1.1 EDUCATION

Life is a continuous process in which Education is an essential element in the transformation of an individual as "human being". From the perspective, education is serving primarily as an individual development function. Education is that which brings out the best in the individual. Education begins at birth and continues throughout the life. It is a constant and ongoing process. Education is defined as a process designed to inculcate the knowledge, skills and attitudes necessary to enable individuals to cope effectively with their environment and essential for achieving success in one’s life.

Education is greatly essential for the growth and development of individual as well as society. It is only through education that moral ideals and spiritual values are transferred from one generation to another for preservation, purification and sublimation into higher and higher achievements. Education is regarded as the potential instrument of social transformation and an important means of national development.

In the present world of science and technology, education has to determine the levels of well-being and prosperity of the people. Education is considered to be one of the most powerful agencies in moulding the character and determining the future of individuals. Education is a dynamic process, which involves imparting knowledge, generating interests and curiosity, and inculcating desirable attitudes, values and essential skills required for independent study. This is necessary for enabling students to become competent and useful citizens. Education should be possible for the learners to have freedom to choose courses in line with their interests and aptitudes so that they can continue their studies without any difficulty and have the satisfaction of becoming high achievers. Education should make each and every member of the society academically
sound and socially efficient so as to enable them to contribute considerably to national
development.

Education thus is considered with bringing about changes in the three broad
domains of the individual, namely cognitive, affective and psychomotor. The idea of
lifelong education is the keystone of learning society. In the formal system of education,
discovering the relationship between mental process, and the learning behavior has always
been the major concern of the educationists and educational psychologists.

1.2 EDUCATION AT PRESENT IN INDIAN CONTEXT

One of the serious problems facing educationists in India is the high percentage of
failure in the school and college examinations (Chopra, 2010). Now, India is called as
young India because it has lot of youth resources (60 %) in which proper utilization of
human resources leads to the development of nation. Being a developing country, India
should use its resources to the fullest extent without wastage. Hence it becomes the
responsibility of everyone concerned with education to prevent failure, wastage and ensure
proper achievement on the part of the students.

The problem of students’ achievement in schools has drawn the attention of the
educationists and psychologists (Caulfield, 2008). A poor performer and a poor achiever
have less likely to contribute to the society than a good performer. If we can identify the
factors which facilitate high level of academic performance, it may possible to provide
better and more conducive educational environment to the students, so as to improve their
academic performance. Discovery of factors, which are constantly related to high and low
level of academic performance is therefore a useful educational research objective (Pishel,
1973).
1.3 HIGHER SECONDARY EDUCATION

Higher secondary education forms a basis for professional courses or higher (degree) education. Higher Secondary Education is an integral part of school education and it orients students to the world of work and helps them in making educational or vocational choices. Higher secondary level of education occupies a very vital place in our education ladder, as it provides link between secondary and higher education. Majority of the students completing higher secondary educations either go for higher education including professional courses or enter the society to make a living.

Today’s students learning and achievement are considered as a major issue because it plays a crucial role in students’ life on one side and major determinants in assessing the quality of Education. Identifying factors affecting students learning and achievement are considered as an important objective of educators at all levels (Carrotte, 1999). Therefore, student learning at higher secondary education is an apt concept to study the influential and hindering factors that affect learning and achievement.

1.4 SCHOOL

The school is a miniature society or a social institution, which is entrusted with the responsibility of bringing up the students’ participation effectively, efficiently and harmoniously in the community to which they belong. The modern school is not a knowledge shop and the learning experiences should not be limited to the four walls of the classroom. The school should provides various opportunities to the students for participating in social services, community activities, health campaigns, literacy drives and other kinds of public services of educational importance. This will break the barriers between the school and the community and make school life and experiences meaningful, lively realistic and natural (Mohanty, 1991). The modern educationists and educators are expected to be fully aware of the psychology of individual differences, and they do accept
the view that no two individuals are alike. There is bound to be wide differences among
the children of the same class in their academic performance.

1.5 TEACHER

Teacher is the most important factor for teaching learning process to takes place. Schools are the places where students are supposed to interact with the teachers to acquire the skills and competencies required by them. The teacher’s role is very important in imparting quality education, thereby bringing about a qualitative and quantitative behavioural change in the learning environment and achievement. Student learning and achievement are two major concerns in determining the quality of education at all levels.

1.6 LEARNING

Learning is a broad phenomenon and considered as the vast process by which life relevant and related knowledge, concept, skill and attitude are acquired, transferred, applied, understood and extended. The process of learning starts from man’s birth and ends with man’s death. Therefore the competence of human beings and their ability to function in the environment get enhanced through one’s own interest and habits based on their experiences and feelings. Hence, it is predicted that learning is somewhat a cognitive, affective and socialized process.

1.6.1 Learning as cognitive process

Mental process such as attention, perception, analysis, reasoning, decision making and drawing conclusions are all considered as cognitive process.

1.6.2 Learning as affective and socialised process

The cultural and social customs around our environment play a vital role in affecting our knowledge, ideas, concepts, images, beliefs, and understanding of the world. Therefore knowledge, ideas, concepts, attitude, customs, beliefs and the skills are combination of the above cognitive, affective and socialised process.
1.6.3 Characteristics of learning

The important characteristics of learning are “it is a process and not the product”; It involves those experiences and trainings of an individual; All learning is purposeful and goal oriented; It prepares an individual for the necessary adjustment and adaptation; and it is universal and continuous. Learning is the acquisition of habits, knowledge and attitudes (Crow and Crow, 1973). Learning is defined as a function of interaction of personal and environment factors that can be shortly noted as

\[
\text{Learning} = \text{Function (Environmental factors } \times \text{ Personal factors)}
\]

Both personal and environmental factors contribute its role in the learning of individual and may influence to some extent. Based on research, the followings are the significant factors that affect learning of students in Education. They are Intelligence; Learning Style; Emotional stability; Self-efficacy; Self-esteem; Self-concept; Scientific Aptitude; Goals; Mental health; Educational Aspiration; Attitudes; Interests; Socio–Cultural determinants; Readiness & Maturation; Motivation; Values; and Multiple Intelligence.

1.7 ACHIEVEMENT

Achievement is the amount of knowledge derived for learning. Achievement is a test designed to measure the knowledge of proficiency of an individual in something that has been learned or taught as arithmetic or typing. The educational capacity of the students is judged by his/her achievement in the school. The academic achievement performance in school subject is the criteria for choosing the future course of life.

In our society achievement is considered as a permanent key criterion to judge one’s total potentialities and capacities. Hence academic achievement occupies a very important place in education as well as in the learning process. Academic achievement is defined by Crow and Crow (1969) as the extent to which a learner is profiting from
instructions in a given area of learning i.e., achievement is reflected by the extent to which skill and knowledge has been imparted to him. Academic achievement also denotes the knowledge attained and skill developed in the school subject, usually designated by test scores.

Achievement is influenced by personality, motivation, opportunities, education and training. Srivastava (1968) found that poor environment is a major factor associated with low academic achievement. There are several other factors also which influence the academic achievement of students like study habit, self-concept, socio economic status, intelligence etc. According to Gupta (1975), achievement is influenced by a number of factors such as abilities [Intelligence, Scholastic Aptitude...etc..], Efforts [Drive, Aspiration and Achievement Motivation] and Environment [School, Home…etc..]. The other factors that affect achievement are academic factors, personal factors, media, facilities, Guidance services and Organizational climate.

1.7.1 Academic factors

Teacher’s efficacy, Teacher’s qualification, experience, creativity, communication skills, Teaching methodology, Teaching style, Subject content, teaching aids usage, evaluation, assessment, learning environment, educational events, quality of teachers, reinforcement, interest, motivation, appreciation, confidence, and role model are the various factors that affects students achievement as well as learning. Classroom size, competency of teacher, conducive environment in school, Team work, Peer group support, Homework, Tuition, Parents relationship, Awareness of course objectives, repeated class test also make impact upon achievement.

1.7.2 Personal factors

Insufficient sleeping, Psychiatric problems, Mental illness, Parental Education qualification and annual income, Study habits, health condition, conducive environment
at home, proficiency of students in subject, peer education, intelligence, self esteem and peer study make positive impact on achievement. Self conflict, Day dreaming, love affair, extroversion, poor economic & Socio background, eating habits, unhealthy social interactions, home sickness, family background, Parents unsupport, tension, frustration, and gossiping & chatting make negative impact on achievement.

1.7.3 Media

Newspaper reading, periodical reference, library usage, radio listening activities, ICT and technical based teaching methods like PowerPoint presentation, Smart Class and smart board technique are the positive factors that increase achievement. Watching excess time of T.V, cinema, internet, video games and wrong usage of media leads to negative impact on achievement.

1.7.4 Facilities

Students have positive influence of facilities on achievement (Nighatsana Kirmani, 2008). Financial support, transport facilities, scholarship, library, internet access, comfortable classes, teacher student ratio, clean environment, weather condition, furniture, free education system and educational loan are the influential factors that make impact upon achievement.

1.7.5 Guidance

Student support activities, Proper guidance and counselling services related to personal, career and higher education, solution to solve adolescent problems, Orientation about feature life and Teacher understanding student’s problems enhances achievement. The above conditions are applicable to both hostel and non – hostel students.

1.7.6 Organizational Climate

Good student-teacher relationship, Teacher’s pet, students union, students’ club activities, freedom of expression of opinions/feelings in classrooms/institutions, prizes,
praises, participation in extracurricular and co-curricular activities are the factors that influence students’ achievement. Cheating, ragging, bribery, strikes, ragging, harassment by other students are the negative factors that hinder achievement.

1.8 ACADEMIC ACHIEVEMENT

Academic achievement is the accomplishment or acquired proficiency in the performance of an individual in a given skill or body of knowledge. Dictionary of education (Good, 1959) defined “Academic achievement means knowledge attained and skill developed in the school subjects usually designed by test scores or by marks assigned by teachers or both”. According to Chaplin (1965) “Academic achievement is specified level of attainment or proficiency in academic work as evaluated by the teachers by standardized tests or by a combination of both”. So, achievement can be measured with the help of tests, verbal or written of different kinds. Since academic achievement is the criterion for selection, promotion or recognition in various walks of life, the importance of academic achievement cannot be ignored.

A number of investigators in India have used the marks obtained by the students in their final school examinations in a particular course of study as a valid index of academic achievement (Singh and Kumar, 1977 and Vijayalakshmi, 1980). Grade point average (GPA) has also been used as the measure of achievement by a number of research workers from other countries (Halpin et.al.1973).

1.9 IMPORTANCE OF ACHIEVEMENT IN EDUCATION

Education is indispensable to normal living, without education the individual would be unqualified for group life (Safaya, et al. 1963). The importance of scholastic and academic achievement has raised important questions for educational researchers. So, what are the factors that promote achievement among the students and how far do the different factors contribute towards academic achievement, (Ramaswamy, 1990) are get
very much importance. A modern society cannot achieve its aim of economic growth, technical development and cultural advancement without harnessing the talents of its citizens.

School achievement may be affected by various factors like intelligence, study habits, and attitudes of pupil towards school, different aspects of their personality, socio economic status, etc. The desire for success is derived from individual’s concept of himself and in terms of the meaning of various incentives as they spell success and failure in the eye of others. Thus a child who seems himself as top ranking as scholars, may set as his goal the attainment of the highest grade in the class. One of the major tasks of education is to help children develop the skills appropriate to the age in which they live and those skills which promote a lifetime of learning.

Educationists and counsellors in educational settings are often confronted with students who appear to have above average scholastic aptitude but are very poor in their studies. Januar (1974) stated that efficient learning depends not only on good teaching methods but also satisfactory learning procedures. Anwana and Cobbach (1989) are also of the view that students do badly academically on account of factors other than low intellectual capacity. Tiwari and Bansal (1994) mentioned that a child with high academic achievement is likely to be well-treated as well behaved and independent and low achievers as incapable and deprived of employment, which may lead this to maladjustment to life.

1.10 ACHIEVEMENTS AS A QUALITY INDICATOR IN EDUCATION

The primary purpose of Education is to foster and promote the fullest individual self realization for all people. Achieving this goal requires understanding of commitment to the proposition that education is a primary instrument for social and economic advancement of human welfare (Verma, 1990). The world is becoming more and more
competitive. Quality of performance has become the key factor indicator for personal progress. Parents desire that their children climb the ladder of performance to as high a level as possible. This desire for a high level of achievement puts a lot of pressure on students, teachers, and schools and in general the education system itself. In fact, it appears as if the whole system of education and quality in education revolves round the academic achievement of students, though various other outcomes are also expected from the system. Thus a lot of time and effort of the schools are used for helping students to achieve better in their scholastic endeavours.

1.11 ESSENTIAL OF CHEMISTRY IN LIFE

The International Year of Chemistry (IYC) 2011 is a worldwide celebration of the achievements of chemistry and its contributions to the well-being of humankind under the unifying theme “Chemistry our life, our future”. The goals of IYC 2011 are to increase the public appreciation of chemistry in meeting world needs, to encourage interest in chemistry among young people (school and college students), and to generate enthusiasm, aptitude, attitude & interest for the creative future of chemistry.

Chemistry is the branch of science that deals with understanding the matter and the interactions between particles. Modern chemistry paved the way to know the atomic nature to understand the relationship between different chemical elements and the way they react together. Emergence of periodic table and classification of elements leads to modern society which may creates many things such as healing drugs, pesticides and fertilizers to ensure better crops and chemicals for many synthetic materials.

Chemistry holds many of the answers regarding understanding of how matter works and how the environment might be protected from the source of pollutants. So, rapid progressing trend in chemistry enters into other branches of chemistry and answers for all those miracles that are found in all living organism and non-living matter.
Therefore, the importance of chemistry is very much increased and its uses are indispensable in every walk of life. Chemistry is essential for the existence and progress of modern world. All the subjects taught in the school contribute to the achievement of the objective to form an integrated personality of the pupil.

1.12 ROLE OF CHEMISTRY IN HIGHER SECONDARY EDUCATION

The Kothari commission (1964-66) clearly stated about compulsory teaching of physics, chemistry, biology and earth sciences. Chemistry is a dynamic and vital force in our daily life. It touches every phase of human activity. The modern world requires scientific training. Good programs of chemistry education shall aim at imparting a sufficient quantum of scientific knowledge in various fields to all and ultimately developing a scientific outlook in them. This should be done from the school level onwards when they are learning science. Hence the student’s achievement in chemistry is very important for a healthy achievement.

Studying chemistry at first year higher secondary education play an important role as it is the basis for further study in future. The educational capacity of the student is judged by his/her achievement in the school. Today’s chemistry students achievements are not at expected level because learning could be affected and influenced by various factors such as demographic variables. Research studies of Gupta (1975) revealed that achievement is influenced by a number of factors such as abilities, effort and environment (school & home). Srivastava (1968) found poor environment is a major factor associated with students’ achievement. This study would throw more light into the causal relationships among the student, the teacher and the school environment - related variable under investigation and achievement of students in chemistry. One of the best outcomes to be expected from the study is to stimulate the stakeholders to improve upon the isolated
variables which have been found to have direct causal relationships with students’
achievement in chemistry, with a view to enhancing student performance in the subject.

1.13 EDUCATIONAL ASPIRATION AS AN INFLUENCING FACTOR OF
ACADEMIC PERFORMANCE

Education is a part of human life; it cannot help the pursuers unless they have the
required amount of educational aspirations. Education in the present scenario plays a vital
role in bringing about the best from the individual and must meet the requirements of the
society. Today, unemployment, underemployment and unsuitable employment are some of
the problems faced by the educated individual in India. This is due to lack of vocational
behaviour of an individual which he lacks initially at the studying of the courses. The
fruitful approach to study one’s self enhancement has been the concept of aspiration level.

Life is a long travel wherein an individual’s aspiration keeps them to very active
and live. Aspiration makes the life very meaningful. An aspiration is a wish or ambition
and efforts are being taken to achieve the perceived goal. The days of schooling are very
fundamental where most of the aspirations are formed and induced to form. The later days
of schooling i.e., higher secondary becomes crucial since career direction is going to be
determined. The motivation was the driving force which propels the individuals towards
their respective destinations. There was a different motivational factor which differs
according to the interest of the individuals. Nat

There are different theoretical perspectives on the interpretation of educational
aspirations and their significance for the future behaviour, which stresses aspirations as a
cognitive state that motivates or drives young people to strive for academic success (Khoo
and Ainsley, 2005). This indicates that both personal dimension (e.g. the impact of
significant others or students’ perception of their own personal attributes) and social
dimensions (e.g. quality of schooling, or parental social class) are important transmitting
factors. Parents in particular have been seen as the most significant others in shaping
aspirations because they provide the opportunities, encouragement and support for their children for proper learning (Garg et al., 2002).

The environmental factors include aspects of social support, i.e. parental involvement, affecting the individual. The influence of these factors is well documented in the literature (Garg et al., 2002). The problems in economic studies on educational aspirations are twofold. The first is that a vast majority of the research on educational aspirations concentrates on surveying young pupils, because correlation coefficient between educational intention and the achieved result is high (Khoo and Ainsley, 2005). However, adolescents are usually not independent in their educational decisions as it is assumed in economic models of choice, and up to some particular point are commanded or guided by parents. On the other hand, parents may have unrealistic educational aspirations for their children, especially those who strive to provide income support for the family.

Educational institutions have major responsibility in introducing right type of curricular choices and vocational decisions among the students at the right time to promote their Educational Aspiration. It occupies central place in the life of the students and hence it is necessary to know the educational aspiration of the individual. The Need of Educational Aspiration is vital part in students’ life to select career of correct choice. It includes selection of subjects for study; to select professional, diploma and degree courses from colleges and universities; it helps institution to organize student supportive services; administrators to plan effective learning facilities; suitable curriculum and knowledge regarding educational aspiration helps teachers’ select appropriate teaching aids and methods of teaching.

1.14 EMOTIONAL INTELLIGENCE AS A PREDICTOR OF GOOD LIFE

The Indian commission (1964-66) emphasizes the pursuit of truth, full development of the youth physically, intellectually, socially and morally with a sense of
social purpose, to promote equality and social justice, and to promote attitudes and values needed for developing the “Good Life”. Our country is well known for the quality of mind and is recognized as a potential knowledge hub of the world. Its demographic profile is that a majority of the population is in the age group 0 – 30 years. The challenge for the education system, particularly the higher education system is to recognize itself for enabling the youth in becoming emotionally intelligent.

The emotional intelligence concept is being used in the psychological literature from the end of the 1980s. Greenspan first introduced it in 1989 when he was trying to provide a unified model for emotional intelligence in light of Piaget theory, psychoanalysis theory, and reactive learning. Greenspan's model states that acquiring emotional intelligence needs three levels of learning: physical learning, learning by results and representative synthesis learning (Othman and Rizg, 2001).

Zopardy (2001) states that emotions forms one important part of the human behavior. Emotions are very much close to human's life and character. Emotions also can be different from one person to another. Some people are matured emotionally and can adapt with the society while others are not. Those people, who are not matured emotionally, often suffer from problems in adapting with individuals in their community. Future is better for those who have high levels of emotional intelligence. Therefore, it is said that mental intelligence helps you to get a job, but emotional intelligence helps you to keep that job. Mayer and Salovey (1997) state that the emotional intelligence theory originates in the eighteenth century when scientists used to divide the mind into the following three parts: knowledge, emotion and motivation. Emotional intelligence is connected, in one way or another, to knowledge and emotion. They are integrated despite the fact that not all aspects of knowledge and emotion are considered elements of emotional intelligence (Othman and Rizg, 2001).
1.14.1 Definitions of Emotional Intelligence

“It is the ability to perceive, to integrate, to understand and to reflectively manage one’s own and other people’s feelings.” – John D. Mayer.

According to Salovey (1990), “Emotional Intelligence is a type of social intelligence that involves the ability to monitor one’s own and other’s emotions to discriminate among them and to use the information to guide one’s thinking and actions”. Goleman (1995) stated that “A degree of emotional intelligence is awareness of one’s own and other people’s feeling such as sympathy, compassion, motivation and the ability to respond to pain and pleasure appropriately”.

Singh (2002) said that emotional intelligence includes qualities such as self-awareness, ability to manage mood, motivation, empathy and social skills like cooperation and leadership. Hein (2003) defines emotional intelligence as: “Being able to know how to separate healthy feelings from unhealthy ones and how to turn negative feelings, into positive ones”. Bar-On (2000) defines it as a group of personal and emotive abilities that affect the individual's overall abilities so that he/she can adopt with the pressures of life.

1.14.2 Applications of Emotional Intelligence in Life

There are twenty one emotional intelligence in life which can be classified under positive and negative emotional intelligences. The positive emotional intelligences are respect, pity, love, joy, hope, gratitude, freedom, faith, empathy and coverage. The negative emotional intelligences are anger, apathy, conceit, despair, doubt, envy, fear, greed, guilt and hatredness.

1.14.3 Importance of Emotional Intelligence for students

Emotional intelligence allows us to think more creatively and use our emotions to solve problems. Daniel Goleman (2000) believes that emotional intelligence appears to be
an important set of psychological abilities that relate to life success. It is empathy and communication skills as well as social and leadership skills that will be central to our success in life and personal relationships. Emotional intelligence is very much a need for the development of the leaderships skills and promoting interpersonal cum intrapersonal skill among the higher secondary school students.

1.15 MENTAL HEALTH - A FACTOR OF INFLUENCING INDIVIDUAL BEHAVIOUR

Mental Health is a state of balance between the individual and the surrounding world, a state of harmony between oneself and others, a co-existence between the realities of the self and that of other people and the environment. Qualities could be measured with expected behavioural changes. In teaching-learning process, various factors influence behavioural changes of a child. Mental health is an important factor influencing individuals’ behaviour, activities, happiness and performance (Walter and Mereditho, 1973 and Anastasi, 1996).

1.15.1 Definitions

Karl Menninger (1947) defines mental health as “An adjustment of human beings to the world and to each other with a maximum of effectiveness and happiness”. The American Psychiatric Association (APA 1980) defines mental health as “Simultaneous success at working, loving and creating with the capacity for mature and flexible resolution of conflicts between instincts, conscience, important other people and reality”. Jahoda (1950) defined, “The mentally healthy person as one who actively masters his or her environment, demonstrates a considerable unity or consistency of personality and is able to perceive self and world realistically”. Bernard (1970) defines mental health as the adjustment of individual of themselves and the world at large, with maximum of effectiveness, satisfaction, cheerfulness and socially considerate behaviour and the ability of facing and accepting the realities of life. Mental health as a relative state of mind in
which a person is healthy to cope with and adjust to the recurring stress of everyday living in an acceptable way.

1.15.2 Indicators of mental health

There are six identified indicators which include

1. **A positive attitude towards self**
   This includes an objective view of self, including knowledge and acceptance of strengths and limitations. The individual feels a strong sense of personal identity and security within the environment.

2. **Growth, development and the ability for self actualization**
   This indicator correlates with whether the individual successively achieves the tasks associated with each level of development.

3. **Integration**
   Integration includes the ability to adaptively respond to the environment and the development of a philosophy of life, both of which help the individual maintain anxiety at a manageable level in response to stressful situations.

4. **Autonomy**
   Refers to the individual’s ability to perform, in an independent self-directed manner; the individual makes choices and accepts responsibility for the outcomes.

5. **Perception of reality**
   This includes perception of the environment without distortion, as well as the capacity for empathy and social sensitivity – a respect and concern for the wants and needs of others.

6. **Environmental mastery**
   This indicator suggests that the individual has achieved a satisfactory role within the group, society or environment. He is able to love and accept the love of others.
1.15.3 Characteristics of a Mental Healthy Person

The following are the important characteristics of a mental healthy person.

- He has an ability to make adjustments.
- He has a sense of personal worth, feels worthwhile and important.
- He solves his problems largely by his own effort and makes his own decisions.
- He has a sense of personal security and feels secure in a group, and shows understanding of other people’s problems and motives.
- He has a sense of responsibility.
- He can give and accept love.
- He lives in a world of reality rather than fantasy.
- He shows emotional maturity in his behaviour, and develops a capacity to tolerate frustration and disappointments in his daily life.
- He has developed a philosophy of life that gives meaning and purpose to his daily activities.
- He has a variety of interests and generally lives a well-balanced life of work, rest and recreation.

1.15.4 Intrinsic values of Mental Health

Mental health is essential for the well – being and functioning of individuals.

- It is an important resource for individuals, families, communities and nations.
- Positive mental health contributes to the social, human, and economic capital of every society.

1.15.5 Importance of Mental Health

Man is basically a mind body unit and these two aspects vitally influence each other. For efficient functioning of the individual, he should, not only possess sound
bodily health, but also sound mental health. The terrific advances in the field of preventive and curative medicine coupled with continual attempts in all countries, to improve the standard of living of its people have to a large extent enabled us to eradicate most of the diseases of the body and helped to provide for longevity of human life with sufficient physical health. A sound body has now become an easy possibility within the reach of everyone and a sound body is basic to a sound mind and bodily handicaps, diseases do affect mental ability and outlook. As the aim of education is to provide healthy personality for individuals and one of the important ingredients of education, the role of mental health is crucial not only in formal education but also, in informal education – such as family and societies. Various studies have been carried out in different parts of the world to identify factors that impact on students’ mental health since poor mental health has been recognised as the leading cause of suicidal behaviour, a sense of helplessness (Kay, Li, Xiao, Nokkaew & Park, 2009) and lower academic achievements (Puskar & Bernardo, 2007).

But in contemporary society, mental health has become a major problem affecting almost every person. Mental Health hazards significantly increased in number and complexity, but these have also affected the physical efficiency of individuals, causing a variety of psychomatic disorders. So mental health is now recognised as an important aspect of an individual’s total development and mental hygiene is accepted as an integral part of the school programme.

1.16 SCIENTIFIC APTITUDE – A PROMOTER OF SCIENTIFIC OUTLOOK

“Scientific aptitude is a complex of interacting hereditary and environmental determinants producing predisposition or ability in science. Through these abilities, it is possible to predict future accomplishment of a person in science” defined by Rao, 1969.
Scientific aptitude is a potentiality of future accomplishment in science without regard to past training and experience. An individual with right aptitude toward science develops better scientific aptitude which is very useful in selecting a career. Without right aptitude toward a subject one cannot master or show any interest in a subject. Likewise, without good scientific aptitude an individual does not perform much in science. Many researchers indicate that intelligence and aptitude is specified areas are two important determinants of school attainment and, therefore, are potential predictors of success in all forms of performance in school subject (Pillai, 1986).

Teaching of everyday science for everybody has become an unavoidable part of general education. Nobody questions its inclusions as a subject in the school curriculum. It is included in a school’s curriculum for the same reasons as any other subject, but in addition, science inculcates certain special values peculiar to it and which no other subject can provide. Besides satisfying the usual needs for its inclusion as a subject in the curriculum such as intellectual, cultural, moral aesthetic, utilitarian as well as vocational values. Science learning provides training in scientific method, and also helps to develop a scientific attitude of mind and scientific aptitude in the learner. Therefore, science now is a compulsory subject in every system of school education right from the elementary level.

Scientific aptitude is a complex of interacting hereditary and environmental determinants producing predispositions or abilities in science. It appears to be dependent upon a variety of factors such as study skills, motivation, and persistence in learning a subject, socio-economic factors, cultural background, interests and attitudes.

1.16.1 Definitions

Good (1959) defined “Aptitude is a pronounced innate capacity for or ability in a given line of endeavor such as particular art, school subject or vocation”. Rao (1996) defined ‘Aptitude’ is considered as “a natural talent, skill or ability, quickness in learning
and understanding”. Aptitude is not a specific skill; rather it is the capacity to acquire that specific skill (Freeman, 1965). Right aptitude of a person, in any specific field, indicates his/her ability of acquiring skills in that particular field, on the basis of which a prediction may be made regarding the amount of improvement of that person in that field, which further training might effect (Rao, 1996).

Aptitudes may be physical or mental. Aptitude and intelligence quotient have effects on one another positive or negative. Intelligence quotient considered intelligence is the only measurable latent trait and aptitude divides mental ability into many different characteristics, which are independent to each other. A casual analysis of any group of test scores will prove the high correlation between aptitude and intelligence (Science Daily, 2008).

Aptitude and interests are essential. Personality encompasses some of interest and values. So, aptitude and interest have relation and have effect on each other. Both aptitude and interest are helpful in future educational and career decisions but are different terms (Career Vision, 2006). In term future education or career, no one can neglect the importance of science. Science helps students to apply varied set of skills (About Intelligence, 2008).

Science aptitude is the potential for success in future in the field of science. An individual having science aptitude must enter in science or technical education otherwise he or she will not be successful in the field of science. Certain study skills, science and heredity background are helpful in determining science aptitude. Other factors like physical, social, emotional developments, moral character, interests, abilities and attitudes may also be considered for the development of science aptitude (Digumarti, 1994).

Education is a continuous and vital process through which an individual acquires knowledge, skills, aptitude and attitude which are essential for achieving success in one’s
life. Therefore, education must impart academic knowledge, efficiency and skill which make the learner contribute his own to the development of the country. Society expects more from the schools. School is a place where an individual gains all sorts of experiences and their achievement is periodically evaluated to fulfill the educational goals. Science is the systematized and classified knowledge achieved by the experimental studies of nature. Secondary and Higher secondary schools in all countries given a higher priority and status to science education.

1.16.2 Importance of Scientific Aptitude

Importance of science learning is being recognized more and more in the context of contemporary society which is highly scientific as well as technical. Effective science learning in this context is not only necessary for one’s individual development; it also helps learner to contribute significantly for the development of nation as well as scientific aptitude.

Scientific aptitude is not only important for the two reasons, as mentioned. In fact, it is also considered as a symbol of recognition of a learner in his/her surrounding environment i.e. school, home and society (Ganguli & Vashistha, 1991). Students feel a strong urge to enroll themselves in science courses particularly in senior secondary stage due to number of causes, among which to ensure their well acceptance in surroundings is also a major one. Parents are also driven strongly by this type of external motivation, considering science learning of their children as the symbol of social status (Shukla, 2005). Therefore learners’ felt urge in learning science along with their sound scientific aptitude only may result in expected achievement (Ghosh, 1986).

Scientific aptitude is a potentiality of future accomplishment in science without past training and experience. An individual with right aptitude towards science develops better scientific aptitude which is useful in selecting a career. Scientific aptitude is the
application of general intellectual capacity to scientific materials and problems. In the field of education, scientific aptitude tests are used principally for guidance and counseling classification.

According to Kamala.S pillai (1986), achievement refers to present and past accomplishment, aptitude relates to the possibility of future accomplishment. Scientific aptitude involves many hereditary and environmental factors which are very essential for a successful person. Most of the students failed in chemistry and physics subject in 2006 April higher secondary examination conducted by the state government of Tamilnadu (Padmanaban, 2007). In order to check this wastage and to save the students from failures and frustrations, they must be guided scientifically in the proper selection of the courses. So, the investigator tried to relate the achievement in chemistry and scientific aptitude. By doing this students having scientific aptitude, attitude, outlook may be selected for science courses. Lack of scientific aptitude among students couldn’t continue their studies beyond undergraduate. The study of relationship, association between scientific aptitude and chemistry achievement may help the science educators for making curriculum decisions and in guiding the pupils in proper lines.

Among various discipline in science, chemistry particularly is perceived by learners as an area of major difficulty. Its axiomatic nature, necessity of applying inductive-deductive, analytical-synthetic approach in its learning, particular nature of the curricular content consisting of several interrelated concepts having hierarchical nature etc. are the probable causes of this perception (Mukhopadhyay, 2011). All these may result in learners’ under achievement. Researchers have identified that student failure in science courses to a large extent is attributed to their failure in chemistry course particularly (Shukla, 2005). Therefore aptitude towards the field of chemistry of higher secondary learners is the area needs a major emphasis.
1.17 NEED FOR THE PRESENT STUDY

Mental illness, lack of motivation, poor study habits, personal maladjustment, outside work, lack of preparation, difficult with instructional methods, lack of attendance, frustration and lack of interest are the major obstacles in proper learning and achievement. Higher secondary students are the laurels of our nation, so teacher must be aware of all influential factors that affect students’ achievement and learning. It is duty of every teacher that he/she much concentrates on facilitating and monitoring education system for the betterment of students’ life. Efficient and effective work habits or study habits contribute to more achievement. Students’ efforts, responsibility and co-operation with educational system ever need for the successful learning and achievement to attain quality of education.

Higher secondary education provides the link between secondary and higher education level. Higher secondary education forms a basis for professional courses or higher (degree) education. Studying chemistry at first year higher secondary education play an important role as it basis for further study in future. The educational capacity of the student is judged by his/her achievement in the school.

The incidence of large failure in chemistry in higher secondary school examination (The Hindu Newspaper, 2006) and in the first year chemistry and maths papers of first year engineering graduates at university examinations (The Hindu Newspaper, 2011) are of great concern not only to the parents but also to the educators. Thus, pedagogical psychology has proved that interest, attitude & aptitude of children and youth are shaped and developed in the process of activity requiring the utilization of those qualities which form abilities to do that kind of activity. Sometimes, the parents, due to their over-enthusiasm and own ambition, force the child to opt for chemistry without knowing the interest of the child. The child gradually develops hatred towards the subject and becomes
backward in chemistry which result in the poor performance leads to low achievement. There is a great need to study about the achievement of higher secondary students in their chemistry achievement and it is considered as the main variable of the study.

Individuals will have aspirations, all stages of life people try for self enhancement. The aspirations during students’ period influence their behavior. An individual’s aspiration level represents him not only as he is at any particular moment, but also as he would like to be at same problem in the future. The term educational aspiration or vocational choice is based on knowledge of traits. The aspiration level of an individual is an important motivating factor. It is a frame a reference involving self esteem or alternatively experiences, that is the feeling of failure or success.

In well developed countries the school system is so organised that the student can make some anticipating or actual vocational decisions at the end of each stage of education. The student has the freedom to choose from different curricular, these educational decisions influence the career.

But in the Indian context, the higher secondary school students have no freedom to choose the curriculum. The curricular choices are only possible at the beginning of the higher secondary stages, that too mainly on the basis of his/her academic achievement. It is also known that educational aspiration begins to germinate by about twelve and thirteen years of age and tend to be developed in full form by about fifteen and eighteen years of age which result in the formation of educational aspiration among the students in choosing right carrier choices in the higher education. With the aspect in mind, the present study is limited to the educational aspiration of first year higher secondary school pupils who will be in the age group of sixteen and seventeen years. Hence in this investigation, educational aspiration is included as one of the variables in this study.
School education is an important segment of the total educational system contributing conducive environment for development of cognitive, affective and psychomotor domains for all round character development. Today, the problem with the education is more emphasis of cognitive rather than affective (emotion). Therefore, an education for promoting emotions or emotional quotient is a need of hour and essential element in the class room. According to UNESCO’s historic report of the “International commission on Education in the 21st century”, “Learning to be “ and “ Learning to live together” are the two pillars which clearly indicate the “emotions” to evolved and strengthened among students through suitable learning strategies. Denial Goleman (2000) argues that men particularly need to develop emotional skills and gives many examples of high intelligence that were not successful because they have problems. He found from his research that people with high emotional intelligence generally have successful relationships with family, friends and fellow workers. They are also successful because they persist in the fact of setbacks and channel their goals. Therefore, the current study tries to explore the emotional intelligence among the higher secondary students in order to raise it among all students. This is because of the fact that emotional intelligence is important for individuals in their lives in general.

Mental health is perceived as a positive source contributing to asset development individually, socially, and economically (WHO, 2004). The World Health Organization conceptualized mental health separate from mental ill-health and defined the concept as: a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her own community. Shanmugam (2008) found that mental health of higher secondary was below average in nature. Better mental health outcomes in adolescents are characterized by greater adaptation in family, society, and school
environment, improved quality of life (Hoagwood et al., 1996). Many Researches has revealed an increasing incidence of depression and other mental health issues among youth, adolescents (Cash, 2003) which leads to social deviants and terrorism. The rise in mental health issues in adolescents is a growing concern in the school and for the community counselors, and educators. Thus this study is need to study about the mental health for students at the higher secondary level and find out the whether the mental health affect the students achievement. So mental health is included as another independent variable in this study.

By knowing the scientific aptitude of the child, he/she can be guided to adopt a profession related to the field of chemistry. Chemistry achievement of a child largely depends upon scientific aptitude at the higher secondary level of education. As our society becomes more and more dependent on high levels of technology, it becomes increasingly important that children should grow up with a basic competence and familiarity. Achievement in chemistry is the competency shown by the student in the subject. There are intra and inter differences among the individuals in the achievement of chemistry. These differences may be due to their scientific aptitude in the subject. So the present study intends to discover the levels of scientific aptitude of higher secondary school students in relation to achievement in chemistry. The present study has great significance, relevance, importance and utility for both parents and teachers because this will encourage them to come forward to understand their children's scientific aptitude. Findings of the present study may be helpful to parents and school authorities including teachers and principals to know and understand the effect of scientific aptitude on the academic achievement of students in chemistry.
1.18 STATEMENT OF THE PROBLEM.

The present study is intended to analyze “Achievement in chemistry in relation to certain selected variables”.

1.19 OPERATIONAL DEFINITION OF THE TERMS

The definitions used in the study along with their operational definitions are given below.

Achievement in chemistry

It is the performance by the student in chemistry subject after testing.

Educational Aspiration

It means strong desire “especially to do something great or important in education”. It is the possible goal which an individual sets for him/herself.

Emotional Intelligence

It is a type of intelligence that involves the ability to monitor, understand one’s own and others emotions, to discriminate among them and to use the information to guide one’s thinking and actions.

Mental Health

It is a relative state of mind in which a person is healthy to cope with and adjust to the recurring stress of everyday living in an acceptable way.

Scientific Aptitude

The tests that measure the reasoning ability, numerical ability, science information and science vocabulary level of students.

Higher secondary School students

Those students who are studying 10+2 pattern of education after high school education from Tamilnadu state board of education.
1.20 OBJECTIVES OF THE STUDY

1. To find out the level of achievement in chemistry of higher secondary students.

2. To find out the level of educational aspiration of higher secondary students.

3. To find out the level of emotional intelligence of higher secondary students.

4. To find out the level of mental health of higher secondary students.

5. To find out the level of scientific aptitude of higher secondary students.

6. To find out the high, average and low levels of achievement in chemistry of higher secondary students with respect to their educational aspiration, emotional intelligence, mental health and scientific aptitude.

7. To find out whether there is any significant difference among the high, average and low levels of achievement in chemistry of higher secondary students with respect to their educational aspiration, emotional intelligence, mental health and scientific aptitude.

8. To find out whether there is any significant difference among higher secondary students’ achievement in chemistry based on their sub-sample.

9. To find out whether there is any significant difference among higher secondary students’ educational aspiration based on their sub-sample.

10. To find out whether there is any significant difference among higher secondary students’ emotional intelligence based on their sub-sample.

11. To find out whether there is any significant difference among higher secondary students’ mental health based on their sub-sample.

12. To find out whether there is any significant difference among higher secondary students’ scientific aptitude based on their sub-sample.
13. To find out whether there is any significant relationship between higher secondary students’ achievement in chemistry and their educational aspiration with respect to entire and sub sample.

14. To find out whether there is any significant relationship between higher secondary students’ achievement in chemistry and their emotional intelligence with respect to entire and sub sample.

15. To find out whether there is any significant relationship between higher secondary students’ achievement in chemistry and their mental health with respect to entire and sub sample.

16. To find out whether there is any significant relationship between higher secondary students’ achievement in chemistry and their scientific aptitude with respect to entire and sub sample.

17. To find out whether there is any significant contribution of independent variables and the demographic variables on higher secondary students’ achievement in chemistry.

1.21 HYPOTHESES OF THE STUDY

1. The level of achievement in chemistry of higher secondary students is high.

2. The level of educational aspiration of higher secondary students is high.

3. The level of emotional intelligence of higher secondary students is high.

4. The level of mental health of higher secondary students is excellent.

5. The level of scientific aptitude of higher secondary students is high.

6. High, average and low levels of achievement in chemistry of higher secondary students with respect to their educational aspiration, emotional intelligence, mental health and scientific aptitude are high.
7. There is no significant difference among the high, average and low levels of achievement in chemistry of higher secondary students with respect to their educational aspiration, emotional intelligence, mental health and scientific aptitude.

8. There is no significant difference between higher secondary students’ achievement in chemistry based on their sub-sample such as gender, medium of school, location of school, type of family, parental monthly income, siblings and attendance.

9. There is no significant difference among higher secondary students’ achievement in chemistry based on their sub-sample such as type of school management, type of school, religion, community, fathers’ education, mothers’ education, fathers’ occupation and mothers’ occupation.

10. There is no significant difference between higher secondary students’ educational aspiration based on their sub-sample such as gender, medium of school, location of school, type of family, parental monthly income, siblings and attendance.

11. There is no significant difference among higher secondary students’ educational aspiration based on their sub-sample such as type of school management, type of school, religion, community, fathers’ education, mothers’ education, fathers’ occupation and mothers’ occupation.

12. There is no significant difference between higher secondary students’ emotional intelligence based on their sub-sample such as gender, medium of school, location of school, type of family, parental monthly income, siblings and attendance.

13. There is no significant difference among higher secondary students’ emotional intelligence based on their sub-sample such as type of school management, type of school, religion, community, fathers’ education, mothers’ education, fathers’ occupation and mothers’ occupation.
14. There is no significant difference between higher secondary students’ mental health based on their sub-sample such as gender, medium of school, location of school, type of family, parental monthly income, siblings and attendance.

15. There is no significant difference among higher secondary students’ mental health based on their sub-sample such as type of school management, type of school, religion, community, fathers’ education, mothers’ education, fathers’ occupation and mothers’ occupation.

16. There is no significant difference between higher secondary students’ scientific aptitude based on their sub-sample such as gender, medium of school, location of school, type of family, parental monthly income, siblings and attendance.

17. There is no significant difference among higher secondary students’ scientific aptitude based on their sub-sample such as type of school management, type of school, religion, community, fathers’ education, mothers’ education, fathers’ occupation and mothers’ occupation.

18. There is no significant relationship between higher secondary students’ achievement in chemistry and their educational aspiration with respect to entire and sub sample.

19. There is no significant relationship between higher secondary students’ achievement in chemistry and their emotional intelligence with respect to entire and sub sample.

20. There is no significant relationship between higher secondary students’ achievement in chemistry and their mental health with respect to entire and sub sample.
21. There is no significant relationship between higher secondary students’ achievement in chemistry and their scientific aptitude with respect to entire and sub sample.

22. There is no significant contribution of independent variables and the demographic variables on higher secondary students’ achievement in chemistry.

1.22 LIMITATIONS OF THE STUDY

It refers to the incompletion of an investigation in the form of non-fulfillment of initially and originally designed and expected.

1. The study is conducted only in Namakkal district during the academic year 2012-2013.

2. Welfare and special category schools could not be considered for this study.

3. Students of highly downtrodden, Orphan students, physically, visually, and mentally challenged students are not considered for the study.

4. The enrolled higher secondary first year students in chemistry subject in selected schools constitute the population. The actual population is 2023.

5. At first, simple random sampling technique is adopted for school selection. Then stratified sampling technique is adopted for sample selection.

6. The students at the higher secondary stage are expected to have acquired a reasonable command of English language and therefore English versions of the tools were used in the study.

7. Achievement in Chemistry Test was constructed and standardized by the investigator. Reliability and Validity was established for the self constructed tool.

8. For respondents, time limit should be adopted only for answering chemistry achievement and scientific aptitude tools. Required time is given for educational aspiration, emotional intelligence and mental health tools for answering.
9. Norms for the achievement in chemistry is based on the \( M \pm 1\sigma \) (Mean\( \pm 1\)Sigma).
   The levels classified into high, average and low categories within obtained achievement in chemistry score range limit 6-48.

10. Descriptive analysis (mean, standard deviation, skewness and kurtosis), differential analysis (t-test and F-test), correlation analysis (co-efficient of correlation (r) and regression analysis (R) could be employed for the present study.

11. The general mood and environmental factors at the time of responding to the tools would have affected the responses of the subjects and this is recognized as a limitation.

12. Even though there are various dimensions available for selected independent variables, dimension wise analysis could not be carried out and it is considered as the important limitation of this study.

1.23 Delimitations of the Study

It refers to the process of conscious narrowing down of any phenomenon. This may occur in the provision of operational definition terms. Each of research problems whether in humanities or pure sciences has to be delimitied up to some extent because the research could not control all factors responsible for the criterion. This research study would be delimited in terms of content and sample. Similarly, the present study was delimited to the following aspect.

1. The achievement of the students has been studied in chemistry subject only.

2. The study was confined to the first year higher secondary chemistry students during the academic year (2012-2013) and those in the vocational stream could not be selected.

3. Out of 150 numbers of higher secondary schools in Namakkal district, only 40 numbers of higher secondary schools from four taluk (Tiruchengode, Rasipuram,
Velur and Namakkal) which consisted 15 educational Community Developmental blocs were considered for the study.

4. From 40 selected higher secondary schools, 20 Government, 10 Aided and 10 Private higher secondary schools students were selected in the ratio 50:25:25.

5. The study is delimited to only 800 chemistry students from the total number of students 2023 (Population) enrolled. This constitutes 39.54 % of sample from the selected population.

6. The present study is delimited to selecting sub sample such as gender, medium of school, type of school management, location of school, type of school, type of family, religion, community, fathers’ education, mothers’ education, fathers’ occupation, mothers’ occupation, parental monthly income, siblings, and attendance.

7. Out of the four types of technique of research (survey, observation, interview and sociometry), the present study is delimited to survey technique only.

8. This study is delimited to studying achievement in chemistry in relation to four independent variables (educational aspiration, emotional intelligence, mental health and scientific aptitude) and fifteen demographic variables.

1.24 BRIEF RESUME OF CHAPTERS OF THE STUDY

The present investigation is described in five chapters,

- The first chapter deals with brief resume of theme, statement of the problem, objectives of the study, hypotheses, limitations, delimitations and chaptering scheme.
- The second chapter deals with meaning of review of related literature.
- Third chapter deals with method of research, population and sample size, variables of the study, justification of the variables, tools used, scoring procedure reliability and validity of the tool, and statistical techniques used.
• Fourth chapter deals with analysis and interpretation of data in relation to testing of hypotheses and inferences.

• Fifth chapter deals with summary, findings, recommendations, implications, discussions, suggestions for further study, and conclusions.