Chapter 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY
1.2 NEED AND SIGNIFICANCE OF THE STUDY
1.3 STATEMENT OF THE PROBLEM
1.4 EXPLANATION OF KEY TERMS
1.5 VARIABLES OF THE STUDY
1.6 OBJECTIVES OF THE STUDY
1.7 HYPOTHESES OF THE STUDY
1.8 METHODOLOGY OF THE STUDY IN BRIEF
1.9 SCOPE OF THE STUDY
1.10 LIMITATIONS OF THE STUDY
1.11 ORGANIZATION OF THE REPORT
CHAPTER 1
INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Education is one of the important human activities, which help the developmental process of a country and the progress of a country today is decided to a great extent by the level of scientific knowledge it has acquired. Science has further enabled human beings to gain supremacy over nature. It has greatly changed the outlook of people about themselves and the world around them. Science is considered as a symbol of culture and enlightenment and as a synonym of progress. “Science is a cumulative and endless series of empirical observations which result in the formation of concepts and theories, with both concepts and theories being subject to modification in the light of further empirical observations. Science is both a body of knowledge and the process of acquiring it” (Fitzpatrick, 1960).

Knowledge of basic concepts in science is very important, to the masses as it enable them to take part in the creation of a society, which is free from different types of social evils and inequalities. The secondary Education commission (1953) recommended the teaching of General Science as a compulsory subject in the high and higher secondary schools.

The report of the Indian Education commission (1966) recommended that “Science and mathematics should be taught on a compulsory basis to all pupils as a part of general education during first ten years of schooling. Also
science teaching should be linked to agriculture in rural areas and to
technology in urban areas.” The national policy on Education (1986) makes it
clear that “science education must be strengthened as to develop in the child
some well defined abilities and values like spirit of enquiry, creativity,
objectivity courage to question and aesthetic sensitivity”.

Science education in school curriculum, especially at secondary
school stage, is a necessity. Due to rapid advancements in the field of
science and technology, new inventions and discoveries are made every day
and some of these have great impact on society. Science education helps the
individual to have a balanced view about the new advancements in the field
of science.

Science education gives training to individuals in scientific method and
helps to develop a scientific attitude and inculcates in them a spirit for
scientific enquiry. Science education provides unique training in truth, imparts
the capacity to know the unknown, and improves the strength to face failures.
These are highly useful and transferable to other life situations also.

1.1.1 BIOLOGICAL SCIENCE

Almost every aspect in the field of biological science is of help in the
day-to-day life of individuals. Knowing about plants and animals in our area
helps us to understand about other plants, animals and human beings.
Development of high yielding varieties of food crops and cash crops was
made possible by the study of biology. Knowledge of biology enabled us to
control different types of diseases, harmful insects and pests. The ill effects of
population explosion can be taken care effectively with the knowledge of biology. Understanding the causes of pollution and developing effective measures to control it are possible only with the knowledge of biology. Knowledge about heredity and genetics has been of immense use especially in the field of agriculture and medical science. Biotechnology and other modern branches of biology have revolutionised the concept of biology itself.

The inventions and discoveries in the field of biological science in different countries benefit people throughout the world. This universal character of biological science can develop a broader outlook on the part of the learner. The achievements in biological science have in fact influenced all sections of modern society. The mind of the individual, who uses the fruits of new developments in biology, determines its use or abuse. This is especially relevant in the light of recent advancements of biology, in the field of industry, agriculture and medicine. The recommendation of the Education commission (1966) highlights the importance of a proper formation of essential concepts in Biology with a 'process' approach. According to it “the concept of Biology as a method of enquiry by means of accurate and confirmable observations qualitatively and mathematically analysed and controlled experimentation should be impressed on the minds of young learners”.

1.1.2 SCIENCE CONCEPTS

Concepts are the basic units of all types of learning and the simplest learning unit with meaning in a scientific discipline is
represented by scientific concepts. The concepts are the ways by which facts and experiences can be integrated and are remain impressed in the mind much longer than facts. Concepts differ from facts at one extreme and from theories or conceptual schemes at the other. Facts outside concepts may be regarded as blind and concepts without facts are useless.

Eminent psychologists and educationists have stressed the importance of concepts in learning, based on their research findings. According to Gagne (1970), concepts and principles may be related to the world and to each other in a hierarchical fashion. If a child does not learn concepts and principles that are lower in hierarchy, the learning of those higher in hierarchy becomes difficult or impossible. Bruner (1975) opined that attaining a concept is beneficial to the individual in several ways – in identifying objects around him, in reducing the necessity of constant learning and in reducing the complexity of environment. Chase (1960) found that knowledge of concepts was necessary in learning problem solving skills. He also found it necessary for children to learn computational skills and to observe details. According to Weil and Joyce (1978), helping children learn concepts and teaching them how to learn concepts is a fundamental purpose of schooling.

In abstract thinking, one makes use of concepts and does not require the perception of actual objects or events. It is considered as the superior type of thinking as it economizes efforts in understanding
and is of great help in discovery and invention. This point to the importance of giving stress to the conceptual structure of science while teaching science subjects. Concepts in science describe a more complex kind of organization than a simple response to a class of objects.

Today's education is expected to produce citizens who can deal with words, concepts and scientific symbols, essential for a successful life in the highly technological modern world. The stress given to the conceptual structure of science will enable the pupil to recognize and understand better the fast changes in the field of scientific knowledge in a better manner. This will facilitate the students to be in a better position in the acquisition of scientific knowledge.

Proper understanding of the basic concepts in a particular subject and having the ability to apply these concepts in different situations are important factors determining a pupil's achievement in that particular subject. Biology teachers, like other science teachers, must pay special attention to the development of concepts in pupils, through direct and concrete sensory experiences as far as possible.

1.2 NEED AND SIGNIFICANCE OF THE STUDY

In the present system of education no stress is given to discriminate between the minimum essential competencies and advanced competencies at a particular stage of learning. The need of the hour is that there must be some method to ensure that every pupil coming from a
lower standard to a higher standard should have a minimum subject competency. It is a general assumption that each stage of learning is self-contained and forms a good basis for the next stage. The teachers of secondary schools believe that the pupils, coming to the secondary level, have mastered the basic material in their primary school level. But in many cases these pupils may not possess even some of the most essential subject abilities, necessary for the stage.

In the secondary schools, there are three groups of pupils, on the basis of their option for science education. Among them, the first group of pupils wants to continue with science for their studies in the higher class. The second group of pupils wants to continue their studies in subjects other than science. There is still a third group who will end their formal education with the secondary school stage. This fact points to the importance of teaching to master scientific concepts at the secondary school stage, especially for the benefit of the last two groups mentioned above, to enable them to lead a normal life in a world which is highly advanced in the field of science.

Concepts in Biology have an impact on the child in different situations in life. The different concepts in Biology regarding the importance in keeping personal hygiene and healthy food habits developed in the early stages of learning will be having lasting impact on the child through out his life. Higher-level concepts in Biology acquired by the pupil in the secondary school level are also having very high transfer value and find much application in different stages of life compared to other science subjects.
One of the main disadvantages of our educational system is that it is operating at the lowest level of efficiency. This system is characterized by poor pupil and teacher performance and it results in much wastage and stagnation. Many of the shortcomings of our education system are due to an incomplete understanding of the pupil and the wrong teaching-learning process followed by the educational institutions. Generally we can say that our system of education is not still able to develop the full potentials of the individual pupils. This inability is mainly due to an improper understanding about the social and psychological background of the pupils and lack of an in-depth understanding of their influence on their academic capabilities.

It is a usual practice of the teachers to follow the same process of instruction to teach the students who differ in psycho-social levels. Such an approach causes a number of limitations in the instruction process and it in turn affects the efficiency of the learning process. This is reflected by the experience of a number of teachers who feel that even after utilizing their maximum abilities and efforts, they are not able to make all the pupils of their class progress at the desired rate.

Formation of concepts in any subject is an individual affair. It is influenced by a number of psychological and social variables. There are apparent individual differences in pupils with regard to their ability to conceptualize.

Attitude towards science is a very significant outcome of science teaching. Learners can adjust themselves well and live as efficient citizen in
a scientifically advanced society, if they have developed the proper scientific attitude. It is a usual observation that pupils with high degree of interest and attitude towards a particular subject show greater academic achievement in that subject.

Positive parental-behavior and home environment are considered to improve the concept formation of children. But in a country like India it cannot at any rate be taken for granted that parents' help is effective and systematic due to many reasons. While in the western countries parents are now being educated as to know how their children are to be guided and supported in their studies.

Intelligence is considered as the greatest boon of nature to man, which has made him supreme among living beings. Proper training of our minds, acquisition of socially desirable habits, developing increased awareness about ourselves, about fellow creatures and the material universe we live in – are all the results of the new ways of thinking and reasoning using our intelligence. Intelligence develops reasoning power and it in turn helps us to discharge our duties efficiently that we can lead a successful life in a given environment.

Study habit is the tendency of a pupil or student to study when the opportunity is given. Recent studies reveal that to maximize the academic achievement of the pupil, approaches to study and study habits of the pupil are also of great importance besides the classroom environment. The establishment of proper study habits in the learners may be taken as one of
the indicators of the efficiency of an educational system. The inability of a system to develop useful study habits in its learners leads to wastage and stagnation.

A comprehensive study intended to identify the important social and psychological variables, which influence a child's academic achievement, and the related pattern of behavior has not yet been taken up under Indian conditions. Knowledge related to this important area of education is mainly obtained from the studies conducted in western countries, where the nature and method of interaction of the different social and psychological variables, type of sample selected etc. are highly dissimilar. The knowledge obtained from a study under Indian condition would be of much value in obtaining a theoretical understanding of the extent of the influence of psychological and social variables, which control the learning and achievement at school level. Further it may also serve to design the instructional practices, which are most suited and relevant to the varied learning situations.

It is true that the teacher cannot alter some of the social and psychological factors, which lead to poor learning. But an advanced knowledge about such factors can help the teacher to understand the students in a better way. He will thus be in a better position to modify the teaching-learning situation to benefit the pupils, drawn from different strata of the psycho-social variables.

The factors, which influence achievement in science, are explored by a number of educational researchers. They have tried to
assess how some of the basic psychological variables like intelligence and different traits of personality influence achievement in science subjects. But whether the same relationship can be carried to other forms of achievement, like conceptual achievement, needs to be studied in detail.

The effect of social and psychological environment on the achievement of pupil in different academic subjects has always attracted wide common and research interest. Many attempts to study the different dimensions of the problem in great detail were done by educational and psychological researchers in different parts of the world. There were some studies to find out the effect of different social and psychological factors including, home environment, study habits, intelligence, attitude towards different school subjects.

The present study is expected to be a first level exploratory study, aiming to investigate the association between the acquisition of concepts in Biology and certain selected psychological and social variables in combination with sex, locale and the type of management of school in which the subjects study. Significant work in this area has not been done and even the reported studies in the present area do not cover the possible correlates of the acquisition of concepts at secondary school level in adequate depth and variety. An overview of the related literature has shown that Intelligence, attitude towards science, home environment, and study habits of the pupil play a prominent role in the concept acquisition of pupils. This necessitates
the investigator to make a proper investigation on the influence of different psycho-social correlates on the acquisition of concepts at the secondary school level. From the investigator's own experience as a secondary school teacher, he has felt that academic excellence, especially in science subjects, is shown by students who have high attitude towards science, intelligence, study habits and home learning environment. In this context the investigator who is specialized in biology decided to conduct a study on the influence of certain psycho-social factors such as Intelligence, Attitude towards Science, Home environment and Study habits on the acquisition of Biological concepts of pupils at the secondary level. Hence the importance of the study.

1.3 STATEMENT OF THE PROBLEM

The present study is entitled as "A STUDY OF THE INFLUENCE OF CERTAIN PSYCHO-SOCIAL CORRELATES ON PUPILS IN THE ACQUISITION OF BIOLOGICAL CONCEPTS AT SECONDARY LEVEL"

1.4 EXPLANATION OF KEY TERMS.

The key terms of the problem under investigation are defined as given below.

Psycho-social: It means involving aspects of psychological and social behavior of an individual. Here (a) 'psycho' means psychological. It is a phenomenon of mind. (b) 'social' means the sociological aspects, which deals with human interactions and interrelations.
Correlates: Correlates, means 'have a mutual relation or bring (one thing) into such a relation (with another)' (Hornby, 1962)

It can also be defined as (1) Something closely resembling or analogous to something else. (2) Either of two correlated variables.

Psycho-social correlates: 'Psycho-social correlates' in this study stands for a representative set of psychological and social variables, which can affect the conceptual achievement of pupils. In this study the psychological variables selected are 'Intelligence', 'Attitude towards Science' and 'Study habits'. The social variable selected is 'Home environment'.

Acquisition: Acquisition means "a new response added to the organisms repertory of responses through learning" (Atkinson, J., Berne, E. & Woodworth, R.S., 1988).

Concept: According to Good (1959), a concept is (1) an idea or representation of the common element or attitude by which groups or classes may be distinguished (2) any general or abstract intellectual representation of a situation, state or affairs or object (3) a thought, an opinion, an idea or a mental image.

According to Fernald and Fernald (1978), "A concept is a general idea formed from experience".
Biological concept: 'Biological concepts' in this study means most important and indispensable concepts in the secondary school subject Biology which cover all the important content areas and are needed to be mastered at a particular stage so that the learner gets a comprehensive picture or idea about this subject.

Secondary Level: The Secondary level is the third stage of school education in Kerala state consisting of standard VIII, IX, and X. In the present study students of standard IX is taken.

1.5 VARIABLES OF THE STUDY

For the present study, the investigator has taken 'acquisition of biological concepts' as the dependent variable. The different psycho-social correlates such as 'intelligence', 'attitude towards science', 'home environment' and 'study habits' are taken as the independent variables.

1.6 OBJECTIVES OF THE STUDY

This study has the following objectives;

1) To identify whether there is significant difference between the sub samples of secondary school students with respect to the selected psycho-social correlates such as intelligence, attitude towards science, home environment and study habits.
2) To understand whether there is significant difference between the sub samples of secondary school students with regard to their acquisition of biological concepts.

3) To identify whether there exists any significant relationship between the acquisition of biological concepts and the selected psycho-social correlates such as intelligence, attitude towards science, home environment and study habits for the total sample, sub samples of secondary school students and sub categories of the selected psycho-social correlates.

4) To find out whether there is significant relationship between the acquisition of biological concepts and combined effect of the four selected psycho-social correlates, for the total sample and sub samples of secondary school students.

5) To compare the relationships between acquisition biological concepts and each of the selected psycho-social correlates of pupils at secondary level.

6) To understand the influence of background variables like sex, location of school and type of management of school on the acquisition of biological concepts as well as on the selected psycho-social correlates of secondary school pupils.

7) To understand the influence of the selected psycho-social correlates on the acquisition of biological concepts of pupils at secondary level.
1.7 HYPOTHESES OF THE STUDY.

The hypotheses formulated for the study are the following;

Hypothesis I

There is significant difference between the sub samples of secondary school students with respect to the selected psycho-social correlates such as intelligence, attitude towards science, home environment and study habits.

Hypothesis II

There is significant difference between the sub samples of secondary school students with regard to their acquisition of biological concepts.

Hypothesis III

There exists significant and positive relationship between the acquisition of biological concepts and intelligence, for the total sample and sub samples of secondary school students.

Hypothesis IV

There exists significant and positive relationship between the acquisition of biological concepts and the attitude towards science, for the total sample and sub samples of secondary school students.
Hypothesis V

There exists significant and positive relationship between the acquisition of biological concepts and the home environment, for the total sample and sub samples of secondary school students.

Hypothesis VI

There exists significant and positive relationship between the acquisition of biological concepts and the study habits, for the total sample and sub samples of secondary students.

Hypothesis VII

There exists significant relationship between acquisition of biological concepts and combined effect of the four selected psycho-social correlates, for the total sample and sub samples of secondary school students.

Hypothesis VIII

There is significant difference between the relationships of acquisition of biological concepts and each of the selected psycho-social correlates of pupils at secondary level.

Hypothesis IX

The background variables like sex, location of school, and type of management of school have significant influence on the acquisition of biological concepts as well as on the selected psycho-social correlates of secondary school pupils.
Hypothesis X

The selected psycho-social correlates have significant influence on the acquisition of biological concepts of secondary school pupils.

1.8 METHODOLOGY OF THE STUDY IN BRIEF

Normative survey method is used for the present study. The major tools used for the collection of data are

1) Test of biological concepts
2) Home environment questionnaire
3) Study habits inventory
4) Scale of attitude towards science
5) Intelligence test

For the selection of sample, stratified random sampling technique was adopted. 800 pupils of standard IX drawn from 20 secondary schools in Ernakulam revenue district were used as the sample for the study. In the selection of sample due representation is given to rural-urban locale of the schools of the subjects, type of management of school and geographical distribution of schools. All the different tools were administered to the selected sample and the data was collected and analysed using appropriate statistical techniques. The major statistical techniques used were the two tailed test of significance of difference
between means, ANOVA, Pearson's product-moment coefficient of correlation, test of significance of difference between coefficients of correlation, partial correlation, multiple correlation, multiple regression analysis and multiple classification analysis.

1.9 SCOPE OF THE STUDY

The present study is an attempt to examine the influence of some selected psycho-social correlates such as intelligence, study habits, home environment and attitude towards science on acquisition of Biological concepts of pupils studying in the secondary schools of Kerala.

Many of the educational thinkers believe that the basic aim of schooling is to help the children learn concepts. But in the present system of education, sufficient stress is not given to the acquisition of concepts in any subject. In the teaching-learning situation, facts are more stressed, but such facts have less transfer value and are not retained for long. So the need of the hour is to ensure that each student, coming from a particular standard to the next higher standard, must have acquired the minimum set of essential concepts expected for that standard.

There are some individual differences in pupils with regard to their ability to acquire concepts in different subjects, owing to a number of psychological and sociological factors. The investigator believes that the influence of the selected psycho-social correlates on the acquisition of biological concepts as revealed by this study will also be applicable to the acquisition of concepts in other science subjects such as physics and
chemistry. The investigator further believes that the results of the study will be useful to have a better understanding of the nature of the acquisition of concepts, which can be utilized to develop better theories about the educational outcomes of different kinds. The findings of the study may be of use to the educational thinkers, school administrators, teachers, parents and all those who are concerned with education to arrange better learning environment so as to benefit each and every student.

A review of related literature shows that studies in the present area of study do not cover the possible correlates of the acquisition of science concepts at the secondary school level under Indian conditions. Hence the present study may be a pioneering attempt under Indian conditions to study the influence of certain selected psychological and social variables in combination with sex, locale and type of management of school on the acquisition of Biological concept of pupil studying in the secondary schools.

In the selection of sample, due representation is given to the urban-rural location of school, the sex of the subjects, the type of management (government / private) and the geographical distribution of schools. The present study makes use of standardized tools to measure the dependent and independent variables. Effort is also made to maintain the ideal test conditions during the administration of tools. This study also uses suitable and reliable statistical techniques to analyse and interpret the data obtained by the administration of tools. For these reasons the investigator hopes that the results of study will be valid and useful.
The investigator hopes that a proper understanding of the nature of the influence of the psycho-social variables on the acquisition of concepts will lead to a better understanding of the nature of the acquisition of concepts itself. Such knowledge will help us to develop better theories about educational outcomes of different kind. This will also enable us to understand in what ways conceptual achievement is identical with or different from the traditional educational outcomes. It is also hoped that the findings of the study can help us to redefine the process of instruction itself that will especially be aimed at the development of higher level learning outcomes, including the acquisition of concepts. These learning activities will be ultimately aimed at the better performance of pupils belonging to different strata in psycho-social variables.

The new knowledge yielded by the present study will be of help to classroom teachers, school administrators, parents and all others concerned with the process of education to get a comprehensive understanding about the underlying factors leading to conceptual achievement and help in the designing of better instructional strategies. This will also facilitate to provide extra-educational treatment like guidance and counselling and other types of individualized programmes for the improvement of each pupil.

1.10 LIMITATIONS OF THE STUDY.

Every effort is made by the investigator to make the study as perfect as possible. In spite of this, the investigator is aware of some limitations of the study. They are the following;
1) The sample selected for the study is only from a single revenue district of Kerala and sample size is limited to 800. A still more generalized result would have been obtained if the sample size were bigger and selected from different revenue districts of Kerala State. But the time factor made the investigator to limit the sample size and confine sampling from a single revenue district.

2) Even though the present study is aimed at the secondary school pupils, the sample selected consists of only standard IX pupils. Standard IX is the middle stage of secondary education and represents the characteristics of secondary school students. Standard VIII, being the entry stage of secondary education, the pupils of that standard may not fully represent the characteristics of secondary level. Students of standard X are not easily available for a study of this nature. Thus the study is confined to the students of standard IX because of these practical limitations.

3) There are no efforts to control or measure the variables like the socio-economic status of the pupils. But it is to be noted that in the present Kerala scenario, pupils of almost similar socio-economic background are present to a greater extent in the Government and private aided schools in Kerala, where this study is conducted.

4) The study is limited to factors influencing the acquisition of concepts in a particular subject, that is Biology. Practical reasons prevented
the investigator from extending the study to the acquisition of concepts in other subjects.

In spite of the above-mentioned limitations, the investigator has made all possible attempts to make the study as reliable, valid and objective as possible. The investigator hopes that the results of this study will be of use to all those who are concerned with the field of education.

1.11 ORGANIZATION OF THE REPORT

The report of the study is organized into five chapters

Chapter One: - This introductory chapter deals in a nutshell with background of the study, the need and significance of the study, the statement of the problem, the explanation of key terms, the variables of the study, the objectives of the study, the hypotheses of the study, the methodology of the study in brief, the scope of the study, the limitations of the study and the organization of the report.

Chapter Two: This chapter examines the studies related to the present problem and summary of major trends regarding the related studies.

Chapter Three: This chapter about the methodology of the study explains the method adopted, the variables of the study, the description of tools, the details of the sample, the procedure for the collection of data, the scoring and consolidation of the data, the statistical
techniques used for the analysis of data and sub categories of the independent variables.

Chapter Four: This chapter presents the detailed analysis and interpretation of the data obtained for the study.

Chapter Five: An overview of the study, the major findings of the study, tenability of hypotheses, the major conclusions arrived at from the study, the suggestions of the study and suggestions for further research are included in this chapter.