CHAPTER I

INTRODUCTION

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

1.1 BACKGROUND OF THE STUDY

Psychological thought in the mainstream evinces an overwhelming tendency to construe and apply a tripartite division of mind comprising of cognition, affection and conation (Hilgard, 1980). The domain of intelligence illustrates very well how such compartmentalizations operate in the disciplinary matrix. Thus, intelligence was used to characterize how well a person’s cognitive functions excel. After a long period of popularity the notion of intelligence and intelligence quotient (IQ) has started losing its grounds for several reasons. Prominent among them is its failure to explain real life experiences (Sternberg, Wagner, Williams & Horvath, 1995). In a large share one’s ultimate niche in society is determined by non-IQ factors (Gardner, 1993). The heavy emphasis on cognitive aspects such as memory and problem solving, for explaining the work efficiency, probably ignored the dynamics of the workplace and many other non-cognitive factors that remained unidentified, but played an important role in determining the outcome. However, it would not be correct to assume that there was a complete absence of awareness in regard to ‘non-intellective’ psychological constructs. For instance, Thorndike discussed measurement of social intelligence as early as 1937 (Thorndike & Stern, 1937) and Wechsler (1940) defined intelligence as the aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his
environment. Wechsler further emphasized that the non-intellective abilities are essential for predicting one’s ability to succeed in life.

Emotional intelligence is a recent development in the area of intelligence as well as in affective science, both of which have given birth to overlapping perspective on human nature. It is a fascinating area of study related to everyday life. The concept gained popularity through Goleman’s (1995) bestseller book titled, *Emotional Intelligence: Why it can matter more than IQ*. In his book Goleman discussed at length about the significant contribution of emotional intelligence to success at home, at school, and at work. Goleman made a very provocative chain about the importance of emotional intelligence by comparing with IQ. He said that if IQ contributed up to 20% of life success, the remaining has to be filled in by emotional intelligence. Emotional intelligence has been identified as one of the important behavioural constructs considered to be a major contributor to performance (Goleman, 1995; Goleman, 1998; Hay group, 2003). Goleman argues that an intellectual balance between reason and emotion is necessary for learning essential lessons of life. The viewpoints and ideas propagated by Goleman have brought a revolution in the field of education.

It is interesting to note that most people have the feeling that there is little they could do to alter their course of events in their life while a few others feel that they are masters of their fate. Rotter (1966) has proposed, however, that people differ in the extent to which one or other of these beliefs characterize their perception of the causal relationship between behaviour and reinforcement that follow it. At one extreme are
those who fail to perceive any causal relationship between their action and the reinforcements that follow. They ascribe the reinforcement, whether positive or negative to fate or chance. They believe that they have no control over the occurrence of reinforcements and are, therefore, called ‘external controllers’. At the other extreme are ‘internal controllers,’ who perceive themselves and their behaviours as the major determinants of reinforcements received in any situation. The concept of locus of control had originated within Rotter’s Social Learning Theory in which behaviour is predicted from the value that people have for particular reinforcements, their expectancies about the effect of certain behaviours upon the occurrence of reinforcement and the nature of situation.

In the context of education, locus of control refers to the types of attributions we make for our successes and/or failures in academic tasks. A person’s locus of control belief about himself or herself is known as an “attribution”. Attribution refers to how people explain events that happen to themselves and others. People who are relatively internal believe they are responsible for their destiny, whereas people who are relatively external believe that the good and the bad things, that happen to them are determined by luck, chance or powerful others. Locus of control has been suggested to be a culturally influenced variable (Kishore, 1983). Thus, its relationship with scholastic achievement is expected to vary along cultures.

The construct of rigidity has attracted researchers from around the world with recent articles on rigidity published by psychologists in Africa, China, Eastern Europe, India, Japan, Mexico, Pakistan, Russia, the United States and Western
Europe. Even now the construct is alive and well in psychological research. Systematic research on rigidity can be traced back to the Gestalt psychologists of the late 19th and early 20th century (Cattell, 1946; Chown, 1959; Luchins & Luchins, 1994; Spearman, 1927; Stewin, 1983). Piaget had shown how early thought is characterized by overassimilation and overaccommodation and cogently demonstrated that young children and mentally retarded adults employ one-dimensional, rigid, ‘centred’ cognitive strategies in comparison with the multidimensional, flexible, ‘decentred’ strategies employed by older children and normal adults. According to Piaget, affective and moral development is inseparable from cognitive development. Therefore, the rigid behaviours found in intellectual tasks have their parallels in the lack of autonomy, perseveration and rigid constructions of personal and interpersonal values found in social behaviours.

The growth of any country ripens on the soils of mathematics. The discipline of mathematics and its applications have found importance since antiquity. Anybody, belonging to any culture, caste, creed, economic status, academic level will definitely agree to the importance of studying and doing mathematics. Mathematics has had a profound effect upon civilization. The sharp growth of technology and the extensive development of science in the last quarter of the twentieth century are without any doubt due to the true applications of mathematics. Applied mathematics has filled the gap between mathematics and other disciplines which existed in the past. Today everyone who intends to enter the infinite world of science must be familiar with the language of mathematics. Mathematics is the language in which, for the past four
thousand years, people have been communicating and recording their thoughts and findings about the world.

Although mathematics is usually associated with science and technology in the modern mind, it seems apparent from the writings of the great mathematicians of the 17th and 18th centuries that religious beliefs had played a great role in their pursuit of mathematics. They saw the “system of the world” obeying mathematical laws and as a consequence felt impelled to study mathematics so as to better appreciate the creator of the universe.

1.2 NEED AND SIGNIFICANCE OF THE STUDY

There is a growing realization that much more than cognitive ability is involved in determining one’s level of functioning and ensuring overall success in life. In addition to one’s intellectual capacity, a multitude of personality and temperamental characteristics have been identified as playing a crucial role in determining one’s performance. The importance of non-intellectual factors in academic achievement has long been discussed (Tyler, 1956). These findings have led to significant changes in the traditional concepts regarding the nature of intellectual potentialities in man. Important among the new developments are the theory of multiple intelligences put forward by Gardner (1983) and the theory of emotional intelligence originally proposed by Salvoey and Mayer (1990) and later popularized by Goleman (1995).
Emotional intelligence is a relatively new area of research in the Indian context. The growing interest in the construct of emotional intelligence can be attributed to the recent theories taking broader conceptualisations of intelligence. The world where we live in has only increasingly demonstrated the power of emotion as a human competency deserving its own high place. The concept of emotional intelligence (EI) can be attributed to a comprehensive package of individual skills and dispositions, usually referred to as soft skills or inter-and intra-personal skills, which make up the competency profile of a person. Such skills are beyond the traditional areas of specific knowledge, general intelligence, and technical or professional skills. Individual emotional intelligence differences help to explain the wide variation in the professional accomplishments, competencies and effectiveness of people with similar levels of general intelligence, experience, and academic credentials. Emotional intelligence, as the existing literature suggests, comprises basically of two core competencies, i.e., awareness and skills in personal and social domains. Personality and social characteristics are different. While personality traits are rather enduring dispositions, social skills are learned and can be expanded (Feist & Feist, 2002). The social level awareness and skills help in making sense of social situations and assist people in maintaining positive shared interactions.

Education, for promoting emotions, needs to be recognized as an essential element of the interactional process in the classroom and therefore developing emotional intelligence becomes a prime concern of educational institutions. There is ample scope for its development at any age. Emotions flavour all human experiences,
both positive and negative, but they seem most poignant during times of adversity and turmoil – the conditions of stress. The parents and educational institutions can help children develop the ability to manage both their emotions and their rationality by nurturing EI. The older children displayed greater emotional competence than their younger counterparts. It has been found that EI increases with age/grade. Jha (1997) has reported that emotional maturity was positively related with both educational level and psychological maturity. The concept of EI shows (Mayer & Salovey, 1997; Mayer, Caruso & Salovey, 1999) that to understand and appreciate intelligence in totality one needs to attend to the domains of personality, emotions and motivation. Several studies (e.g., Feldman, Coats & Spielman 1996; Salovey & Mayer, 1990) have shown that EI developed with increasing age and experience. Within the current higher education environment, there is a drive towards the development of greater independence and personal reflection requiring students to take ownership of their learning. In order to do so, it is important that they are able to understand and identify their own emotions and strategies adopted by them and the extent to which these influence upon their levels of achievement.

An important factor that has been suggested to have influence on achievement of students is the concept of locus of control. Attempts to produce empirical evidence of this relationship have been ambiguous (Lao, 1980) while some studies have found positive correlations between internality and grades (Lao, 1970; Bar-Tal, Kfir, Bar-Zohar & Chen, 1980; Kanoy, Johnson & Kanoy, 1980; Findley & Cooper, 1983), others have failed to find any relationship (Baltis & Walters, 1973; Duke & Nowicki,
The normal student is known to show a great sensitivity to social stimuli of all sorts, and it is very likely that many times he/she happens to face a lot of environmental stress that appears to be influenced by one’s locus of control. The more one is able to handle stress, the better it would be scholastic. Thus, locus of control turns out to be an important variable that plays a role in determining the scholastic achievement of a student.

The concept of locus of control has a significant effect on our daily lives. Even though one’s actions may not have anything to do with an outcome, the belief that they do can greatly aid one’s psychological well-being. Therefore, those who attribute a sense of personal responsibility for their future thoughts and aspirations are much more adapt to living in the social world.

Rigidity is a highly interesting psychological construct because it refers to two aspects of individual differences - personality and ability - that are usually regarded as separate. Rigidity is the low end of the bipolar ability factor of flexible thinking, extensively studied by Guilford and his colleagues (Guilford, 1967). In this portrayal, rigid thinkers have conventional and fixed approaches to problem solving that render them uncreative and convergent rather than divergent. Rigidity, however, is also conceived as a personality trait. The construct of rigidity, albeit under different names, is important in many different approaches to understand personality. Rigidity may be cognitive, especially, perceptual – that is, it may be an ability to perceive things differently even when the objective conditions have changed. Rigidity may also be affective, or it may show itself in overt action.
Despite the long history of research on rigidity, the construct continues to attract research from a variety of psychological disciplines (D’Aunno & Sutton, 1992; Mckelvie, 1990). The term rigidity continues to be commonly used by psychological researchers. Systematic study of rigidity has produced a large body of research with some clear and established findings. However, controversies surrounding several fundamental aspects of rigidity remain.

Research in undergraduate mathematics education is a relatively young and rapidly growing field of study concerned with questions about knowing and learning undergraduate mathematics. The research areas of the mathematics education faculty include proofs, calculus and differential equations. Other areas include the role of problem solving in learning and teaching students at degree level and teachers’ attitudes, beliefs and mathematical habits. Researchers require access to materials that are specific not only to other fields, but also to the broader literature of mathematics, education, learning theories, instructional strategies, alternative assessment techniques, cognitive development and human behaviour. No reform of mathematics education is possible unless it begins with revitalization of mathematics at degree level in both curriculum and teaching style.

The place of mathematics in modern education must be determined by an analysis of the modern society. The Kothari Commission Report (1964-66) rightly points out that study of mathematics plays a prominent part in modern education. Mathematics is a very useful subject for most vocations and higher specialized courses of learning. At the higher secondary and university stages, most of the
physical and social sciences require the applications of mathematics. No other subject can be a substitute for mathematics. The function of mathematics is not giving new experience to a child, rather, it promotes the organization of ideas that have already been developed from perceptual experience. Although the concrete material may act as a stimulus, the mathematical response is a mental organization of relations. Exact and precise modes have to be adopted to make this organization of ideas valuable. The content and methods of teaching are determined by various factors primarily by the needs of society, the position of mathematical knowledge and the peculiarities of the development of children who study mathematics.

There are many factors which influence the scholastic achievement. Scholastic achievement, as widely accepted now, is a function of many cognitive and non-cognitive aspects of personality. Mathematics achievement is one of the most highly important and valuable aspects of students’ academic career. Not only does it mould one’s vocational career, but also it does determine the pattern of one’s living. In view of this, the factors which play an important role in determining an individual’s mathematics achievement need to be studied in detail.

The subjects in this study consisted of eight hundred second year B.Sc. degree students in mathematics from twenty-six colleges, affiliated to the Mahatma Gandhi University. The principal task of the present research has been to unravel some of the complex determinants (emotional intelligence, locus of control and rigidity) of mathematics achievement of students at degree level.
The factors, which influence mathematics achievement, are explored by a number of educational researchers. But significant works in this area have not been done and even the reported studies in the present area do not cover the possible correlates of mathematics achievement at degree level in adequate depth and variety. The knowledge obtained from a study under Indian condition would be of much value in obtaining a theoretical understanding of the extent of the influence of non-intellectual factors which control the learning and achievement at college level. Further, it may also serve to design the instructional practices which are most suited and relevant to the varied learning situations.

The literature shows that the effects of personality variables that they make over mathematics achievement have been explained in one way or the other. It is also found that almost all the studies considered to observe the effects of one or two variables and neglected the others at the same time. But personality dynamics being a multimodal complex of so many traits carry the semantic effects of other variables, even if a single trait is studied. This may, therefore, persuade a researcher not to limit himself/herself to the study of a phenomenon by only univariate considerations but compels to study the same in its complex structure. With this view, the present study was taken up by the researcher to observe the confounding of some effective variables, namely emotional intelligence, locus of control and rigidity operating simultaneously in mathematics achievement. An overview of the related literature has shown that emotional intelligence, locus of control and rigidity of the student play a prominent role in the achievement of students. This necessitates the investigator to
make a proper investigation on the association between mathematics achievement and certain independent variables such as emotional intelligence, locus of control and rigidity in combination with sex, location of institution and type of management of college in which the subjects study. It is hoped that once such variables are identified, they could act as guidelines for educational workers in formulating theoretical assumptions and in taking practical measures most suited for developing their mathematics achievement.

1.3 STATEMENT OF THE PROBLEM

The present study is proposed to understand the nature of emotional intelligence, locus of control, rigidity and mathematics achievement of students at degree level. The framework in which it was planned prompted the investigator to assume that the cause of an individual’s mathematics achievement can be best understood in the context of interaction among these variables. Keeping this in mind, the problem under investigation is presented below:

“INFLUENCE OF EMOTIONAL INTELLIGENCE, LOCUS OF CONTROL AND RIGIDITY ON MATHEMATICS ACHIEVEMENT OF STUDENTS AT DEGREE LEVEL.”
1.4 DEFINITION OF KEY TERMS

Some of the terms that require definition are presented below:

**Emotional Intelligence**

Emotional intelligence refers to the capacity for recognizing our own feeling and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships (Goleman, 1998).

An emotional competence is a learned capability based on emotional intelligence that results in outstanding performance at work (Goleman, 1998).

**Locus of Control**

Locus of control is a generalized expectancy about the degree to which individuals control their outcomes (Rotter, 1966).

Locus of control is an expectancy variable that refers to the extent to which a person believes that he has control over the reinforcement which he experiences. It has a continuum, the extreme poles of which are termed as ‘external locus of control’ and ‘internal locus of control’. The person at the ‘external’ pole of the continuum perceives reinforcement in his life to be a result of luck, chance, fate or powerful others. The person on the other extreme of the continuum believes that the reinforcement in his life is under his control and is contingent upon his behaviour.
Rigidity

Rigidity is a tendency to perseverate and resist conceptual change, to resist the acquisition of new pattern of behaviour and to refuse to relinquish old and established pattern (Schaie, 1955).

Rokeach (1948) says that rigidity is the inability to change one’s set when the objective conditions demand it.

Mathematics Achievement

Mathematics is the science of quantities or numbers, including the relationships between them and geometric forms (Encyclopaedic Dictionary of Education, 1997).

Good (1945) says achievement refers to the standard performance of students in the group under consideration for a test developed to measure curricular outcomes. The achievement of a group of learners is expected to be scattered over a wide range from very low to very high. Achievement is the knowledge attained or skills developed and it is represented in the form of test scores.

For the present study, mathematics achievement refers to the total score obtained by the individual as measured in the test standardized by the investigator in mathematics for the second year degree students of Mahatma Gandhi University, covering the objectives viz., knowledge, comprehension, application, analysis, synthesis and evaluation.
Degree Level

Degree: An academic title given by a college or university to an individual who has successfully completed a programme of studies that fulfil the requirements for graduation (Encyclopaedic Dictionary of Education, 1997).

For the present study, the samples taken were the second year B.Sc. degree students with mathematics as main subject studying in different colleges affiliated to the Mahatma Gandhi University.

1.5 VARIABLES OF THE STUDY

For the present study, mathematics achievement is taken as the dependent variable. The three selected variables such as emotional intelligence, locus of control and rigidity are taken as the independent variables.

1.6 HYPOTHESIS OF THE STUDY

Each of the independent variables selected for study will have a significant influence on the dependent variable, and this influence will be visible in different forms like the following:

(a) significant correlation between each independent variable with the dependent variable; and

(b) in the form of significant mean differences in the scores of the dependent variable for any two contrasted groups developed on the basis of the scores in each of the independent variables (low, average and high groups developed for each independent variable).
1.7 **OBJECTIVES OF THE STUDY**

This study has the following objectives:

**I.** To assess the relation between each of the independent variables and mathematics achievement for the general sample and sub samples.

a) To assess the relation between emotional intelligence and mathematics achievement for the general sample and sub samples.

b) To assess the relation between locus of control and mathematics achievement for the general sample and sub samples.

c) To assess the relation between rigidity and mathematics achievement for the general sample and sub samples.

**II.** To compare the mean mathematics achievement scores of three groups (low, average and high) based on the independent variables for the general sample and sub samples.

a) To compare the mean mathematics achievement scores of three groups based on emotional intelligence (low, average and high) for the general sample and sub samples.

b) To compare the mean mathematics achievement scores of three groups based on locus of control (low, average and high) for the general sample and sub samples.

c) To compare the mean mathematics achievement scores of three groups based on rigidity (low, average and high) for the general sample and sub samples.
III. To test whether the correlations obtained between each of the independent variables and mathematics achievement for the sub samples differ significantly.

IV. To assess the combined effect of the three independent variables (emotional intelligence, locus of control and rigidity) on the dependent variable (mathematics achievement) using partial and multiple correlation.

V. To assess the influence of the three independent variables on mathematics achievement using multiple regression analysis.

1.8 METHODOLOGY OF THE STUDY IN BRIEF

Normative survey method is adopted for the study. The present study has been envisaged on a sample of eight hundred second year B.Sc. degree students in mathematics of Mahatma Gandhi University from twenty-six colleges of Ernakulam, Idukki, Kottayam, Pathanamthitta and Alappuzha districts, selected by the method of stratified random sampling technique. The differences in sex (males/females), location of institution (urban/rural), and type of management of college (government/private) are taken as the background variables in this study. The independent variables are also sub categorized as low, average and high.

The relevant data regarding the dependent and independent variables have been collected by the tools developed and standardized by the investigator. They are:

(1) Mathematics Achievement Test
(2) Emotional Intelligence Scale
(3) Locus of Control Scale
(4) Rigidity Scale
All the different tools were administered to the selected sample and the data was collected and analysed using appropriate statistical methods. The major statistical methods used were Karl Pearson’s Product-Moment Coefficient of Correlation, the two-tailed test of significance of difference between means, the test of significance of difference between two r’s, ANOVA, Scheffe’s Method, Partial Correlation, Multiple Correlation and Multiple Regression Analysis.

1.9 SCOPE OF THE STUDY

The present study endeavours to point out the influence of emotional intelligence, locus of control and rigidity on mathematics achievement of students at degree level.

It is expected that the findings of the study may be of use to the educational thinkers, college administrators, teachers, parents and all those who are concerned with education to make better learning environment so as to benefit each and every student. The investigator believes that the influence of the selected independent variables on mathematics achievement as revealed by this study will also be applicable to the achievement in other subjects such as physics, statistics and chemistry. The investigator further believes that the results of the study will be useful to have a better understanding of mathematics achievement of students at degree level which can be utilized to develop better ideas about the educational outcomes of different kinds.
In the selection of sample, due representation is given to the sex of the subjects, urban-rural location of institution and the type of management of colleges. The present study makes use of standardized tools to measure the dependent and independent variables. Effort is also made to maintain the ideal test conditions during the administration of tools. This study also uses suitable and reliable statistical methods to analyse and interpret the data obtained by the administration of tools. For these reasons, the investigator hopes that the results of the study will be valid and fruitful. It is further hoped that the results of the study would pave the way for further research in the area which can perhaps yield more generalizable results.

1.10 LIMITATIONS OF THE STUDY

Validity of the conclusions drawn from the analysis of the data depends on the representativeness of the sample, and relevance of the variables and methods. Every effort is made by the investigator to make the study as precise and objective as possible. In spite of this, the investigator is aware of some limitations of the study. They are the following:

(i) The study was confined to a representative sample of eight hundred second year degree students in mathematics from twenty-six colleges in five districts under Mahatma Gandhi University. The second year students in mathematics were taken as a representative level, even though the degree students comprise of first and third year also. The first year class, being an entry stage of degree level education, the students of that class may not fully represent the characteristics of
degree level. The students of final year classes were not easily available for a study of this nature as they were very busy with the completion of their course requirements. Thus, the study was confined to the second year students because of these practical limitations. A still more generalized result would have been obtained if the samples were selected from different universities. But practicability prevented the investigator from extending the study to different universities.

(ii) The study is limited to variables influencing the achievement in a particular subject, that is, mathematics. Practical reasons prevented the investigator from extending the study to the achievement in other subjects.

(iii) There are no efforts made to measure the variable like socio-economic status of the students. But it is to be noted that in the present scenario of Kerala, students of almost similar socio-economic background are present to a great extent in the government and private aided colleges, where this study was conducted.

(iv) All possible range of independent variables, which can affect mathematics achievement, were not selected. Confining the scope of the study to include three independent variables may be looked upon as yet another limitation of the study. But such limitations are also quite usual in research studies of this kind where one has to make a choice from a list of the best possible variables available in a given set-up.

(v) Statistical methods used in the study are Karl Pearson’s Product-Moment Coefficient of Correlation, the two-tailed test of significance of difference
between means, the test of significance of difference between two r’s, ANOVA, Scheffe’s Method, Partial Correlation, Multiple Correlation and Multiple Regression Analysis. The important multivariate technique of research studies like factor analysis which could also provide valid results for the study, has not been attempted because of procedural difficulties.

Even though these limitations were present, it needs to be reiterated that all attempts have been made to obtain reliable findings within the limitations stated above.

1.11 ORGANIZATION OF THE REPORT

The report has been organized under six chapters.

Chapter I contains background of the study, the need and significance of the study, the statement of the problem and definition of key terms, variables for the study, hypothesis, objectives, methodology in brief and scope and limitations of the study.

Chapter II presents a detailed theoretical overview of the major constructs used in the study.

Chapter III examines the studies related to the present problem and major trends indicated by the survey.
Chapter IV gives a detailed description of the method adopted for the study, the variables, tools used for measurement, sample used for the study, data collection procedure, scoring and consolidation of data and statistical methods used for analysis.

Chapter V presents the results of the analysis of data collected for the study followed by interpretations and discussion.

Chapter VI represents an overview of the study, the findings of the study, tenability of hypothesis, the major conclusions arrived at from the study, the suggestions of the study and suggestions for further research.

The conclusion is followed by a bibliography and appendices. The APA format is adhered to the maximum extent possible with justifiable modifications keeping in mind that a number of variations from the requirements described in the Publication Manual are not only permissible, but also desirable in the preparation of final manuscripts (Publication Manual of the APA, 2001, p.332).
References


