports and games from Kottayam district of Kerala.

A study by Mathai (1998) of the association between study habit and home learning environment in mathematics of secondary school students revealed that study habit and home learning environment were significantly correlated with achievement in mathematics. Multiple ‘R’
obtained is found to be significant and capable of predicting achievement in mathematics, given study habits and home learning environment.

A study conducted by Naseema (1989) on the effect of intelligence and science learning approach on achievement in physics of secondary school pupils revealed that the main effect of intelligence and science learning approach on achievement in physics was significant.

Haynes et al (1988) administered a learning and study strategies inventory to high, average and low achieving students and observed a significant difference between high achieving and low achieving students in study habits and cognitive skills.

In a study by Jamuar (1961) regarding the relationship between study habits and achievement, it was found that there exists a positive correlation between study habits and achievement.

Nancy (2002) obtained significant correlation between process outcomes and most of the dimensions of study habit. Findings suggested that out of seven independent variables studied, few variables viz. preparation for examination, reading and note taking, school environment, habit of concentration together are capable of predicting the process outcomes in biology.

**Summary of Major trends:** The review of related literature on the studies regarding the influence of selected psycho-social correlates on achievement shows that,
1) There is inconsistency in the relationship between achievement and the selected psycho-social correlates such as intelligence, attitude towards science, home environment and study habits.

2) Influence of the selected psycho-social correlates on achievement is reported by only a small number of studies. So further research in needed in this area.

Thus the review of related literature further forms the basis of the selection of the independent variables in this study such as intelligence, attitude towards science, home environment and study habits.