CHAPTER – 1

INTRODUCTION

Education is the process of developing the capacities and potentials of an individual so as to prepare him for a successful orientation in a specific society or culture. From this perspective, education serves primarily the function of developmental tool for an individual. Education begins at birth and continues throughout life. It is a constant and ongoing schooling which generally begins in the age four and six when children are gathered together for the purpose of specific guidance related to skills and competence that society deems important. In the earlier time, once the formal primary and secondary schooling was completed, the process of education was finished. However, in today's age of information, adults quite often learn in informal setting throughout their working lives and even after their retirement. Education in its broadest sense is defined as a process designed to inculcate the knowledge, the skills and the attitude necessary to enable individuals to cope effectively with the environment they live in. Its primary purpose is to foster and promote self-realization in an individual to the fullest. Achieving this goal requires the understanding of education as a primary instrument for social and economic advancement of human welfare (Verma, 1990).

A modern society cannot achieve its aim of economic growth, technical development and cultural advancement without harnessing the talents of its citizens.

The Strength of the nation lies in its commitment and capacity to prepare its people for needs, aspiration and requirements of a progressive technological society. This implies the new creation of opportunities and facilities for training large number of youth in imbibing as much new knowledge as possible. This being generally true of all developing countries, it is more so for India, especially Tripura for accelerating the pace of economic growth and social development. Tripura is a small state of India which is situated at North-Eastern Region of India. Educationally Tripura is a growing state of country. But growth rate is not up to the mark as it is desired. Development in education of a state or a country depends on its basic education. First step of basic education in the sense of public examination is secondary examination (Madhyamik Examination) conducted by state education board (Tripura Board of Secondary Education).

Educationists and psychologists concerned with educational settings are often confronted with students who have above average scholastic aptitude but are very poor in their studies. An important question which often baffles them is raised that why some students succeed in their studies, while others do not. This question is sometimes considered to be closely related to learning than teaching. Janaur (1974) states that efficient learning depends not only on good teaching methods but also satisfactory learning procedures. Christian (1983) is of the view that students fare badly in their academic domain due to some factors other than their low intellectual capacity. Tiwari and Bansal (1994) mentions that a child with high academic achievement is likely to be well behaved as well as well treated in the society and low-achievers are treated as incapable and are deprived of employment which may lead to maladjustment in their lives.

1.1 Academic Achievement

Achievement of pupil in school may be affected by various factors like intelligence, study-habits, aptitude, interest, attitude towards school, different personality traits, socio-economic status etc. The desire of success is derived from individual's definition of himself and is also measured in terms of various incentives in explaining success and failure in the eyes of others. Therefore, a child who sees himself as a top ranking scholar may set his attainment of the highest grade in the class. It had been rightly mentioned that in our society academic achievement more specifically Mathematical Achievement is considered as a key criterion to judge one's total potentialities and capacities. Hence, Mathematical academic achievement occupies a very important place in education as well as in the learning process.

Academic achievement is defined by Crow & Crow (1956) as the extent to which a learner is profiting himself from instructions in a given area of learning. In other words, achievement is defined as the competence that pupils actually show in the school subjects in which they have received instructions. Academic achievement means the attainment level at which the students perform in school tasks and it is measured by school marks or grades earned (Mohan, 2008).

Assessment of learner's scholastic achievement is of utmost importance. The past records of a student may illuminate his present status. Extremely good or extremely poor marks may be indicative of unusual personality traits of a student. Educational achievement also forms the basis of admission to various courses and promotion to higher classes. It also helps to reveal strength and weakness of an individual in a specified area. Besides helping the students, academic achievement also helps the teachers in day to day classroom situation. It helps them to develop learning situations suited to the needs and capacities of the individual students, discover the areas of particular strength and develop remedial programmes (Kanchanna & Kaliappan, 2002).

Academic achievement is accomplished by the actual execution of class work in the school setting. It is typically assessed by teacher's ratings, tests and exams (Howse,1999). In the educational setting as Ashok (2008) also pointed out achievement as essentially a test of teaching and learning outcomes of any given topic, subjects or tasks. Achievement in an educational institution means any desirable learning that is observed in students. Academic achievement is also defined in terms of student's expectancy and ability beliefs (Wigfield & Eccles, 2000). Taylor (1964) stated that the value a student places upon his own worth affects his academic achievement. A very high level of expectation tends to make a pupil accept a very high standard of achievement, while a very low level of expectation tends to make him accept a very low standard of achievement.

Enhancement of academic achievement of the students and to enlarge their vision is one of the chief objectives of education. Achievement encompasses student's ability and performance; it is multidimensional, is intricately related to human growth, and his cognitive, emotional, social and physical development; it reflects the whole child; it is not related to single instance but occurs across time and levels through a student's life in public school and passed to secondary years and also reflects in working life (Steinberger,1993) In today's highly competitive world education plays a key role in the success and prosperity of an individual (Amusen, 2006).

In the formal education sector, the level of education attained is measured in terms of academic achievement which means achieving the curriculum objectives of success and prosperity as defined by the society. By implication academic achievement distinguishes between students and predicts their success at work. Thus, we can say that academic achievement is of paramount significance. In present day society, achievement of an individual largely leads to his status and power building in society rather than having ascribed qualities (Singh, 2008).Therefore, it has been a challenging problem of continuing interest to the educationists and psychologists to predict future success of students in the scholastic courses especially on the basis of intellectual, non-intellectual and personality variables.

1.1.1 Factors Associated with Academic Achievement:

Educators and Psychologists have therefore been interested in those factors which influence or are associated with academic achievement (Bakare, 1979, Hassan, 2001; Onabamiro, Owoyele, Toybo & Majekodammi, 2007).

Academic achievement has been a topic of considerable interest and research for a very long time. Countless number of studies have been undertaken which focus exclusively on academic achievement and its relationship with cognitive, social and personal factors. (Aguirre, Perez, Otero Ojeda & Manjarrez 2008; Steca & Malone 2006; Contessa Ciadiells & Perlman 2005; Finney & Barron 2007; Johnson, McGue&Lacono2006 ; Abar Carter & Winsler 2008; Johnson2008; Black & Land 2006).

A myriad of factors are related to academic achievement.

The four fundamentals which will be addressed in this study are: creativity, level of aspiration achievement motivation and academic achievement. Apart from intelligence, one of the major factors or determinants of academic achievement is creativity.

Numerous recent researches have been conducted on the subject of creativity (Charlton2009; Heinze, Shapira, Rogers & Senker, 2009; Ivcevic, 2009; Miller, 2007; Runco, 2007a, 2007b; Simonton & James, 2007 & Yusuf, 2009).

Creativity is regarded as the greatest asset of mankind. It is an ability that is most vital for shaping the future of man. The credit for opening the present era of research in creativity goes to Guilford (1950) who defined this term variously. Creativity as the key to education in its fullest sense and is a solution to mankind's various problems. Creativity is the process that can be characterized as originality, novelty, fluency, flexibility and appropriateness. Creativity has been subjected to many different definitions. On the one hand it is defined as the academic achievement or academic ability and on the other hand it is relatively more easily defined, measured and interpreted (Palaniappan, 2005). Other researchers namely Sternberg & Lubart (1996) describes creativity as the confluence of intellectual activity, knowledge, motivation, thinking style, personality and environment. According to Akinboye (2003) without creativity a person is not able to access the fullness of information and resources available but is locked in old habits, structures, patterns, concepts and perceptions.

Researchers have been curious about the relationship between creativity and acadennic achievement for numerous years (Cicirelli1965; Denny & Condon, 1965; Ai 1999; Behroo2i2006; Barrois & Hughes, 2008 and Naderi, 2009). Several researches have also suggested that academic achievement can be predicted through creativity testing (Hirsh & Peterson, 2008 and Struthers et al., 1996).

There has been controversial debate on the relationship between creativity and academic achievement in school and later in vocational success. Some researchers have pointed out that creative thinking is important as a traditional measure of IQ. in educational setting. Mehdi (1977) supports the view that scholastic achievement which is usually based on convergent thinking is predicted better by intelligence test. He emphasizes that divergent thinking and convergent thinking do not operate separately but collectively interact for achievement. Several scientific investigations have reported a significant relationship between creativity and academic achievement (Singh, Mathur & Saxena, 1977; Asha, 1980; Jarial, 1980 Vijaylakshmi,1980; Chandra, 1992; Bawa, 1997; Mansoor 2000 Rothenberg, 2002; Furnehm 2006;Preckel, Holling & Wiese, 2006 Chauhan, 2008 and Ling, 2009).

However, there are other few studies which indicates low and insignificant relationship between creativity and academic achievement. Getzal & Jackson (1959, 1969) reported insignificant relationship in the scholastic attainment of their subjects despite a difference of 23 points in mean IQ of high creative (HC) and high intelligence (HI) groups. Some other researchers namely Torrance,1959, 1960; Bist,1964; Yamatto,1969; Pathak,1961; Parmesh, 1973; Joshi, 1974; Ai; 1999; Karimi, 2000 and Mehr Afza, 2004 obtained insignificant relationship between creativity and academic achievement.

Other researchers (Ai, 1999, Behroozi, 1997; and Nori, 2002) also reported that creativity was not related to academic achievement in any significant way. Additional research suggests that as students attain higher level of education, there is an apparent decline in the relationship between academic achievement and creativity. On the basis of this, it may be suggested that divergent thinking in the form of fluency, flexibility and originality might contribute and interact with convergent thinking in understanding academic achievement.

Academic achievement is also influenced by the level of aspiration which is an important variable to predict it. Aspiration is a natural phenomenon of human life. The concept of "Level of aspiration" was first of all introduced by Dembo in 1931. Hoppe (1931), defines level of aspiration as "a person's expectation; goals or claims on his own future achievement in a given task".

The important role of aspirations and expectations in identifying the future educational and career options remains an important area of the present study. The level of aspiration plays a significant role in the scholastic achievement of the students. There is a close and one to one relationship between academic achievement and level of aspiration. Higher level of aspiration leads to higher academic achievement. The level of aspiration is generally raised when performance Is equal to level of aspiration and lowered when performance falls below the level of aspiration.

Several researches and studies have been conducted on the topic of relationship between level of aspiration and academic achievement (Joshi1947; Jucknet 1937; Akinson 1953; Kumar 1972; Tripathi 1990; Chung & Gonzo, 1996; Armstrong & Crombie, 2000; Davey & Stoppard, 1993; Kim, 2003; Rojewski, 2005 and Peter et al.,2007).

Various investigations made by the researchers namely Jucknet, 1937; Lewin, 1944; Weigard, 1953; Lowell, 1953; Worell, 1959, Moultan, 1965; Kuppuswami, 1972; Shukia 1973; Khan, 1982 have reported positive relationship between academic achievement and level of aspiration.

Kumar (1972) studied self-concept and level of aspiration as factors affecting academic achievement and found that tendency to aspire for higher scores are more marked for higher achievers than the lower achievers.

Numerous recent studies on level of aspiration and academic achievement also found positive and significant relationship between these two variables (Tripathi, 1990; Ngailiankim, 1991; Getaum, 2000; Ziegler & Strogrt, 2004; Rinn, 2005; Peter, et al., 2007 and Salami, 2008).

Some studies by Sharma (1981) and Gupta (1987) have found insignificant relationship between academic achievement and level of aspiration.

Thus, on the basis of above research findings, it can be concluded that level of aspiration is an important determinant of academic achievement.

Motivation is one of the major factors that contribute to academic success. It is necessary both for parents and educators to understand that why promoting and encouraging academic motivation from an early age is important. Motivation is crucial to student's academic success at any age because development of early achievement motivation has significant implication for the later academic success. Intelligence is not only the sole determinant of academic achievement but also of high achievement motivation, engagement of learning which consistently been linked to reduced dropout rates and increased level of student's success (Kushman, Sieber, Harold2000). Development of academic intrinsic motivation in young children is an important goal for education because of its inherent importance for future success as well as also for the children's effective school function (Gottfried, 1994).

Motivation has been shown to be affected by one's attributions of events, perceived causes (Weiner,1980) and is associated with behaviour leading to educational achievement (Atkinson,1980).

The formulation of achievement motivation constructs derives from the work and theory of Murray (1938). Achievement motivation has been reported to be the need for achievement (nAch) since the beginning of its systematic study (McClleland, Clark, Roby & Atkinson, 1949). Everyone has a need for achievement or competence in some area or other. Achievement motivation is defined by McClleland et al., (1953), "an internalized tendency to strive for standards of excellence." It attempts to account for the determinants of the direction, magnitude and persistence of behaviour.

In recent times, psychologists and other social scientists have shifted their emphasis on the academic performance concerning achievement motivation. Scholars such as McClleland, 1961; Kulka, 1972; Weiner, 1985 and Atkinson, 1964 have done extensive studies on it and the common conclusion which is Introduction arrived at is that people with high achievement motivation are found to be high achievers and thus they are always set for a high academic achievement and efficiency in school system.

A great deal of researchers have found that students high in achievement motivation are more likely to have increased level of academic achievement and have lower dropout rates (Blank,1979). Numerous studies have investigated the relationship between motivation and academic performance and success (Gottrieb, 1990; Johnson, 1996; Kushman, Sieber & Harold, 2000; Sandara, 2002; Garrison, 2004 and Skaalvik, 2004a, 2006b).

Several recent studies have been carried out on the subject of achievement motivation and academic achievement and have found significant and positive correlation between these two variables (Gottfried,1990; Golberg, 1994; Boggino et al., 1992 Fortier, 1995; Vallerand & Guay 1995; Rea 2000; Koffi 2004 Coats & Garrison, 2004; Khan, 2005; Telia, 2007; Freeman, 2008 Daniel 2009 and Turner et al., 2009).

It should be noted that some studies have found little or no significant relationship between achievement motivation and academic achievement. Studies such as Niebulor, 1995; Goldberg & Cornell, 1998; Stipek & Ryan, 1997 and Halawah, 2006 have found that the correlation between motivation and achievement was very low.

Hence, the issue of motivation, intelligence, SES of students and their impact on academic achievement is considered as an important aspect of effective learning.

1.2 Intelligence

Some distinctions in terminology are warranted at this point. In educational and psychological literature, the terms “intelligence” and “mental ability” are often used in an interchangeable manner (Snyderman & Rothman, 1988).

The concept of intelligence is found in the writings of Greek philosophers, Plato and Aristotle, and it predates the birth of Jesus Christ (Walsh & Betz, 1985).

The term intelligence is vague and ambiguous in its meaning. Psychologists have been interpreting the term in different ways, and are in disagreement with each other on the meaning of the term, ‘intelligence’.

According to Cyril Burt, the word “intelligence,” originally comes from Latin. It was revived by Herbert Spencer and Francis Galton in the mid nineteenth century as a scientific term, which means “innate, general cognitive capacity” (Snyderman & Rothman, 1988). However, it must be noted that several definitions have been suggested by psychologists but no two psychologists agree on a single definition of the term (Chauhan, 1995). In the early days of philosophical enquiry, the term intelligence was mostly considered from the narrower point of view of “abstract intelligence”. The early studies of ‘intelligence’ by psychologists in this century were also concerned with operations of abstract intelligence, or performances of the ‘higher mental processes (Kuppuswamy, 2003).

The term “intelligence” is defined with a wide diversity of meaning, not only by the general public but also by members of different disciplines, such as Biology, Philosophy, or Education, and by psychologists who specialize in different areas. Different scientists have had different ideas concerning the nature of intelligence and how to measure it (Walsh & Betz, 1985), and as to whether intelligence is a general ability or a concatenation of many separate abilities concerning the different theoretical orientations.

Some definitions of intelligence emphasize on the adjustment ability of an individual with his environment. Such definitions are presented by Stern, Pintner, and Piaget. Stern (1921, cited in Anastasi, 1958; Chauhan, 1995) defined intelligence as a general capacity of an individual, to consciously adjust his thinking to new environment. Pintner (1944, cited in Sternberg 1982) defined intelligence as “the ability of the individual to adapt himself adequately to relatively new situations in life”. According to Piaget, intelligence constitutes a state of equilibrium towards which tend all the successive adaptation of sensorimotor and cognitive nature, as well as all assimilatory and accommodatory interactions between the organism and the environment (Piaget, 1971).

Other definitions of intelligence emphasized on the importance of an individual's ability to learn. Learning ability is an index of one's intelligence. Such definitions are presented by Goddard, Backingham and Woodrow. Goddard (1946) defined intelligence as "the degree of availability of one's experiences for the solution of immediate problems and the anticipation of future ones". Backingham defined intelligence as "the learning ability", and Woodrow (cited in Sternberg, 1982) as "the capacity to acquire capacity".

Some of the other definitions of intelligence have emphasized on the effective use of concepts and symbols in dealing with situations, especially, in presenting a problem to be solved through the use of verbal and numerical symbols. Such definitions are presented by Terman, Spearman, and Binet. Terman (1937) defined intelligence as an individual's ability to carry on abstract thinking, and to use abstract symbols in the solution of all kinds of problems. Spearman (1923) held that intelligence is essentially the perception of relation, especially the perception of difficult or subtle relations. According to Binet's concept, in order to behave intelligently a person must have the ability to select, to make judgments and, to criticize any solution that he may have to solve a problem (Robb et al, 1972).

According to Wechsler (1944) “intelligence is the aggregate or global capacity of the individual to act purposefully, to think rationally and to deal effectively with his environment”. Stoddard’s (1943) definition states that “intelligence is the ability to undertake activities that are characterized by (1) difficulty, (2) complexity, (3) abstractness, (4) economy, (5) adaptiveness to a good situation, (6) social value, and (7) the emergence of originals, and to maintain such activities under conditions that demand a concentration of energy and a resistance to emotional forces”.

Few of the definitions offered by experts have contained a clear commitment about the relative effects of hereditary by defining intelligence as ‘innate general cognitive ability’. Since scores of existing tests have often been shown to be susceptible to environmental influences, a consequence of this definition is that intelligence as defined as innate general cognitive ability differs from intelligence as measured by tests. Psychologists have attempted to escape from this dilemma to adopt an operational definition of intelligence (Butcher, 1988), and this view became very popular in science during the 1930. The definition presented by Boring (1923) is that “intelligence is what these tests measure”, and Sanford’s (1962) definition is, “intelligence is what the intelligence tests test”.

Sanford (1962) commented that an intelligence test is a device that confronts an individual with an array of tasks, and the individual responds to the test, and his behavior is quantitatively compared with the behavior of a known population of people who have responded to the same array of problems. We take an individual score to be indicative of the intelligence that consistently characterizes the individual's behavior (Sanford, 1962).

Vernon (1960) classified all the definitions of intelligence under three broad categories such as biological, psychological and operational.

- Biological approach- This category of definitions emphasize the adaptive nature of human beings.
- Psychological approach- Few of the definitions advanced by experts contained a clear commitment about the relative effects of hereditary and environmental influences on the development of intelligence.
- Operational approach- Operational definitions are important to understand the concept of intelligence in clear and definite terms.

Freeman (1962) divides them into those emphasizing:

a) Power of adaptation to the environment.

b) Capacity for reasoning.

c) Ability for abstract thinking.

Probably the best-known study of experts' definitions of intelligence was one done by the editors of the Journal of Educational Psychology, 1921. Fourteen experts have discussed their definitions and their views on the nature of intelligence (Sternberg, 2003). One well-known set of definitions was published in 1986 as an explicit follow-up to the 1921 symposium. Sternberg and Berg (1986) attempted a comparison of the views of experts in 1921 with those of the experts in 1986. They reached three general conclusions:

1. There was at least some general agreement across the two symposia regarding the nature of intelligence.

2. Central themes occurred in both symposia. One theme was, one versus the many: Is intelligence one thing or is it a multiple of things? How broadly should intelligence be defined? What should be the respective roles of biological versus behavioral attributes in the seeking and understanding of intelligence?

3. Despite the similarities in views over the sixty-five years, some salient differences could also be found. Metacognition – conceived of as both knowledge about, and control of cognition – played a prominent role in the 1986 symposium but virtually no role at all in 1921. The latter symposium also places a greater emphasis

on the role of knowledge and the interaction of mental processes with this knowledge.

The term intelligence is used in many contexts, with a diversity of meanings. Although these meanings are not irreconcilable, they certainly emphasize different aspects of intelligent behavior (Anastasi, 1983). All these meanings have contributed to our current understanding of the nature, meaning, and measurement of intelligence.

Psychologists often distinguish between three kinds or three areas of intelligence activity – the abstract, the mechanical, and the social (Garrett & Bonner, 1961).

- Abstract intelligence is exhibited in our handling of symbols – words, numbers, formulas and diagrams diagrams. The abstractly intelligent person is able to discover the relations among symbols and to solve problems with their aid.
- Mechanical intelligence enables its possessor to deal readily with machines and mechanical contrivances.
- The social intelligence is shown in personal and social affairs. The socially intelligent person is an extrovert, makes friends easily and is tactful and understanding in human relationships.

Psychologists, too, differ from one another in their opinion about the concept of intelligence. There were two different conceptual approaches to intelligence, the psychometric and Piagetian (Kohlberg et al; 1987).

Psychometric approaches: Two psychometric approaches are distinguishable. The first is the classic British biological view of intelligence as hereditary and maturational. This view is represented by Galton (1869), Spearman (1904, 1923. 1930), and Cattell (1972). With regard to the theoretical issue of nature and origin, they believed that intelligence is “an innate, general cognitive ability”. With regard to the issue of assessment of cognitive functioning, the British school developed a method that maximized the chances of observing intelligence as a general biological capacity relatively independent of experience. Since intelligence is conceived of as a fixed capacity by this approach, the educational use of intelligence tests must be for educational selection, not for assessing educational progress or change.

The second psychometric approach is the environmental-learning view (Kohlberg et al; 1987). With regard to this theory, an environmental-learning conception of intelligence is reflected in various American writings. Hayes (1962), for example says that “manifest intelligence is an accumulation of learned facts and skills”. Environmental-learning approach has not provided a clear conceptual distinction between “intelligence” and specific skills of school achievement. The value of intelligence as defined by the environmental-learning view is relative to its prediction of success in a particular culture (Kohlberg et al; 1987).

The third view is given by Piaget. Piaget’s position is inter-actionist; it is not a doctrine about the quantitative contribution of heredity and environment to intelligence, but a doctrine about the origins of the structure of intelligence and its development. While he has acknowledged biological rate and environmental learning factors (Kohlberg et al; 1987), Piaget’s (1971) position is that intelligence is the product of the individual’s active construction and interpretation of experience through a process of equilibration. Thus Piaget adds the third factor i.e equilibration, a balance of assimilation and accommodation that represents intelligence as adaptation itself, to already existing two factors, that is (1) biological heredity and maturation and (2) cultural and social learning (Kohlberg et.al; 1987). Intelligence is thus only generic to indicate the superior forms of organization or equilibrium of cognitive structuring (Piaget, 1971). Binet never developed a final theoretical conception of intelligence. He suggested that intelligence is defined by a diverse set of independent abilities. Yet he eventually developed a test of intelligence that provided for the computation of a single index, implying that intelligence was one thing. Binet sought in his tests to measure not an entity or single dimension (general intelligence) but rather an average level of intelligence in general (Brody & Brody, 1976). Binet (1905) believed that there were separate mental "faculties" such as memory, imagination, attention, and judgment. He believed that these "faculties" are only revealed in complex performances calling for a number of these faculties at the same time.

Cattell (1972) presented his view about the nature of intelligence when he distinguished between two kinds of intelligence, fluid and crystallized. Fluid intelligence is reflected from inference and reasoning on tests, that are relatively free of cultural or informational content. On the other hand, crystallized intelligence is manifested in the results of tests that are strongly influenced by the trappings of culture, such as tests of vocabulary, facts, and information. Fluid intelligence is more culture- free than crystallized intelligence and corresponds more closely to Spearman's "g". Cronbach (1970), states that the most promising way to view the nature of intelligence is as a hierarchical structure in which there are broad factors, each of which accounts for performance in a wide range of tasks, and below these, more specific task abilities, that account precisely for the varied tasks in the domain.

While there are no mechanical procedures for extracting a hierarchical structure from a correlation matrix, a combination of conventional factor analysis and substantive reasoning can produce a structure that provides a reasonable working hypothesis (Cronbach,1970).

From the biological point of view, intelligence thus appears as one of the activities of the organism, while the objects to which it adapts itself constitute a particular sector of the surrounding environment (Piaget, 1971).

The other question about the nature of intelligence is, how much of a person's intelligence – test rating, depends on native and inherited powers, and how much of it can properly be attributed to opportunity and circumstances.

Unfortunately, no exact answer can be given to this often – discussed question (Garrett & Bonner, 1961).

Various methods have been used in attempting to arrive at a quantitative estimate of the relative influences of heredity and of environment on the development of intelligence.

Eysenck (1972, 1979) also estimated that 80 percent of general intelligence is hereditary using the estimates of correlation corrected for attenuation, as described earlier in Spearman's (1904) work.

The study of Newman et al, (1937) reveals the effect of environment on intelligence and also gives some support to the claim of Cattell (1972) and Eysenck (1972) that 75 percent of the variance in general intelligence is due to heredity.

There are at least three different positions on the influence of heredity in intelligence. The “classical” position which has been reaffirmed in recent years by Jensen (1973) and Herrnstein (1973) suggests that approximately 80% of the variance in intelligence test scores is attributable to genetic differences among individuals. Jencks (1972) has concluded that the best estimate is that genotypic differences explain approximately 45% of the variance in scores. Finally, Kamin (1974) has reviewed the literature on the inheritance of intelligence test scores and concluded that, “there exists no data which should lead a prudent man to accept the hypothesis that I.Q. test scores are in any degree heritable”.

Psychologists today agree that development is shaped by the interaction of heredity and environment. Within this interaction, our genetic endowment for many characteristics provides us with a reaction range – that is, a range of possible levels that we may ultimately reach, depending on the quality of our experience (Morgan et al; 1997).

A major point to bear in mind is that intelligence is not a single, unitary ability, but a composite of several functions. The term is commonly used to cover that combination of abilities required for survival and advancement within a particular culture (Anastasi, 1986). It follows that the specific abilities included in the composite, as well as their relative weights, vary with time and place. In different cultures and at different historical periods within the same culture, the qualifications for successful achievement differ (Anastasi & Urbina, 1997).

The importance of intelligence and the influence of intelligence on behavior clearly show up, when individuals are confronted with novel or complex situations. Every day observation, however, is not sufficient to determine whether intelligence is a scientifically valid and useful construct (Murphy & Davidshofer, 1998).

1.3 Socio-Economic Status (SES)

The word, socio comes from the word 'social' and refers to people and the ways (level) they fit into the community in which they live. It reflects how well they are educated, have job etc. Economic refers to the financial position of the people within society and include, how much they regularly earn, whether own a house and the assets owned etc. In other words, it is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position in relation to others, based on income, education, and occupation. When analyzing a family's SES, the household income, earners' education, and occupation are examined, as well as combined income versus, when their own attributes are assessed. Socioeconomic status is typically broken into three categories, High SES, middle SES, and low SES to describe the three areas a family or an individual may fall into. When placing a family or individual into one of these categories any or all of the three variables (income, education, and occupation) can be assessed. Moreover a 4th variable, wealth is also an important component of determining socioeconomic status.

1.3.1 Components of SES

Income:

Income refers to wages, salaries , profits, rents, and any flow of earnings received. Income can also come in the form of unemployment or workers compensation, social security, pensions, interests or dividends, royalties, trusts, alimony, or other governmental, public, or family financial assistance. It is a commonly used measure of SES because it is relatively easy to figure for most individuals. Low income families focus on meeting immediate needs and do not accumulate wealth that could be passed on to fiiture generations, thus increasing inequality. Families with higher and expendable income can accumulate wealth and focus on meeting immediate needs while being able to consume and enjoy luxuries and wither crises. Additionally, low income and little education have shown to be strong predictors of a range of physical and mental health problems, ranging from respiratory viruses, arthritis, coronary disease, and schizophrenia. These may be due to environmental conditions in their workplace, or in the case of mental illnesses, may be the entire cause of that person's social predicament.

Education:

Education also plays a role in income as median earnings increase with each level of education. Higher levels of education are associated with better economic and psychological outcomes (i.e.: more income, more control, and greater social support and networking). Education plays a major role in skill sets for acquiring jobs, as well as specific qualities that stratify people with higher SES from lower SES. Annette Lareau speaks on the idea of concerted cultivation, where middle class parents take an active role in their children's education and development by using controlled organized activities and fostering a sense of entitlement through encouraged discussion. Armette Laureau (2003) argues that families with lower income do not participate in this movement, causing their children to have a sense of constraint. A division in education attainment is thus bom out of these two differences in child rearing. Lower income families can have children who do not succeed to the levels of the middle income children, who can have a greater sense of entitlement, be more argumentative, or be better prepared for adult life.

Occupation:

Occupational prestige as one component of SES, encompasses both income and educational attainment. Occupational status reflects the educational attainment required to obtain the job and income levels that vary with different jobs and within ranks of occupations. Additionally, it shows achievement in skills required for the job. Occupational status measures social position by describing job characteristics, decision making ability and control, and psychological demands on the job. Occupations are ranked by the Census (among other organizations) and opinion polls from the general population are surveyed. Some of the most prestigious occupations are physicians and surgeons, lawyers, chemical and biomedical engineers, and communications analysts. These jobs, considered to be grouped in the high SES classification, provide more challenging work and ability and greater control over working conditions. Those jobs with lower rankings are food preparation workers, counter attendants, bartenders and helpers, dishwashers, janitors, maids and housekeepers, vehicle cleaners, and parking lot attendants. The jobs that are less valued were also paid significantly less and are more laborious, very hazardous, and provide less autonomy.

Wealth:

Wealth, a set of economic reserves or assets, presents a source of security providing a measure of a household's ability to meet emergencies, absorb economic shocks, or provide the means to live comfortably. Wealth reflects intergenerational transitions as well as accumulation of income and savings. The effectiveness of social economic status in conditioning the faith personal, social and psychological development has an outstanding importance.

Faith needs a happy and stable environment and a conducive social network for overall growth and development. Youth / adolescence is a transitional period from childhood to adulthood. Earlier it was seen as a period of storm and stress, nowadays it is considered as a time of plain sailing, where youth are full of vigor and vitality. Every youth is a store house of human strengths and virtues. The need of the time is to make youth aware about their human strengths, such as hope, happiness, optimism and residence etc. which will provide true insight into the core reasons behind their consistent successes.

1.4 Achievement in Mathematics

In modern world, mathematics is being increasingly used in sciences, technologies, social science, education etc. With the use of computer and other devices there is a more emphasis in the mathematics. Though the world is more mathematically inclined, the majority of students in school feel it as more abstract. Though the teacher can teach it with the help of modern educational technological devices and more advanced effective methods of teaching, there is a poor performance of the students in the mathematics. Hence, there must be some factors like psychological, social and biographical affecting the learner in learning of mathematics at large. In a study considering the factors of achievement in mathematics, one possibly ignores those aspects in which individuals differ from one another. The starting point may be achievement in mathematics itself where wide ranging variations occur from the point of non-performance to the point of outstanding achievement in it. If we consider a group of students, a few students are found to be high achievers on the one hand, and a few are low achievers on the other, while a sizable number of students always appear as moderate achievers. The question arises why such a difference in achievement appears when the school provides more or less uniform instructional and environmental facilities? Is this difference due to certain factors? Does this difference depend upon inherent qualities? Or Is there any single factor or host of factors which account for all the differences in mathematics achievement? These questions often appear in the minds of the Educators, Educationists and the Psychologists, but with hardly satisfactory answers. Various investigators have explored numerous factors which are found responsible for success or failure in the mathematics.

1.4.1 Achievement in Mathematics In Relation To Variables Studied

It has been firmly established by now that Mathematics Achievement is influenced by psychological variables, social variables, biographical variables, instructional variables, and so on. Sufficient data are available which indicate relationship between these variables and Achievement in Mathematics. There are quite a few well-planned, well-designed multivariate studies which reveal many variables influence Achievement in Mathematics. But there is need to subdivide complex variables and find out how each of the sub-variables is related to the success in the Mathematics. To make a case, it may be noticed that SES which is a composite of sub-variables like parents income, father's educational level, mother's educational level, educational facilities available at home etc. has been found to fluctuate under different conditions in its relationship with pupils' success in the Mathematics. Though an attempt has been made by a few researchers to consider a number of such sub-variables, it is felt that a greater emphasis should be laid on undertaking in-depth studies to analyze the relationship of Achievement in Mathematics to their interactive effects.

- **Gender and Scholastic Achievement in Mathematics -** Many research studies conducted in India and Abroad suggest the boys superiority over girls in educational Achievement in general and numerical ability in particular. Generally, it has been observed that male students have more knowledge and understanding of the Mathematical concepts and thinking in comparison to the females. In the Indian situation, it was found that boys' score in the Mathematics is higher than that of girls. The result of research studies conducted by Sathiyagirirajan (1981), Holland & Sandler (1982), Khatoon (1988), Sucin (1992), Driver (1993), Bassa (1993), Leiker (1993), Chakalisa (1994), Thomous & Wangu (1995), Narayan (1995), Matpass (1999), Patel (1996), Piearey (1996), Arnold & Judith (1996), Paria Debasis (1996), Wells (1996), Pruett (1997), Kaliyan (1997), Jacobi (1997), Marsh (1998), Singh & Singh (2007) and Khatoon & Mahmood (2010) result support the conventional expectation of the boys superiority over the girls in learning outcomes of the Mathematics. Cyrus (1996) (boys have more ability in Mathematics), Narayan (1995) (boys scored higher on Numerical

Ability), Becker (1981) also found the same result. On the other hand, some researches reveal that the girls' superiority over boys' in the Mathematics Achievement viz; Kulkarni, Lal and Naidu (1970) in their survey found that girls belonged to Delhi and Mysore get more marks in comparison to boys. Endsley (1984), Wohlgehager (1992), Wang (2001) and Ganihar & Wajiha (2009) found that girls achieved significantly higher score in the Mathematics than that of boys'. There are some studies which reveal sex factor is non-effective eg. Rule (1981), Koehler (1986), Carmichall (1986), Rajyaguru (1991), Teston (1992), Abdulmajeed (1992), Miller (1993), Harvath (1995), Segars (1995), Sriniwasan (1999), Toole (2001) and Choudhury & Kumar (2009) found in their studies that sex factor did not have an effect on the learning outcomes in the Mathematics. Besides it, Houston (1980), Jensen (1982), Heimann Vtefreyja (1982), Carmichall (1986), Metcaff (1986) and Prakash & Pandey (1996) found that males and females have significant difference on the Mathematics Achievement.

- **Socio-Economic Status and Scholastic Achievement in Mathematics** Among several sociological factors, SES of the child is one of the factors which require constant examination. One of the intriguing aspects of students Mathematics Achievement is the SES of their parents. It has become customary of educational research to treat SES as one of the effective factors of the Mathematics Achievement. Numbers of studies have clearly established a definite relationship between the SES and learning outcomes in Mathematics. David and Michal (1984), Leach & Tunnechlifle (1984), Rajput (1984), Singh (1986), Deshmukh(1988), Prabha Rashmi (1992), Setia (1992), Kim(1992), Leiker(1993), Pruett (1997), Segers (1995), Piearey (1996) and Patel (1997) have focused the positive contribution of the S.E.S. to the Achievement in Mathematics. Grootenbore & Hemmings (2007), Mustafa (2009) and Engin, Nuri & Hulya (2010) found that students from the higher SES groups scored more marks than the low SES groups. On the contrary, many studies do not show any relationship between these two variables. Rajyaguru (1991), Abdulmajeed (1992), Thampurathy (1994) (Social Position), found low and negligible correlation between the SES and the Mathematics Achievement. They found that below a certain level, the marginal differences in socio-economic conditions as such couldn't contribute to Mathematics and Educational Achievement of the children. In the same way Bhargava (1980) did find very little rather negligible impact of the SES on the Mathematics Achievement. In this connection, remark of Harris (1996) cannot be ignored. He found that the students of lower socio-economic status have more knowledge, understanding and application of the Mathematics in comparison with those students who have high socio-economic status because the students of the low socio-economic status get more opportunity of calculation in their day to day life. They have to go to market and they make transactions and hence they become experts in the mathematical calculations and applications.

- **Intelligence and Scholastic Achievement in Mathematics Intelligence** occupies a peculiar position in the study of school performance of Mathematics. A vast essay of research literature in Education and Psychology has brought it to common knowledge that intelligence as general ability, is an important contributory factor in the school Achievement. The level of intelligence truly makes a dominant difference in school's Achievement. The Intelligence as an inherent unified and stable characteristic unequally found among the individuals. It is supposed that difference in learning outcomes in the Mathematics can be easily accounted for. It has been argued that more intelligent pupil is inherently capable of performing better in the examination and earns higher grades than less intelligent pupils. It is a common notion that students of high intelligence obtain better score in the Mathematics' test. Bhushan and Sharma (1981), Annamal (1981) and David and Michal (1984), found that the high intelligence group performs better than the low intelligence group in the Mathematics Achievement, specially in the area of computational skill. Materlis (1970) found that high intelligence made statistically significant gains in Mathematical Understanding than lower Intelligence groups. Kaliyan (1997) [Abstract Reasoning, Numerical Ability, Space Relation, Substitution of Symbols], Rajput (1984) and Nagialiankin (1991) [Numerical Ability, Abstract Reasoning, Space Relation], Rajyguru (1991), Lalitha (1992) [Numerical Ability, Abstract Reasoning, Non-language Reasoning], Setia Seema (1992), Sumangala (1998) [Numerical Ability, Numerical Reasoning, Ability to use Symbols, Spatial Symbols and Abstract Reasoning], Patel (1997), Whang (1997) [Reasoning Ability], Arrieta (1998), Segars (1995) [Student Ability] Glutting Joseph (2006) [Verbal Comprehension, Perceptual Reasoning, Working Memory and Processing Memory], Fernandez (2011) [Brain Hemisphericity] found positive relationship between the Intelligence and specific areas of the Mathematics Achievement. Similarly, Das (1986), Patel (1997), Kasat (1991) and Abdulmajeed (1992) found positive relationship between the Intelligence and the Mathematics Achievement. But the long trail of consistent evidence found only a moderate correlation between measured Intelligence and Scholastic Achievement in Mathematics, gradually led to the acceptance of intelligence, as one of the several determinants. The fact is borne out in our everyday experience which shows that some pupils who impress us as fairly intelligent out of class situations, secure poor marks in the school and college examinations and some who appear dull in such situations, score high in the examinations. Thus although intelligence is a prominent and promising factor for the Achievement, but sometime it may be found that low intelligent or normal intelligent student can secure more marks than the high intelligence students due to some other reasons. Because learning outcome is affected by so many factors e.g. Study habit, home Environment etc. Wilson's (1978) study found that intelligence has no effect on the Mathematics Achievement of the boys and the girls. It has also been observed that the high intelligence students sometimes fail to recall the formulas of the subject matter and hence they fail in the examination. Although such students have a very good understanding of the principles and they can apply those principles very effectively. On the contrary, it has also been observed that a student having low intelligence can crammed most of the principles of the Mathematics but he cannot apply those principles properly.

- **Attitude towards Mathematics and Scholastic Achievemen**t in Mathematics Attitude is surely a forceful determinant of the learning outcomes. Every student with similar abilities differs in school attainment due to his attitude towards the subject. Several efforts have been made from time to time to satisfy the query of finding out the effect of Attitude toward Mathematics on learning outcomes in this subject.

It is a general observation that students having positive Attitude towards Mathematics get more marks in it in comparison with those students who have negative Attitude towards Mathematics. Much of the work has been done, based on the assumption that attitude affect Achievement recently - Miller (1993), Endsley (1984), Ashutosh (1989), Jayraman (1989), Nagailiankin (1991), Rajyaguru (1991), Wohlgehager (1992), Hariharan (1992), Rodriquez (1992), Armstrong (1992), Driver (1993), Bassa (1993), Segars (1995), Thomous & Wangu (1995), Hart (1995), Stella & Purushothaman (1995), Sriniwasan (1999), Choudhury & Kumar (2009) and Ganihar& Wajihar (2009) found in their studies that students' positive Attitude towards Mathematics is significantly related to Achievement in the Mathematics. Suydam and Weaver (1975) in their review of affective factors of Mathematics' learning mention that continued attention should be directed towards developing positive Attitude towards Mathematics Miller, Linda, Herman (1981) found a significant correlation between positive Attitude towards Mathematics and Mathematics computational skill. But sometimes, it has been observed that students, who have no positive Attitude in Mathematics, are able to get good marks in the Mathematics. In other words, it may be stated that attitude has no effect on the learning outcomes in the Mathematics. (Ngailiankin, 1988). Aiken (1976) in reviewing studies, examining the relationship between attitude and Achievement in Mathematics usually found low correlation which did not always reach the level of statistical significance. Watson (1981), Robert (1982) and Mckethan (1982) have conducted studies and found that attitude had no effect on the outcomes of the Mathematics. With the help of above-mentioned studies it is clear that the relationship between Attitude and Mathematics Achievement, however, is not clearly defined. At present, no bodywork to support such a relationship, it is necessary to find out the relationship on the scientific basis.

- **Home Environment and Scholastic Achievement in Mathematics** Today, we find an immense increase in the number of problem children. Indiscipline, no compliance, delinquency and character disorders and failure in academic Achievement are increasing by leaps and bounds. The parents do not know how to treat their children so that they may develop themselves adequately. Therefore, what is the most required thing, today, is that parents should be aware of the influence of the Home Environment on academic development of the children. A glance through the review of related literature reveals that students

Achievement in Mathematics and Home Environment are linked together. This has been supported by psychological theories of cognitive development, learning theory of development of Robert Seers and many others. This rationale provides a basis for finding out relationship between the Achievement in Mathematics and Home Environment. Some evidence of this is already available in the research literature. A few researchers have shown that the lack of parental care, lack of control lead to maladjustment and ultimately lead to poor Achievement in Mathematics, while other researches have shown that the rejection might lead to good social adjustment outside the Home and ultimately lead to good Achievement in Mathematics. According to findings of some researchers physical and verbal control lead to maladjustment and non-compliance which lead to greater degree of anxiety and this anxiety ultimately effects the Achievement in Mathematics. The studies largely demonstrate that Achievement in Mathematics is linked with the Home Environment in various ways. Dolan (1983), McGowan and associates (1984), Medrick and associates (1985), Bonder & his associates (1982), Marjoribank (1983) and Tsai & Walberg (1983) have found in their studies that the academic Achievement of the children is definitely influenced by the Home Environment, particularly the educational Environment of the Home. Pruett

(1997), Jacobbi (1997) and Chen (2001) found that the Achievement in Mathematics is significantly influenced by Home physical and educational Environment. In India, so for the investigator knows, not a single study has, however, been conducted which would have shown, which characteristics of Home Environment are related to Achievement in Mathematics and in what manner. Several researches in many other countries have used this rationale. But their findings are not conclusive.

- **Locale and Scholastic Achievement in Mathematics** India is predominantly an agricultural nation with the majority of the population living in rural areas. On the whole, people in urban areas enjoy more educational facilities than those in the rural areas. Apart from this, it is generally felt that parents, in the urban areas because of their occupational status and education, are likely to take more interest in the education of their children than their counter parts in the rural areas. As such, it is hypothesized that the urban school students are superior to the rural children in Mathematics Achievement. Rangappa (1993), Well (1996) and Singh & Singh (2007) made an investigation and found that urban students are better than rural students in Mathematics Achievement. But this fact is not always true as Sharma (1979) and Sriniwasan (1999) found that rural urban population has no significant difference in Mathematics

Achievement. There are also some studies in which no particular results can be drawn, because the findings indicate that both groups are good in different case. In some cases rural students performed better whereas in some cases urban students did well. Thus, the results show all the possible combination and hence one cannot make any categorical statement regarding the urban students superiority or otherwise in vis-à-vis Mathematics Achievement for the students.

- **Institutional Climate and Scholastic Achievement in Mathematics** One of the important variables which may have some bearing on the students' Achievement is the Institutional Climate or School Environment. In India school types vary from state to state considerably government schools and non-government schools, private managed schools, government-aided schools etc. But for the present research the schools have been divided into two broad categories- good schools, having good institutional climate and bad school, having bad institutional climate. It is a general observation that students, having good institutional climate, get more marks in comparison with those students who have bad institutional climate. Much of the work has been done, based on the assumption that institutional climate affects Mathematics Achievement. Recently- Thomous and Wangu (1995), Pruett (1997), Testone (1992), Kim (1992), Harris (1996), Well (1996), Wong and Watkins (1998), Ibrahim, Serpil & Ozer (2009) and Gozde & Giray (2010) found in their studies that the Institutional Climate is significantly related to the Achievement in Mathematics. But sometimes it has been observed that students, who have bad institutional climate, are able to get good marks in the Mathematics. In other words, it may be stated that the institutional climate has no effect on the learning outcomes in this subject. Sriniwasan (1999) in his study found that institutional climate have no effect on the outcomes of Mathematics. Yan, Amery & Bruna (2006) found that Mathematics Achievement was highly related to outside of the school factors than that of the school associated factors. With the help of above-mentioned studies it is clear that the relationship between the institutional climate and the Mathematics Achievement, however, is not clearly defined. But as there was, at present nobody works to support such a relationship, it is necessary to find out the relationship on the scientific basis.

- **Math Anxiety and Scholastic Achievement in Mathematics** As far as empirical evidence of the relationship between mathematics anxiety and achievement is concerned, correlations have been found to be negative (the higher the anxiety, the lower achievement tends to be). (Cates et al., 2003; Ho et al., 2000; Ma, 1999; Maree et al., 1997; Maree et al., 2005 Ashutosh (1989), Rajyguru (1991), Vance (1993), Lafferty (1996), Soman (1997), Piearey (1996) Bruno (1999). The consistency of the magnitude of the relationship between the two constructs has been addressed by Hembree (cited in Ma, 1999) in a meta-analysis who found the average correlation between the mathematics' anxiety and the achievement of mathematics to be in the order of -0.3. Ma (1999), in his meta-analysis of 26 studies related to learners (at school) found the common population correlation to be -0.27. Contradictory results have however, also been reported, e.g. a positive relationship between anxiety and performance, i.e. as performance increases, so does anxiety and vice versa (Ma,1999). On the contrary, many studies (Patel, 1997; Owens 1992; Abut-Hital & Maher, 2000) do not show any relationship between these two variables.

- **Other Factors and Scholastic Achievement in Mathematics**

  Scholastic Achievement in Mathematics is affected by a number of factors. Among them some factors can be identified very clearly such as SES, Sex, Attitude Towards Mathematics, Intelligence etc. But some other factors like Numerical Ability, Achievement Motivation, Study Habit, Self-Concept, Self-esteem, Locus of Control, Emotional stability, Educational & occupational Aspiration, Mathematical creativity (Biswal , 1988; Thampurathy, 1994 and Toole, 2001) Mathematical Aptitude (Khatoon,1988;

Rajyguru ,1991; Abdulmajeed, 1992; Miller, 1993; Sumangla, 1998; Rajani, 2006 and Sethi, 2011), (Singh, 1986), Interest in Mathematics (Singh, 1986; Khatoon, 1988; Kasat, 1991 and Sitha, 2003), and Problem Solving Ability.

One of the major tasks of education is to help children to develop the skills appropriate to their age and also to develop those skills which promote learning for the lifetime (Nuthnap, 2007). Therefore, it is necessary to prepare the child for this era of technology with a strong base at mathematics to face the challenges of 21st century.

From the source of Tripura Board of secondary education, it is followed that the performance of students in mathematics at secondary examination is very poor. Maximum numbers of students are getting poor marks in Mathematics. In the era of science and technology, mathematics has become an indispensable instrument in every walk of our life. It is unimaginable that what happens if mathematics disappears from our lives. From a normal house wife to a great scientist, from a rickshaw puller to a finances minister, every person must depend on mathematics to discharge their duties and functions. Not a single aspect of our life is free from its use. Any person ignorant of mathematics will be easily cheated. Counting, notation, addition, subtraction, multiplication, division, weighing, measuring, selling, buying and many other aspects are fundamental of mathematics which has immense practical value in life. It has wider application in agriculture, industry, defense, information technology, science and technology, music, economies, bio-engineering, physical and biological sciences, astronomy etc. Roger Bacon says," Mathematics is the gate and key of all sciences."

Mathematics is quite helpful in the development of human characteristics and qualities.

Locke rightly said, "Mathematics is a way to settle in the mind a habit of reasoning."

Culture and civilization of any society is linked with property of mathematics.

Mr. J.W.D. Young has remarked that if its backbone (mathematics) is removed, the whole of material civilization would inevitably collapse."

The subject mathematics occupies a very important place in the school curriculum at secondary level. Kothari commission remarked that science and mathematics should be taught on a compulsory basis to all the pupils as a part of general education during the first ten years of schooling. In addition, there should be provision of special courses in these subjects at the secondary stage, for students of more than average ability.

Thus it clear that mathematics has a great importance but student's achievement in mathematics at secondary level is very poor. So it is very important to study the student's performance in mathematics at secondary examination conducted by TBSE so as it's conditioned can be improved.

1.5 Significance of the Study

Academic achievement (Mathematics Academic Achievement in specific) is mostly studied in the context of intellectual factor and less emphasis is given to other non-intellectual factors such as creativity, locus of control, self-concept, level of aspiration and motivation which can also contribute significantly in predicting academic achievement. The basic problem in education today is the problem of motivating the students to learn at all levels. A high level of aspiration for good education would normally make the individual not only put forth his sustained efforts in getting education but it would also make him/her achieve at high level throughout the course of education.

Many previous studies have only given importance to intellectual factor in predicting academic achievement. Earlier studies have indicated intelligence as the key factor influencing the academic achievement (Douglas, 2006). It was believed that high IQ or strong scientific mind is the main measurement of academic success (Abi-Samra, 2000). This belief had implications for curriculum design, teaching, examination and research efforts.

Literature shows that for many years the study of intelligence as a predictor of success focused mainly on the adaptive use of cognition (Piaget,1972). In the present scenario, our classrooms tend to be dominated by approaches that emphasize principles, facts, theories, generalization and memorization associated with specialization at the expense of generic skills which promote social skills such as creativity, self-concept and motivation.

Thus, intelligence is not the sole factor in determining academic achievement. Individual differences in intelligence cannot be accounted for all the major differences in achievement. The present study attempts to suggest that there are certain other personality and motivational variables which may also play a significant role in determining student's academic achievement.

On the basis of above discussion, it may be inferred that Intelligence, Socio-Economic status of the students, creativity, level of aspiration and achievement motivation might hold the key in examination system. Keeping these variables in view, the present study aims at investigating the relationship between Mathematics Academic Achievement and Intelligence of the students along with different aspects of Socio-Economic Status of the family of the students at secondary school level.

1.6 Statement of the Problem

The present study was taken up to find the answer of certain relevant questions like what role does Intelligence and Socio-Economic background of the students play in Mathematics Scholastic Achievement of the students. Again it is also intended to find out whether the Level of the Intelligence and the Socio-Economic background of the Secondary School Students of Tripura state at all related to or may act as contributing factors in their Achievement in Mathematics. Is there any interaction effect of these two variables which might enhance or deteriorate the Achievement in Mathematics of the students?

To find out the answer of the above issues, the present study entitled “Achievement in Mathematics’ in relation to Intelligence and Socio-Economic Status of Secondary School Students in Tripura: A critical Study” was taken up with the following Objectives.

1.7 Objectives

1. To find out the achievement of students in mathematics at secondary level.
2. To find out the intelligence of students at secondary level.

3. To find out the socio-economic status of family of students at secondary level
4. To find out the relation between intelligence and achievement in mathematics of students at secondary level.
5. To find out the relation between socio-economic status of family and achievement in mathematics of students at secondary level.
6. To estimate the interrelationship between different levels of three selected parameters (intelligence, socio-economic status, achievement) of the students at secondary level.

1.8 Delimitation

Previous studies have shown that Mathematics Achievement is influenced by psychological variables, social variables, biographical variables, instructional variables, and so on. But contradictory findings have been reported and not so sufficient data are available which can indicate relationship between these variables and Achievement in Mathematics. There are few well-planned, well-designed multivariate studies which reveal many variables influencing Achievement in Mathematics. But there is need to subdivide complex variables and find out how each of the sub-variables is related to the success in the Mathematics.

To make a case, it may be noticed that Intelligence as well as SES which are composite of sub-variables like parents income, father's educational level, mother's educational level, educational facilities available at home etc. has been found to fluctuate under different conditions in its relationship with pupils' success in the Mathematics.

Though an attempt has been made by a few researchers to consider a number of such sub-variables, it is felt that a greater emphasis should be laid on undertaking in-depth studies to analyze the relationship of Achievement in Mathematics to their interactive effects.

It is not possible to study all the relevant variables that might have an impact on Mathematics Scholastic Achievement like Numerical Ability, Achievement Motivation, Study Habit, Self-Concept, Self-esteem, Locus of Control, Emotional stability, Educational & occupational Aspiration, Mathematical Creativity, Interest in Mathematics etc. And only few dimensions of SES and Intelligence have been considered to study. Moreover in the present study researcher has considered only the west Tripura district but research can be taken in other districts of Tripura. In present study research has taken only secondary level students but research can be done on students at primary level, Upper primary level and Higher secondary level.