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CHAPTER I

CONCEPTUAL FRAMEWORK

1.1. INTRODUCTION

The development of any nation depends on many factors; one of the most significant among the factors is the educational status of the nation. Education especially, school education plays a pivotal role in shaping the personality of an individual. To bring out all round development in children, school education is a key factor because it is during this period that children will be able to learn and understand things properly.

School paves the way for behavioural modifications and strong academic achievement of a child. To children, the first school that is the home and its environment significantly contributes for the academic pursuit of an individual, in addition to creating an atmosphere favourable for the children to gain lot of life-oriented experiences. The home also greatly extends its services to the formal education institution that is the school. Schools also provide necessary opportunity to children not only to grow academically strong but also create chances to the children to experiment their emotional outbursts and modify their behaviour. Every subject of study has its unique aims and objectives, but science learning should especially be rational and sharpens their mental abilities.

The role of school is equally important in shaping the behaviour of children and extending its support like home to carry out the task of educating the child. Apart from these, there are many other factors that influence the academic performance of the child such as intelligence, motivation, interest and hard work, type of content, parental encouragement, facilities both at home and school, medium of instruction, socio-economic status of the family, etc.

Quality education plays a vital role on economic and social development of any nations. OESD (2010) stated that the economic benefits of education flow not only to the individual but also to society through lower social transfers and through the additional taxes individuals pay once they enter the labour market. School education lays the foundation for lifelong knowledge and skill
development of the human kind. School effectiveness refers to the extent to which the goals set by the school management or school boards or school departments of the State governments have been achieved. It is a multi dimensional concept. One of the important measures of school effectiveness is the performance of the students in a public examination. Comparison of performance of students of various schools is no longer limited to national level (Sunil Behari Mohanty, 2009).

1.2. EDUCATION

The necessity of education for individual growth and social development is accepted worldwide. The term education etymologically is derived from the Latin terms, which means “bringing up” or leading out” the inherent potentialities of a child. Swami Vivekananda expressed that “education is the manifestation of the perfection already in man”. Education is a product of experiences and often regarded as synonymous with learning as the acquired experiences of any sort – intellectual, emotional or sensory – motor.

According to John Dewey (1944), “education is the reconstruction or reorganization of experience which adds to the meaning of experience and which increases the ability to direct the course of subsequent experiences”. Education proceeds from birth to death and the school is the primary agency that imparts knowledge and capabilities in educating the child. The main role of education should help the laymen to develop the awakening of curiosity, the stimulation of creativity, the development of proper interests, attitudes, values and the building of essential skills such as independent study and capacity to think and judge for oneself.

The Indian Education Commission (1964-66) observed that “education must serve as a powerful instrument of social, economic and cultural instrument of cultural transformation necessary for the realization of the national goals”. However, education can be formal, non-formal and informal.

1.3. IMPORTANCE OF EDUCATION

The report of Indian Education Commission (1964-66) spelt out that inducement of social change as one of the fundamental functions of education.
Therefore, the realization of country’s aspirations, demands, changes in the knowledge, skills, and values of the people as a whole is the need of the hour. This change in a grand scale is possible only through the process of education. Human behaviour is very flexible. It will adapt itself to the cultural environment. The child’s society begins with parents and siblings and extends through enlarging circles of human relationship. Psychology, sociology, and anthropology play important roles in the interpretation of culture. The study and practice of education must proceed side by side with the study of society. From this it is inferred that education depends on the culture of a society. Personality of an individual is determined by culture. The major aim of education undoubtedly is the attainment of human excellence and perfection, not just in any field of knowledge or activity, but life in totality. Education should be the means to fashion excellent characters out of the very ordinary human raw material.

Education develops the individual like a flower which spreads its fragrance all over the environment. It is not the communication and information by the teacher or the acquisition of knowledge by the child. But it is the total development of the personality. Education is able to instill in the child a sense of maturity and responsibility by bringing in him/her the desired changes according to his/her needs and demands of ever-changing society of which he/she is an integral part. It is only through education that moral ideal and spiritual values, the aspirations of the nations and its cultural heritage are transferred from one generation to another for preservation, purification and sublimation into higher levels of attainments. Hence education is greatly essential for the growth and development of individual as well as society.

1.4. EDUCATION IN INDIA

The system of education in India has confined to the ideals and objectives that the people have changed from time to time to fit the new world in which people are influenced by the Vedas, the Upanishads, the Gita, the Puranas and also by the orthodox and heterodox schools of philosophy. The word education is like a diamond, which appears to be of different colours when seen from different angles. In India, the concept of education is always different from
the western concept of education. Such difference is due to the varied culture of our country.

When the learner comes in contact with real situation, he/she utilizes all his/her past experiences. So, education is considered by the educationists as an active and dynamic process. Education is a social concept, philosophically evolved and psychologically developed.

1.5. STAGES OF FORMAL EDUCATION IN INDIA

The formal education system of India generally includes various stages. They are:

1. Primary / Elementary education
2. Secondary education
3. Higher education.

1. Primary / Elementary Education

J. P. Naik (1968), an eminent educationist of our country has very aptly remarked the importance of primary education as, “the progress of primary education is an index of the general, social and economic development of the country as a whole”. A well planned and properly implemented system of education at this stage pays results in laying down the proper foundation of child’s cultural, emotional, ethical, intellectual, moral, physical, social and spiritual development. It includes the lower primary and upper primary stage. Usually the elementary education starts at 5+ age of a child and completes at the age of 14 as referred in by the article 45, of the Indian constitution.

2. Secondary Education

Secondary education is the important level of schooling that falls between the elementary primary level and higher education level. It can be provided in the name of lower secondary and higher secondary. In view of the importance of the secondary education, the Secondary Education Commission (1952-53) outlined the aims of secondary education in to:
(a) Develop democratic citizenship,
(b) Improvement of vocational efficiency,
(c) Development of personality, and
(d) Development of qualities of leadership.

The secondary education is a crucial stage in Indian system of education, as majority of the students put a full stop for their education and it does not help much to the learner to start a career.

3. Higher Education

Consistent with the national education policy of 1986, government decided to delink pre-degree courses from colleges in a phased manner and to introduce 10+2 system in the high schools and it was named as higher secondary and effected from the academic year 1979-80. In higher secondary education pattern, there are two main educational streams. The first one prepares the pupils for the continuation of high school education as a general spectrum of education, while the second one prepares them primarily for employment as vocational stream of education. As the students are in the adolescent stage, their education is much more important.

Higher secondary education has become an integral part of school education almost during the last three and a half decade or more in our country. It prepares students to the world of work and helps them in making educational or vocational choices. Higher secondary level of education occupies very vital place in our education ladder as it provides link between secondary and higher education. Majority of the students completing higher secondary education either enter the society to make a living or go for higher education including professional courses. The following are the general objectives of higher secondary education:

- It promotes more learning and higher education.
- It helps students develop a realistic self-concept.
- It promotes equality and international co-operation.
• It helps the student for personal adjustment.

• It promotes values, such as common and cultural heritage, egalitarianism including scientific temper, democracy and secularism.

• It reflects on the critical, socio-economic, cultural, moral and spiritual aspects of better equipped citizens.

Today's students learning and achievement are considered as a major issue because it plays a crucial role in students life career on one side and major determinants in assessing the quality of education on the other side. Identifying factors affecting students learning and achievement are considered as an important objective of educators at all levels. Therefore, the condition of student at higher secondary education is an apt subject to discuss the influential and hindering factors that affect their learning and achievement.

1.6. SCHOOL ENVIRONMENT

The School environment can have a dramatic impact on how students learn. It can affect mood, motivation, creativity and productivity of students positively or negatively, or situation that is open, democratic and free may be said to contribute positively to the development of creative potential. On the other hand, a closed society, culture or situation may act as a strong deterrent to the development of initiative within the individual.

A school's environment is the thread that connects the multitude of activities on a campus. In many respects this thread is almost invisible, yet everyone experiences its influence. A school's physical environment includes the school building and the surrounding environs such as noise, temperature, and lighting as well as physical, biological, or chemical agents. The psychosocial school environment encompasses the attitudes, feelings, and values of students and staff. Physical and psychological safety, positive interpersonal relationships, recognition of the needs and success of the individual, and support for learning are all part of the psychosocial environment. Other factors that can affect a school's environment include: the economy; social, cultural, and religious influences; geography; socioeconomic status of students' families and legal, political, and social institutions.
1.7. SIGNIFICANCE OF CLASSROOM

Students experience the classroom as not just an intellectual space, but also as a social, emotional, and physical environment. Classrooms that subtly or indirectly exclude certain groups of students tend to be common from the students’ perspectives; students have a particularly negative reaction to instructors who fail to acknowledge consequential local or national events (Huston and DiPietro, 2007). These implicitly marginalizing classrooms have a negative effect on students’ motivation to learn and cognitive development (Ambrose et al., 2010). Instructors’ attentiveness to the intellectual, social, emotional, and physical environments creates a classroom climate conducive to student engagement with the content and skills of the discipline.

The Indian Education Commission (1964-1966) has aptly stated in its report that destiny of India is being shaped in her classrooms. The shape undoubtedly, will depend on the activities in the classroom and how does it go. A well organized classroom with suitable teaching aids and methods can achieve better results.

1.8. TEACHER AND TEACHING

Pring (2010) rightly pointed out the teaching is a complex reality and teachers, “In the myriad judgments they make every day, would be more professional in those judgments if these were based upon the accumulated evidence from their own practice and from that of the profession as a whole”. Lemov (2010) emphasized, “One of the problems with teaching is that there is a temptation to evaluate what we do in the classroom based on how clever it is, how it aligns with a larger philosophy, or even how gratifying it is to use, not necessarily how effective it is in driving student achievement”.

TALIS (Teacher and Learning International Survey) Report (OECD, 2009) presented an analytical model of the associated factors of an efficient education which has the following variables: teachers’ characteristics; school and classroom characteristics; professional development characteristics; teaching practices and beliefs; school evaluation characteristics; teachers’ praise and feedback; and leadership style. a direct relationship between the perception of a positive school
climate and well-being of students. A school that promotes a sense of belonging and having support facilitates students' personal and social development and their well-being (Cristina Rocha Vieira and Maria Filomena Gaspar, 2013).

1.9. CLASSROOM CLIMATE

Classroom climate refers to the prevailing mood, attitudes, standards, and tone that the teacher and his/her students feel when they are in the classroom. A positive classroom climate feels safe, respectful, welcoming, and supportive of student learning. A negative classroom climate can feel hostile, chaotic, and out of control. The classroom climate doesn't just happen, it's created. Regardless of the students' past experiences, there are things the teacher can do to deliberately shape the climate of his/her classroom into a positive learning environment.

The concept of climate or environment, as applied to educational settings, refers to the atmosphere, ambience, or climate that pervades the particular setting. Research on classroom environments has focused historically on its psychosocial dimensions – those aspects of the environment that focus on human behavior in origin or outcome (Boy and Pine, 1988).

Adelman, H. S. and Taylor, L. (2013) referred as classroom climate sometimes is referred to as the learning environment, as well as by terms such as atmosphere, ambience, ecology, and milieu. The impact of classroom climate on students and staff can be beneficial for or a barrier to learning. Classroom climate is a perceived quality of the setting. It emerges in a somewhat fluid state from the complex transaction of many immediate environmental factors (e.g., physical, material, organizational, operational, and social variables). Both the climate of the classroom and the school reflect the influence of a school's culture, which is a stable quality emerging from underlying, institutionalized values and belief systems, norms, ideologies, rituals, and traditions. And, of course, classroom climate and culture both are shaped by the school's surrounding and embedded political, social, cultural, and economic contexts (e.g., home, neighborhood, city, state, country). Key concepts related to understanding classroom climate include (a) social system organization, (b) social attitudes, (c) staff and student morale, (d) power, control, guidance, support, and evaluation structures, (e) curricular and instructional practices, (f) communicated expectations, (g) efficacy, (h)
accountability demands, (i) cohesion, (j) competition, (k) the "Fit" between key learner and classroom variables, (l) system maintenance, growth, and change, (m) orderliness, and (n) safety.

In terms of the intellectual environment, instructors provide content in an organized and engaging manner and give students motivating and challenging practice so that they are able to do authentic tasks in the discipline. From the emotional aspect of classroom climate, instructors create an encouraging atmosphere where students feel safe taking risks, receive support when events intrude on learning, and believe they can succeed if they put forth effort. And instructors foster approachable and supportive social interactions with students and among students so that learning is a collaborative and not competitive endeavor. With respect to the physical environment, instructors reduce and remove disruptions and barriers to learning so that all students can equally access course material and content.

According to Brian Leung and Jessica Silberling (2006), classroom climate, though difficult to define and assess, affects student learning especially in the elementary schools. Much of the current research focuses on the primary architect of classroom climate--the teacher. There is little doubt that teacher behaviors determine the overall climate of the classroom, but peer actions and reactions also significantly affect classroom climate for individual students. An informal method, sociogram, is described for use by school psychologists in collaboration with teachers to confirm social peer status and hierarchy in the classroom. Sociogram help to identify the need for individual and/or classroom-wide intervention; and the data can also be used to assess effects of such interventions. And it can supplement teacher observations to promote a positive learning environment for all students.

1.10. CLASSIFICATION OF CLASSROOM CLIMATE

The classroom climate is classified into two major groups:

1. Physical climate
2. Physiological climate
Physical climate is divided into two dimensions and physiological climate is further divided into five dimensions. They are as follows.

### 1.10.1 Physical Climate

The factors and forces that influence passively the phenomena of the classroom are called structural climate or physical climate.

**Dimensions of physical climate**

i) Situation and Facility

ii) Instructional Aids

### 1.10.2 Physiological Climate

The factors and forces that influence activities of the phenomena of the classroom are called physiological climate or functional climate.

**Dimensions of Physiological Climate**

(i) Teacher and teaching

(ii) Utilisation of instructional aids

(iii) Learner and learning

(iv) Teacher – pupil relationship

(v) Classroom management

#### 1.10.1.1 Dimensions of Physical Climate

(i) **Situation and Facility**

Architectural aspects, spatial arrangement, size and density of the classroom, storage issues, i.e., action space facilities like ventilation, lighting, type of building, provision of instructional aids, facility for health and hygiene etc. are grouped under situation and facility.
(ii) Instructional Aids

Instructional aids reduce verbalism, stimulate self-activity and contribute to the depth and variety of learning. Charts, various kinds of boards, models, working models, films, radio, television, and video and other demonstrative devices, etc., are instructional aids. The presence of instructional aids according to the need of syllabus promotes the spirit of the classroom and helps the teacher to have confidence on his teaching goals. It increases self-concept and creativity among both students and teachers in classrooms.

1.10.2.1 Dimensions of Physiological Climate

(i) Teacher and teaching

(ii) Utilization of instructional aids

(iii) Learner and learning

(iv) Teacher – pupil relationship

(v) Classroom management

(i) Teacher and Teaching

Influence of teacher personality has direct and cumulative impact in the classroom. Teacher has multifaceted role and acts as a friend, philosopher and guide.

Teacher – teaching approaches,

1. Teacher’s personality traits
2. Teacher’s behaviour and activities
3. Products of teacher’s efforts, etc. are considered

Teachers may be inquisitive about knowing and exploring the conditions under which a classroom phenomenon takes place. Teaching is more than the aggregate of many acts associated with the classroom. It includes also the total influence of the teacher that the teacher expects on his learners both within and outside the school. Teacher acts upon many aspects of teaching like directional
aspect, motivational aspect, attitude development aspect, technical aspect, personal aspect, etc.

The effectiveness of teaching is affected by the following aspects:

Teacher competencies, mastery of subject matter, physical and health status, personal attributes and emotional control, understanding of human nature and development, knowledge and appreciation of learning principles, sensitivity to and appreciation of differences continued professional and cultural improvement, investigation of teaching success, etc. These are considered and imparted here as they actively play their role to form the part of the classroom climate.

(ii) Utilization of Instructional Aids

Presence of instructional aids fulfills the physical climate as a component of it. When the aids accordingly are utilized to the necessity of teaching learning process, they make direct and active influence on the functional climate inside the classroom. Things taught in a concrete way can be pasteurized and produced in their own way using skills of applications. To bring things collectively into the classroom teaching aids should be used to the medium.

Teaching is rooted in learning and learning is rooted in sensation. So, utilization of sensory experience by audio visual aids can make better classroom activity and achievement.

(iii) Learner and Learning

The learner is the central point in the classroom in teaching – learning process and he himself becomes an interacting factor of the classroom climate. Learning process also becomes a factor in the classroom climate. Learning is subject centered. A set of learning materials using a correct method, can create learning situation. In our system, a teacher is core responsible for bringing about learning of a group of learners. Learning is a change in behaviour as a result of experience. Learning process leads to learning outcomes which determine the achievement. Learning problems occur frequently at all grade levels and among different types of students.
(iv) Teacher - Pupil Relationship

It is a bilateral process which can enhance rapport between the teacher and the pupil. The interaction between a teacher and a student determines the gap between them and thereby becomes an affecting factor of the classroom climate.

Teacher – pupil role expectation and role behaviour are essential. Teacher – pupil perceptions of one another may have considerable impact on teaching – learning process, in the classroom. The following activities may promote a reasonable good relationship between a teacher and the students.

Ignoring the misbehavior, providing the enrichment activities and specialized assistance, reasoning with children, availing assistance and participation of pupils, sense of humour, guidance and counseling, helping to attain realistic goals etc. are to be considered in the classroom.

(v) Classroom Management

Classroom management becomes an important force in the classroom climate as it creates the situation for teaching – learning process inside the classroom. Discipline and classroom control that favour and promote the learning inside the classroom. Learners are ego – centered and ‘self image’ of them in a group of learners can lead to mischievous activities in the classroom, which may have considerable impact on the classroom climate. Rewards and punishments, enthusiasm, individualised school work, electing monitors, classified academic works, utilisation of appropriate teaching aids, etc are generally suggested for classroom management.

1.11. TOOLS TO ASSESS CLASSROOM CLIMATE

In educational setting, the main focus of classroom climate is to facilitate the learners to learn completely the subject taught to them within the four walls. To know the status of classroom climate, many traditional and modern methods of evaluation and tools are used. The means and methods of evaluation vary from oral test to online test. However, classroom climate inventory is considered the most reliable and practicable one. Therefore, the researcher has planned to adopt
the tool Classroom Climate Inventory constructed and validated by Rajkumar (1984).

1.12 CLASSROOM CLIMATE AND ACADEMIC ACHIEVEMENT

Quality of education is determined by the climate of the classroom. The structural and functional characteristics of classroom climate play an important part in this direction. The physical and physiological characteristics interact to produce a climate that can be significant to both the individual and the classroom. The individual in a classroom setting becomes the environment of one another.

The general atmosphere of a classroom may be characterized in many ways. That is a classroom climate may be competitive rather than non-competitive, restrictive rather than permissive, and elitist rather than universal in orientation. These properties will express themselves the physical facilities, presence and use of instruction aids, teacher-teaching approaches, learner – learning process, teacher – pupil relationship and classroom management in a classroom.

1.13. ACADEMIC ACHIEVEMENT

The word 'achievement' means 'performing successfully or things have been done successfully, especially with effort and skill', and 'academic' means 'of schools and education'. Thus 'academic achievement' refers to educational performance of the students studying at schools. It indicates how far they are successful in acquiring knowledge, understanding and skills in different subjects imparted to them in the schools (Hazarika, M. 1998, in Manju Chutia Saikia, L. R, 2013).

In the present society, education is widely understood as an important factor for scientific, economic development and growth of a nation. The importance of achievement in educational institution is a matter of great social concern. It has become imperative for educators to ensure maximum achievement of all students enrolled for higher education, both for the benefit of the society and for the individual himself. In spite of numerous reforms that are being made for maximizing the academic achievement of pupils in educational institution it is difficult to research the target set for this purpose.
Achievement is the end product of all educational endeavours. The main concern of all educational efforts is to see that the learner achieves quality control, quality assurance and of total quality management of achievement has highly gained the attention of researches in education.

1.14. ACADEMIC ACHIEVEMENT IN SCIENCE

Academic achievement is related to the acquisition of principles and generalisations and the capacity to perform efficiently certain manipulations of objects, symbols and ideas. Assessing the students progress means “identifying what he has achieved”. The necessity of developing the personality of a child specially depends on the intellect and scholastic status. The classroom is greatly responsible for any academic achievement which the child is expected to acquire.

1.15. SCIENCES AND ITS NATURE

Science is one of the great expressions of humanity. The life style of every individual on earth is affected to some extent by the aspects of this human endeavour. Further, its potential to alter life styles has been increasing at a greater rate day by day. In India, continuous advances in scientific and technological research have led to the growth and greater applications of science in contemporary society. Therefore, science becomes a primary area in education at all levels of education, especially at the school education stage.

James B. Conant, an eminent scientist and educator has defined science as, “an interconnected series of concept and conceptual schemes that have developed as a result of experimentation and observation, and are principal to further experimentation and observation”. Science as a body of knowledge is characterized by the organized structure of knowledge that forms its core and the processes by which, this knowledge is generated. Science has within its purview numerous bits of information concerning diverse phenomena.

These bits of information are arranged in a classificatory system governed by a set of generalizations which in turn are subsumed by certain laws, principles and theories ultimately terminating in a limited member of major conceptual schemes. Thus organizational structure of science can be viewed as pyramidal. The core knowledge of science forms an internally consistent structure.
Also, since science purports to understand and explain natural phenomena, its core knowledge has necessarily to be consistent with whatever information available about the natural phenomena. New information is accepted only if it does not disturb this consistency. If it does, then either it is rejected as invalid or it creates a dissonance within the structure, which may lead to a structural reorganization. This process highlights how knowledge is generated in science.

Beginning with parental care and continuing throughout life, the development of science contributes significantly to the well-being of the individual. Science is man's weapon to cope with nature and weaknesses in his own body. Therefore, one can define science as, "an adventure of the human spirit. It is an essentially human enterprise stimulated largely by disciplined imaginations and based largely on faith in the reasonable order and beauty of the universe at which man is part". Science is a cumulative and endless series of empirical observations which result in the formation of concept and theories, with both concept and theories being subject to modification in the light of further empirical observations.

There are many branches or fields of science. In general, they fall into three broader groups, namely physical, chemical and biological science. The physical science deals with matter, energy, movement and the structure of the universe. They are also concerned with machinery and technology. Chemical sciences include the study of substance and chemicals, what they are made of and how they differ from each other in their many properties and features. Another important area of chemistry is how substances or chemicals change when they combine or react together. The biological sciences cover life and living things in all their forms, from microscopic germs to giant redwood trees and blue whales. They concern how they survive, move about, feed, breed and interact with their surroundings or environment.

1.16. IMPORTANCE OF SCIENCE EDUCATION

Science education occupies a prime place in curriculum both at school and university stages of education in our country. Continuous advances in scientific and technological research have led to the growth and greater application of science in the day-to-day life of contemporary society. Hence,
science becomes a priority area in education, right from the elementary education level to the higher education level. Science education is supposed to perform mainly two fold tasks. The prime objective, in individualistic perspective, is the cultivation of a scientific temper, which includes a spirit of enquiry, a disposition to reason logically and dispassionately, a habit of judging beliefs and opinions on available evidence, readiness to reject unfounded theories and principles, the courage to admit facts, however, unseting or disagreeable they might be, and finally, recognizing the limit of reasoning power itself. Science education also gives individuals a firm grasps of the concept and processes of science and impart them the ability to the scientific method of problem-solving and the techniques of observation and experimentation in handing complex problem in life. From the social aspect, the major objective of science education is to equip individuals to participate in the creation of society free from poverty, hunger, disease and evils such as violence, exploitation, oppression, etc.

The government, educationists, great thinkers and public in general are interested in good education which will result ultimately in human upliftment. Good education is a resultant of our educational policy and educational system. Our educational system is basically characterised with well planned and well organised formal education. Schools are responsible for the fulfillment of successful formal education. The percentage of result is taken into consideration for its success.

1.17. BIOLOGY

1.17.1. Definition and Meaning of Biology

Biological science is the study of life and living organisms. It is also called as “biology”. The Greek word ‘bios’ means ‘life’ and ‘logos’ means ‘study of’. In the late 1700s, Pierre-Antoine De Monet and Jean Baptiste De Lamarck coined the term ‘biology’.

Comprehensive dictionary of education (2008) refers to “biology as the scientific study of living things, both plants and living creatures”.

Gabrielle I. Edwards and Cynthia Pfirrmann (2009) stated, “Biology is the science that studies life and living things, including the laws that govern the
events of life”. Every type of life from the smallest microscopic living particle to the largest and most imposing plant and animal species is included in the study of biology. Biological study covers all that are known about any plant, animal, microbe, or other living thing of the past or present. Biology is a natural science. It is the study of individual life forms within the world of life known as nature. It is the science of fishes and fireflies, grasses and grasshoppers, humans and mushroom, flowers and sea stars, worms and molds. It is the study of life on top of the highest mountain and at the bottom of the deep sea. Whole living things are termed as organisms. Organisms if too small to be seen through microscope are called microorganisms or microbes and if visible by normal eye are called macro organisms.

Biology is an extensive study covering the minute workings of chemical substances inside our cells, to broad scale concepts of eco-systems and global environmental changes. It is also concerned with the physical characteristics and behaviours of organisms living today and long ago, how they came into existence, and what interactions they possess with one another and their environments. In the study of details of the human brain, the composition of our genes, and even the functioning of our reproductive system are dealt with in biological science. However, today it is also called by a new name, ‘life sciences’. Life sciences can be defined as ‘a systematic study of living things or study of nature’.

1.17.2. Branches of Biology

Biology is basically divided into three branches: pure sciences, applied sciences and related branches. Pure sciences are botany and zoology, which deal with the basic aspects about the plants and the animals respectively. Applied sciences have arisen from the pure sciences to study in detail the particular fields, leading to entomology, ethology, ichthyology, herpetology, ornithology, primatology, mammalogy, anatomy, physiology, cytology, molecular biology, ecology or environmental biology, embryology, evolution, genetics, histology, paleontology, taxonomy, endocrinology, microbiology, biochemistry, biotechnology, bio-medical engineering, bio-informatics or computational biology, genetic engineering, nanotechnology, marine biology, behavioural sciences, bio-physics, bio-statistics, genomics, etc. Now, the branches that have
arisen from the pure sciences emerged as separate subjects for research and developments.

1.17.3 Scope of Biology

The knowledge of biology is useful to know about the morphology, cytology, physiology, and reproduction of living organisms. It helps the individual to know the ecological relationships and evolution of organisms on this earth. The knowledge of biology also helps in understanding the biochemical processes and the metabolic reactions occurring in the living cells. It throws light on the genetic material occurring in the living cells. It throws light on the genetic material the DNA, RNA and their role in heredity and reproduction. It provides knowledge about the nature and importance of microorganisms on this earth. It also gives an insight into applied and advanced scientific subjects like biotechnology, molecular biology, biophysics, astrobiology, etc.

Biologists study many different facets of life from the molecules that make up individual cells to bring about the behaviour and ecology of animals and plants. Their studies encompass both basic and applied science because today’s biologists play an increasingly important role in the progress of agriculture, human and animal health, in business and industry.

Whether in the laboratory, in the office, or in the field, biologists meet the daily challenges of preserving the environment, developing new drugs against diseases, increasing agricultural productivity, and expanding the understanding of basic processes of life. There is an increasing need for biological scientists to meet these challenges.

1.17.4. Importance of Knowledge on Biology

The knowledge of biological science helps the students as stated below:

- To develop the individual’s sensitiveness to nature and make him/her feel at home with it.
- To explain the living world in terms of scientific principles and appreciating why organisms behave indifferent ways, and show capabilities, which differ from one another.
- To satisfy the curiosity of students.
- To generate interest about his/her surroundings.

The acquaintance of biology is a backbone of development of human race. Biological science helps in understanding the origin of life on earth, and also-

- It helps in development of appreciation of nature and its environment.
- It helps man to value the existence of other living organisms on earth.
- It develops discipline and orderliness in individual’s life.
- It develops the power of observation and critical thinking and trains in problem solving.
- It develops scientific attitude and scientific methodology.
- It correlates the knowledge of other subjects with life of the individual.
- It develops open mindedness and truthfulness and prepares the individual to lead a modern life style.
- It helps the individual to apply the important concepts like nutrition, health, natural resources and for the betterment of his/her existence.
- It helps the individual to play a fruitful role in a society as responsible human being of society.
- It improves scientific understanding and develops love for fellow human beings and other living things.
- It improves scientific understanding of nature, impact of pollution and various disasters, consequences of diseases and treatment procedures, modern fertilization techniques, new live-stock developments, etc.

1.18. IMPORTANCE OF BIOLOGY EDUCATION

Biology is considered as an important subject in school curriculum as many professional and applied courses, directly or indirectly use the knowledge of biology. Moreover, the present age is the era of science and more number of
people are being employed in scientific pursuits which require knowledge of biology.

Biology education is also necessary because of its immense value in the students' individual life as well as in society.

Biology is essentially a secondary school subject. At this level, it may be taught as a subject in its own right or as part of a broader science course identified by a variety of titles, integrated science, general science and modular science, etc. The discipline may also feature as a component of courses in physical or biological sciences.

The most significant aspect of modern science is the impact it has had in solving a variety of problems of practical and technological importance as well as those related to the pressing problems of mankind. A large number of these problems requires a proper understanding and application of chemical principles and processes.

Everybody needs sufficient knowledge of biology to function effectively in the present day society. At present the Indian society is being influenced by new drugs, synthetic materials, green revolutions in agriculture, micro-computers, micro-electronics, etc.

In developing human resources we should aim at providing high quality education in biology. Such an education should provide opportunity for working in laboratory and for solving mathematical and intellectual problems. Students should be encouraged to investigate, to explore, to use the library, to use the natural environment and to discuss chemical concepts and issues in order to provide them with sufficient opportunity and experience to cope with benefits from products and processes of biology throughout their lives.

The following five reasons can be easily identified for the need of teaching biology.

(i) Those who are interested to become future chemists.

(ii) Those who are interested in other science-based professions (e.g. biological and earth scientists, engineers, physicians, nutritionist, etc.)
(iii) Those who are interested to become technical personnel. They will comprise the support system for science and technology.

(iv) Those who are likely to join industries, in health sciences and in agriculture.

(v) To ordinary citizens, to understand the influence of biology in their daily life.

1.19. AIMS OF TEACHING BIOLOGY

A. GENERAL AIMS OF TEACHING BIOLOGY

The aim of teaching biology refers to the advantages that can be drawn or purposes that can be served by the study of biology. The important aims of teaching biology are as follows:

1. Knowledge Aim

The teaching of biology should increase the knowledge of the individual and such an increase in knowledge should help him/her in understanding him/herself and his/her environment. Thus this knowledge should help him/her in his/her daily life.

2. Practical Aim

The knowledge gained should be of practical use to an individual. The individual should not only know the principles and facts but should be able to use these principles in understanding his/her environment. For this the knowledge should be related to the materials with which the pupil is familiar and should not be based on obsolete devices and ideas.

3. Development of Scientific Attitude

Biology being a science, it aims at the development of scientific attitude among the learners. It should be helpful in removing the superstitions, false beliefs, wrong notions spread in the society and cultivate the habits of proper reasoning, observation and experimentation. One of the major aims of biology like any other science subject is to develop scientific attitude and science related
values amongst students. It should train the student in the method of science and should help develop in scientific temper.

4. Cultural Aim

Present day civilization owes much to the development of biology and for any further development the humans have to strive for progressive improvement in the study of biology. For this the subject biology should be taught in schools in such a way as (i) to grasp the progress in the field of biology (ii) apply it for the enhancement of cultural heritage and the development of civilization, and (iii) appreciate the study of biology in the progressive and development of culture and civilization.

5. Social Aim

The study of biology should help inculcate social virtues among the students for leading a well adjusted social life and contributing significantly towards welfare and progress of society. It should imbibe in him/her essential social qualities and virtues for becoming a responsible useful citizen.

6. Vocational Aim

The knowledge of biology in the present day world is essential for almost all the professions and vocations. To achieve the vocational aim, students must be prepared for the different occupations and vocational courses. This knowledge should also provide them with proper opportunity for adoption of some biology hobby and engage themselves in small scale industries and self-employment projects.

7. Utilization of Leisure Time Aim

The knowledge of biology should be useful to an individual to learn ways and means of utilizing his/her leisure hours more fruitfully.

8. Psychological Aim

Teaching of biology provides to an individual with various opportunities for satisfying his/her varying psychological needs and this helps him/her grow and develop as a well balanced individual.
9. Skill Aim

Like any other science subject, the teaching of biology should aim to develop useful skills pertaining to scientific observation, experimentation and practical use of scientific facts and principles.

B. Specific Aims of Teaching Biology

In 1950 a report was published by ministry of education, government of India which listed the aims of teaching of biology in schools as follows:

1. Aims of Teaching Biology up to Middle School Level

   a) To develop interest in nature and environment.

   b) To develop creativeness and inventiveness of students.

   c) To inculcate scientific methods.

   d) To develop ability to generalize facts.

   e) To make them understand various social implications of biology.

   f) Development of some biology-based hobbies and leisure time activities.

2. Aims of Teaching Biology at Secondary Level

The major objectives of the biology syllabus developed for secondary schools in India by national council of educational research and training (2001) are given below:

   i. to strengthen the concept developed at a secondary level and further developing near concepts to provide a sound background for higher studies.

   ii. to develop a competence in students to offer professional courses like engineering, medicines, etc as their future career.
iii. to acquaint the students with different aspects of biology used in
daily life and enable them to recognize that biology plays an
important role in the service of man.

iv. to expose the students to different processes used in industries and
their technological applications.

v. to provide relevant content materials useful for vocational course.

vi. to develop an interest in students to study biology as a discipline.

Therefore biology teaching is to enable students to adjust to their
environment after understanding it; to help them get a feel of scientific methods;
and to develop scientific attitude and scientific temper in them.

3. Aims of Teaching Biology at Higher Secondary Level

The higher secondary education curriculum provides a much better
educational programme for its learners than the high school education. The
subject matters are more closely connected with the needs of the pupils of that
stage. It teaches many things well to those learners and help them plan for their
future.

The curriculum at higher secondary level offers the two-year course with
different combinations of subject (each combination has four subjects) along with
the first and second language as given below:

**Group – I** Consists of mathematics, physics, biology, and biology or
computer science.

**Group – II** Consists of physics, biology, botany and zoology.

**Group – iii** Consists of commerce, accountancy, economics, and history or
computer science

**Other Group:** Some other groups have some other different combination of
subjects.

The higher secondary education helps in meeting the needs of two
general categories of pupils namely, those who plan to continue their further
education in different forms, and those who wish to end their formal education and search for some kind of employment.

The subject biology is given much importance for those who plan to continue their education further. The marks scored in biology at higher secondary level are counted for the admissions into engineering, medical, agricultural and other such professional courses, besides admission to arts and science degree and other diploma courses. Hence, the marks scored in biology subject at the higher secondary level have immense importance in deciding the future prospect of adolescent’s education and career. The knowledge in biology is also useful for those who quit the formal education and search for an employment or for self-employment.

1.20 STATUS OF BIOLOGY TEACHING AT HIGHER SECONDARY LEVEL IN TAMILNADU

Education at higher secondary level is the most important and a turning point in the life of students. The marks he/she obtains in the higher secondary examinations lay the basis for his/her future education and profession. A good syllabus and its materials (textbook, workbook, and etc.) Certainly help the learner to attain good marks. In this aspect higher secondary syllabus is more important.

In India, especially in Tamilnadu, the patterns of education namely, state board, central board of secondary education (CBSE), and Indian certificate on secondary education (ICSE) are being practiced to impart education at schools. Among these patterns, the matriculation and state board schools have the same syllabus framed by the board of higher secondary education, Tamilnadu. There is a general notion that the CBSE pattern has a quality syllabus which is helpful for the learners to face the challenges of the present demands. Hence, in order to improve the quality of education at higher secondary level in matriculation schools and state board schools and equip the learners to face the multifaceted academic challenges, the board of higher secondary education, Tamilnadu along with the expertise of experts in the field of education revised the syllabus at higher secondary level during the academic year 2004 – 2005. The subject biology was one among them, which was revised during that time.
Whenever a syllabus is framed, it may be analyzed by the experts in the field, subject teachers, and researchers to assess the adequacy of the content matter, illustrations given, exercises and practices specified. Besides, the authorities have planned for the in-service training for teachers and arranging the demonstration classes for the students to improve the teaching-learning process on each subject. In biology too, the suitability and adequacy of the syllabus was analysed, based on the suggestions from the teachers and experts some portions were eliminated and some changes have been made in the syllabus. Necessary in-service training programmes were organized for teachers and demonstration classes for the learners too. But still the learners felt it difficult to learn the concepts in biology and obtain low achievement scores except a small margin of students. Hence, a study is needed to know the achievement in biology of standard xi students.

1.21 DIFFICULTIES IN LEARNING BIOLOGY AT HIGHER SECONDARY LEVEL

Biology is a well-disciplined subject, which deals with abstract concepts and living things. It has its own language, its own tools and mode of operation to help people in proper understanding of the nature’s work and complicated problems of life.

In the present classroom settings, at higher secondary level, majority of the biology concepts and ideas are often conveyed using a specialized, highly condensed picture/model system to reflect the relationship between and within the living beings and systems. In doing so, the system acts as a kind of functions. The relationships among the organs or organisms can be simultaneously represented. The name of the organs or process has become a barrier to understand the ideas and concepts clearly. Hence, majority of the pupils feel that learning biology is difficult and challenging at higher secondary level.

1.22 ACADEMIC ACHIEVEMENT IN BIOLOGY

Academic achievement is the important end products of academic endeavours at all levels of education. Chamundeswari, S. and Uma, V.J. (2008) stated that the achievement of students in the class is not only influenced by the
motivation of the teachers but also by a positive classroom climate. A classroom is a unique place marked by interpersonal relationship among its members. This interpersonal relationship precisely acknowledges the teacher-student relationship and the peer relationship. In addition to academic achievement in biology has great significance in the present day situations than the achievement in other subject areas such as languages, mathematics, etc. Research studies on academic achievement indicate the socio-personal factors such as family and parental characteristics, nature and type of school or educational institution, cognitive aspects, affective factors, learning style, personality characteristics, etc.

1.23 TOOLS TO ASSESS ACHIEVEMENT IN BIOLOGY

In educational setting, the main focus of teaching is to facilitate the learners to learn completely the subject taught to them. To know the status of academic achievement of students many traditional and modern methods of evaluation and tools are used. The means and methods of evaluation vary from oral test to online test. However, the achievement test in biology is considered the most reliable and practicable one. Therefore, the researcher has planned to construct and administer an achievement test in biology.

1.24. DOWNFALL OF RESULTS IN VELLORE DISTRICT

Downfall of percentage of results occurs in Vellore District pertaining to some of the problems in schools and classrooms such as administrative inconvenience, inefficient leader, poor maintenance, inadequacy of library and laboratory facilities, non-utilitarian function and unsuited audio-visual aids according to the syllabus, etc. They are to be overcome as they tend to decline motivation and interest among pupils. They ultimately lead to the downfall of percentage of results. Teacher’s shortage due to frequent transfer and unfilled-up vacancies, increased teacher-pupil ratio etc., may affect the implementation of our educational goals. Students’ carelessness and irresponsible behaviour lead them to malpractice during examination.

Strange effect of foreign language like English, ego problem of adolescence among higher secondary level students and gap between teacher – pupil relationship, for want of rapport between them may cause deterioration of
classroom climate. Boarding schools fail to achieve more, thereby affecting enrollment in higher secondary schools and also the quality of basic knowledge is affected, schooling of students affected by locality, want of accommodation and essential facilities etc., in our schools.

The new trends in methodology and innumerable teaching devices have made teaching more concrete than before. The pupils today have adequate information, pertaining to the various aspects of human life. There is a need for modification in the existing environment in schools. The above said problems totally and consequently may cause the downfall of percentage of results in many schools.

1.25. NEED AND IMPORTANCE OF THE PRESENT 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 knowledge/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 higher secondary schools believe that the pupils, coming to the higher secondary level, have mastered the basic material in their secondary school level to higher secondary level. But in many cases these pupils may not possess even some of the most essential subject knowledge, necessary for the stage.

In the higher secondary schools, there are three groups of pupils, on the basis of their option for biology education. Among them, the first group of pupils wants to continue with biology for their studies at the higher class. The second group of pupils wants to continue their studies in subjects other than biology. There is still a third group who will end their formal education with the higher secondary school stage. This fact points to the importance of teaching to master scientific concepts at the higher 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 especially biology.
Concepts in biology have an impact on the child in different situations in his/her 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 throughout his life. Higher-level concepts in biology acquired by the pupil in the higher 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. Most 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, our system of education has some sort of pitfalls that 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.

The constraints and difficulties in having an ideal classroom in a developing country like India showed highly contemplated. We should identify the conditions necessary to influence the classroom setting. The interaction of the factors that takes place in the classroom plays an important role as the classroom is a web of interaction in a particular way. This interaction forms the basis for the prevailing environment in any class room. The environment provides a network of forces and factors which play on the individual of any classroom.
Some individual may resist this network and some rare individuals completely avoid or escape from these forces. The environment is a shaping and reinforcing force which acts on the individual’s learning. At the same time every individual becomes the part or the component of the environment.

It is imperative to consider the interaction between the teacher and the pupil, teaching and learning, availability and utilization of instructional aids, discipline control, situation and facility available etc. It is believed that the different climate will have different effect on the achievement of pupils. That is, if one moves from classroom to classroom he finds that conditions differ. Hence, the investigator has chosen the present problem.

1.26 STATEMENT OF THE PROBLEM

Biology is a basic and broad science. This broad study is covering the working of chemical substances inside the living cells to the broad scale concept of eco-system. Biological science helps the individual to know the ecological relationship with him and other organisms on the earth. Biologists play an important role in the development of agriculture, human welfare, animal well-being, business, industry, etc. All the aspects of life are concurrently taught to the human beings by home, school and society. In the classroom the teachers and peers serve as a rich source not only to provide education but also show love and affection. They also demonstrate the core values to be adopted and practiced by the children. Above all, they serve as a source of motivation and encouragement to children in all spheres of their life starting from a simple task of satisfying their quest for knowledge to developing scientific temper and rational knowledge in them. Teachers, next to parents also greatly participate in decision-making process of academic affair of their pupils starting from the beginning of formal education to achieving the higher level of education. Therefore it is the teachers who initially act as parents, demonstrators, counsellors by encouraging them to be more scientific oriented and academically sound enough for a bright life career, because the academic achievement is considered the major yardstick either to pursue higher education or to get a suitable job. Therefore, in the present study, the researcher has tried to find out the influence of classroom climate on the academic achievement of first year higher secondary students. Hence, the present
investigation is entitled as, “THE IMPACT OF CLASSROOM CLIMATE ON ACHIEVEMENT AT HIGHER SECONDARY LEVEL”.

1.27. OPERATIONAL DEFINITION OF THE Key TERMS USED

A. Classroom

Learning takes place in a structured situation called classroom; where through certain procedures, formal learning is achieved. The Classroom is not a mere aggregate of pupils. The classroom is a place exposed to our society’s ways and values. In this study, the classroom of the students studying first year (+1) higher secondary course is considered as the classroom.

B. Climate

The term climate has been variously understood in many ways as ‘the zeal’, ‘the atmosphere’, ‘the environment’, ‘the conditions prevailing and ‘the tone of institution’. In this study, the classroom atmosphere of the students studying first year (+1) higher secondary course is considered as the climate.

C. Classroom Climate

Classroom climate can be considered as a product of the dynamic interrelationship between the collective needs of the participants and the system maintenance requirements of the classroom. In this study, the classroom atmosphere of the students studying first year (+1) higher secondary course is considered as the climate.

D. Achievement

In this study, achievement is considered to be the test scores in the subject biology in the academic year 2011-2012. The questions for the test were taken up to the portion of Half-yearly examinations. The marks obtained in the test are considered as achievement score.
E. Higher Secondary Level

In this study, higher secondary level refers to the plus one (+1) students who opted for biology as one of the subjects of study during the academic year 2011-12 from selected higher secondary schools of Vellore District of Tamilnadu.

1.28 OBJECTIVES OF THE STUDY

The objectives for the present study are as follows.

(A) The investigator framed the following general objectives:

1. To study the level of classroom climates of higher secondary students.
2. To study the level of achievement of higher secondary students.
3. To study whether there is any significant difference in classroom physical climates of the higher secondary students with respect to background variables.
4. To study whether there is any significant difference in classroom physiological climates of the higher secondary students with respect to background variables.
5. To study whether there is any significant difference in academic achievement of the higher secondary students with respect to background variables.
6. To find out whether there is any significant association between classroom climate and background variables.
7. To find out whether there is any significant association between academic achievement and background variables.
8. To find out whether there is any significant correlation between classroom climate and background variables.
9. To find out whether there is any significant correlation between academic achievement and background variables.
10. To find out whether there is any significant predictive efficiency of classroom climate on academic achievement of higher secondary students.

(B) The investigator framed the following specific objectives:

1. To find out the level of classroom climate of higher secondary students.

2. To find out the level of academic achievement of higher secondary students.

3. To find out whether there is any significant difference in classroom physical climate of higher secondary students with respect to gender.

4. To find out whether there is any significant difference in classroom physical climate of higher secondary students with respect to type of school.

5. To find out whether there is any significant difference in classroom physical climate of higher secondary students with respect to type of management of school.

6. To find out whether there is any significant difference in physical climate of higher secondary schools with respect to locality.

7. To find out whether there is any significant difference in physical climate of higher secondary schools with respect to the medium of instruction.

8. To find out whether there is any significant difference in classroom physiological climate of higher secondary students with respect to gender.

9. To find out whether there is any significant difference in classroom physiological climate of higher secondary students with respect to the type of school.

10. To find out whether there is any significant difference in classroom physiological climate of higher secondary students with respect to the type of management of school.
11. To find out whether there is any significant difference in physiological climate of higher secondary schools with respect to locality.

12. To find out whether there is any significant difference in physiological climate of higher secondary schools with respect to medium of instruction.

13. To find out whether there is any significant difference in overall classroom climate of higher secondary students with respect to gender.

14. To find out whether there is any significant difference in overall classroom climate of higher secondary students with respect to the type of school.

15. To find out whether there is any significant difference in overall classroom climate of higher secondary students with respect to the type of management of school.

16. To find out whether there is any significant difference in overall classroom climate of higher secondary schools with respect to locality.

17. To find out whether there is any significant difference in overall classroom climate of higher secondary schools with respect to the medium of instruction.

18. To find out whether there is any significant difference in academic achievement of higher secondary students with respect to gender.

19. To find out whether there is any significant difference in academic achievement of higher secondary students with respect to the type of school.

20. To find out whether there is any significant difference in academic achievement of higher secondary students with respect to the type of management of school.

21. To find out whether there is any significant difference in academic achievement of higher secondary schools with respect to locality.
22. To find out whether there is any significant difference in academic achievement of higher secondary schools with respect to the medium of instruction.

23. To find out whether there is any significant association between students gender and classroom climate of higher secondary schools.

24. To find out whether there is any significant association between the type of school and classroom climate of higher secondary schools.

25. To find out whether there is any significant association between the type of management and classroom climate of higher secondary schools.

26. To find out whether there is any significant association between locality and classroom climate of higher secondary schools.

27. To find out whether there is any significant association between medium and classroom climate of higher secondary schools.

28. To find out whether there is any significant association between gender and level of academic achievement of higher secondary students.

29. To find out whether there is any significant association between the type of school and level of academic achievement of higher secondary students.

30. To find out whether there is any significant association between the type of management of school and level of academic achievement of higher secondary students.

31. To find out whether there is any significant association between locality and level of academic achievement of higher secondary students.

32. To find out whether there is any significant association between medium and level of academic achievement of higher secondary students.

33. To find out whether there is any significant association between classroom climate and level of academic achievement of higher secondary students.
34. To find out whether there is any significant correlation between physical climate and physiological climate; physical climate and overall classroom climate; physical climate and academic achievement; physiological climate and overall classroom climate; physiological climate and academic achievement; overall classroom climate and academic achievement.

35. To find out whether there is any significant predictive efficiency of classroom climate on the academic achievement of higher secondary students.

1.29 HYPOTHESES OF THE STUDY

The following were the hypotheses formulated for the present study.

1. The level of classroom climate of higher secondary students is high.

2. The level of academic achievement of higher secondary students is high.

3. There is no significant difference in classroom physical climate of higher secondary students with respect to gender.

4. There is no significant difference in classroom physical climate of higher secondary students with respect to the type of school.

5. There is no significant difference in classroom physical climate of higher secondary students with respect to the type of management of school.

6. There is no significant difference in physical climate of higher secondary schools with respect to Locality.

7. There is no significant difference in physical climate of higher secondary schools with respect to the Medium of instruction.

8. There is no significant difference in classroom physiological climate of higher secondary students with respect to gender.

9. There is no significant difference in classroom physiological climate of higher secondary students with respect to type of school.
10. There is no significant difference in classroom physiological climate of higher secondary students with respect to the type of management of school.

11. There is no significant difference in physiological climate of higher secondary schools with respect to Locality.

12. There is no significant difference in physiological climate of higher secondary schools with respect to the Medium of instruction.

13. There is no significant difference in overall classroom climate of higher secondary students with respect to gender.

14. There is no significant difference in overall classroom climate of higher secondary students with respect to the type of school.

15. There is no significant difference in overall classroom climate of higher secondary students with respect to the type of management of school.

16. There is no significant difference in overall classroom climate of higher secondary schools with respect to Locality.

17. There is no significant difference in overall classroom climate of higher secondary schools with respect to the medium of instruction.

18. There is no significant difference in academic achievement of higher secondary students with respect to gender.

19. There is no significant difference in academic achievement of higher secondary students with respect to the type of school.

20. There is no significant difference in academic achievement of higher secondary students with respect to the type of management of school.

21. There is no significant difference in academic achievement of higher secondary schools with respect to locality.

22. There is no significant difference in academic achievement of higher secondary schools with respect to the medium of instruction.
23. There is no significant association between students' gender and classroom climate of higher secondary schools.

24. There is no significant association between the type of school and classroom climate of higher secondary schools.

25. There is no significant association between the type of management of school and classroom climate of higher secondary schools.

26. There is no significant association between locality and classroom climate of higher secondary schools.

27. There is no significant association between the medium of instruction and classroom climate of higher secondary schools.

28. There is no significant association between gender and level of academic achievement of higher secondary students.

29. There is no significant association between the type of school and level of academic achievement of higher secondary students.

30. There is no significant association between the type of management of school and level of academic achievement of higher secondary students.

31. There is no significant association between locality and level of academic achievement of higher secondary students.

32. There is no significant association between the medium of instruction and level of academic achievement of higher secondary students.

33. There is no significant association between classroom climate and level of academic achievement of higher secondary students.

34. There is no significant correlation between physical climate and physiological climate; physical climate and overall classroom climate; physical climate and academic achievement; physiological climate and overall classroom climate; physiological climate and academic achievement; overall classroom climate and academic achievement.
35. There is no significant predictive efficiency of classroom climate on the academic achievement of higher secondary students.

1.30. METHOD OF STUDY

In the present study, the investigator has employed survey method to analyse the effect of classroom climate on the achievement of higher secondary students.

1.31. VARIABLES OF THE STUDY

The variables selected by the investigator for the present study are given in the following sub-headings.

1.31.1. Independent Variable

"In any research study, the independent variables are antecedent conditions that are presumed to affect a dependent variable. They are either manipulated by the researcher or are observed by the researcher so that their values can be related to that of the dependent variable (Jaeger, 1990). In this study, the investigator considered classroom climate as the independent variable.

1.31.2. Dependent Variable

"In any research study, the independent variable defines a principal focus of research interest. It is the consequent variable that is presumably affected by one or more independent variables that are either manipulated by the researcher or observed by the researcher and regarded as antecedent conditions that determine the value of the dependent variable. The dependent variable is the participant's response (Jaeger, 1990). In the present study, achievement in biology has been treated as a dependent variable."
1.31.3 Background Variables:

In the present study, the following are background variables.

Gender : Male / Female
Type of School : Boy’s / Girl’s / Co-education School
Type of Management : Government / Private
Locality : Rural / Urban
Medium of Instruction : English / Tamil

1.32. TOOLS USED

In this study, the following tools have been used by the investigator.

1. Personal Data Sheet developed by the Investigator. (Appendix-II)
2. Classroom Climate Inventory developed and validated by Rajkumar (1984) adopted by the Investigator. (Appendix-III)
3. Achievement Test in Biology developed and validated by the Investigator. (Appendix-IV)

1.33. STATISTICAL TECHNIQUES USED

In this study, the investigator has used the following statistical techniques for analysis of the data.

1. Descriptive analysis
2. Differential analysis
3. Relational analysis
4. Regression analysis
1.34 SCOPE OF THE STUDY

The present study is an attempt to examine the influence of some selected classroom climate correlates such as physical and physiological climate on acquisition of biological concepts of pupils studying in the higher secondary schools of Vellore District of Tamilnadu. Most 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 individual, psycho-sociological and economic factors. The investigator believes that the influence of the selected classroom climate 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 organize 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 higher 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 variables in combination with sex, locale and type of management of school, type of school and medium of instruction on the acquisition of biological concept of pupil studying in the higher secondary schools. In the selection of sample, due representation is given to the urban rural settings 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 selected 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 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 and classroom settings
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 selected variables. The new knowledge yielded by the present study will be of
help to classroom teachers, school administrators, parents and all other
stakeholders 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. 35 DELIMITATION OF THE STUDY

The present investigation has the following delimitations.

1. Geographically, the sample area was limited to Vellore District of
   Tamil Nadu.

2. Only 20 schools from Vellore District were randomly selected for the
   present study.

3. For the academic achievement aspect, the researcher had taken only
   one subject that is biology. She conducted an achievement test in
biology (Botany and Zoology), the questions were taken only up to the half-yearly examination portion during the academic year 2011-2012.

4. The total number of sample is restricted to 400 higher secondary first year (+1) students.

5. The present study is done only with one major variable and five background variables.

6. There is so many factors responsible for the climate condition of a classroom, the researcher has taken only two factors in the study, they are:

   a. Physical climate and
   b. Physiological climate.

1.3.6 CONCLUSION

The first chapter of this study highlights the introduction to the problem and its statement, operational definition of the key term used, need for the study and delimitation of the study. The need and importance of the study, the term operationally defined in this study have reviewed theoretically from the related literature available, to give a broader theoretical perspective in the light of which appropriate hypotheses could be framed and tested. In the second chapter, detailed review of the studies relating to the present investigation, carried out in India and at abroad have been given. The theoretical bases underlying the construction of the classroom climate scale, the steps involved with in construction and details of administration are all outlined in chapter three. Chapter four gives the result of the analysis of the data, interpretation and the verification of the hypotheses. And in fifth chapter, a brief summary of the investigation, main findings, recommendations and suggestions for further research have been given.