CHAPTER  -  I

INTRODUCTION
CHAPTER – I
INTRODUCTION

1.1 Background of the Study

Liberalization, globalization and privatization have brought in their wake intense competition. Education plays an important role in enabling person to face real life situation with adequate knowledge and skills. All-round betterment will enable the students to be prepared and equipped in this fast paced life to undertake work efficiently and effectively leading to accomplishment of the objective with remarkable ease. By rejuvenating themselves at physical, mental and spiritual levels simultaneously, students can enrich their individual lives and also bring about lasting change in their attitudes.

A balanced education should give total opportunity to a student to discover and use his fullest potential. While aiming at total growth, it should provide for:

i) development of skills, proper habits, attitudes and human values.

ii) application of knowledge as and when required with right dose.

Education is viewed as an instrument to develop the cognitive qualities, tolerance and understanding of the students. It should prepare the younger generation to understand and face the realities of globalization. In this context, the education institutions and the teachers have more responsibilities in moulding the character of the students. The role of the teachers in the society keeps on changing.
We have just crossed first decade of a new century. Intelligence and success are not viewed the same way as they were before. New theories of intelligence have been introduced and are gradually replacing the traditional theories. The whole student has become the center of concern, not only his reasoning capacities, but also his creativity, emotions and interpersonal skills. Intelligence quotient (IQ) alone is no more the only measure for success; emotional intelligence, social intelligence, and luck also play a big role in a person’s success (77:375-378).

Emotional intelligence has its roots in the concept of “social Intelligence”, first coined by E.L. Thorndike in 1920. Psychologists have grouped into three clusters viz., abstract intelligence, concrete intelligence and social intelligence. Emotional intelligence is a type of social intelligence, which involves capacity for recognizing our own feelings and those of others for motivating ourselves and managing emotions well in us and in our relationships.

Emotional intelligence has become a popular phrase in recent times. It is a form of social intelligence which involves the ability to monitor one’s own and others feelings and emotions to discriminate among them and to utilize this information to guide one’s thinking and action (159:185-211). Emotional intelligence predicts success in all walks of life and hence this concept gained paramount importance in the field of educational and organizational research.

Education aims at modifying the behavior of the student in such a way that he may be able to adjust himself to his surroundings in accordance with his nature: harmonious cultivation of the physical, intellectual, aesthetic and moral sides of human nature. Hence aim of
education is to produce a well balanced individual rather than a lopsided individual. All the powers and capacities of the student should be developed in a harmonious manner. For the harmonious development of a student he should adjust, organize his capacities with his environment.

The term personality refers to the habitual mode of adjustment, which the organism effects between its own egocentric drives and the exigencies of the environment. As phrased, this would include practically all of human behavior, since the vast majority of our responses do consist of just such habitual mode of adjustment. Personality not only includes these reactions, but also the more individual personal adjustment and capacities as well as their history.

An individual’s adaptability is indicated in the ways he solves the problems in his life. Life is a process of solving / dealing / managing with problems. Those who can manage problems efficiently do well in life, than those who have difficulty in managing problems.

Problem solving has special importance in the study of mathematics. A primary goal of mathematics teaching and learning is to develop the ability to solve a wide variety of complex mathematical problems. Problem solving is a deliberate or purposeful act on the part of an individual to realize the set of goals by inventing some novel methods or systematically following some planned steps for the removal of obstacles in the path. It is the highest category of intellectual skill in Gagne’s theory of learning. It occurs in novel or difficult situations in which a solution is not attainable habitual methods of applying concepts and principles derived from past experiences in very similar situations.
The present society needs the students who can solve not only the mathematical problems but also the problems of other fields by applying the approaches that are used in solving mathematical problems. Principles and standards for school mathematics state that instructional programmes from Kindergarten through grade 12 should enable all students:

i) to build new mathematical knowledge through problem solving.

ii) to solve problems that arise in mathematics and in other context.

iii) to apply and adopt a variety of appropriate strategies to solve problems; and

iv) to monitor and reflect on the process of mathematical problem solving.

Mathematical problem solving is a unit that has received considerable attention in recent years. A revolution is under way in mathematics education with a major goal being that students will understand and be able to apply mathematics in a wide variety of situations. An analysis of problem solving models (18, 46, 48, 92, 100, 143 and 147), reveals that the basic steps associated with the problem solving are essentially the same as those given for scientific method. Problem solving strategy usually has five stages (44, 45, 67 and 72). Bransford and Stein (24:1078-1089) use the acronym IDEAL to identify the five steps.

I - Identifying the problem

D - Defining and representing the problem

E - Exploring possible strategies

A - Acting on the strategies

L - Looking back and evaluating the effects of activities.
To solve problems, students must search for long term memory for relevant principles, knowledge and strategies that might apply to solve the problem. Our country is now at a developing stage and we require large number of trained persons in different fields who have also some creative spark in them.

The present study is concerned with the influence of emotional intelligence, personality traits on problem solving ability in mathematics among the college going Pre-university science students.

1.2 Genesis of the Problem

The present generation of students are more emotionally troubled than the last. On an average, students are growing more lonely and depressed, more angry and unruly, more nervous and prone to worry, more impulsive and aggressive. So there is an increasing need to address the emotional health of our children and adolescents (1:22-25). Students with high emotional quotient (EQ) are more confident, are better learners, have higher self esteem, have fewer behavioral problems, are more optimistic and happier. Emotional intelligence and personality factors are considered as basic requirement for the effective use of intelligence quotient (IQ). It is an affective adaptive capacity for smooth adjustment in our social life. Emotional intelligence (EI) means empathy, compassion, motivation and ability to respond appropriately to external pain or pleasures (70:13).

In the era of science and technology, mathematics has become one of the important subjects of study because mathematics has become a part and parcel of innovations and even the future is also mathematically inclined. Hence, many psychologists and educationists have acknowledged the importance of mathematics and advocated for learning
arithmetic and computation of numbers in the beginning. The advent of automation and cybernetics has marked the beginning of new scientific, industrial revolution and makes all the more imperative that special attention be devoted to study of mathematics.

Researches have proved that an individual becomes more and more progressive and active when greater is the interest about subject mathematics. There is a common saying most set of students that “I hate mathematics”. It is seen to the optimum that most set of students respond with the same attitude. Keeping in view the natural scope of mathematics and its unique role in solving life problems of the students day to day activities. Mathematics has been considered as one of the core subjects at college level. Though the student has the liberty to learn the subject in his choice of medium of instructions, he find this subject as more heavily loaded with abstract concepts compared to other subjects. The parents and students at large consider mathematics as a difficult subject and this result in more number of failures in this subject. The rate of failure in mathematics is considerably higher than in other subjects. The failure in the subject mathematics may be due to students inability to read and understand the mathematical language and inability to interpret mathematical symbolism in a meaningful way.

The subject mathematics appears as a threat to majority of students studying in Pre-university colleges. The performance of students in mathematics is not satisfactory. Majority of the students are struggling hard to get minimum marks in mathematics subject. This is a common phenomenon. Apart from these factors there may be other reasons like school climate, teacher-student relations, curriculum, teaching strategies adopted, evaluatory procedures followed, home climate of the students,
socio economic background of the students etc. There may be even a few psychological factors which influence learning of mathematics like motivation, attitude, aptitude, need for achievement, emotional intelligence, anxiety, personality traits, mental health and a host of other factors.

The Kothari Education Commission (1964-66) (108: 394 -395) has aptly said that “Destiny of the nation is shaped in her class rooms”. At the college stage, the student is in the adolescent period of development. He is confronted with many stress and strains because of certain physiological changes. He also becomes conscious of his future occupational status. Intellectual development of the student at this stage is of “Formal operational stage”. Therefore, student is in a position to think logically and perform mathematical deductions. Therefore, curriculum at this stage should provide for acquiring a wider knowledge and skill based on the content of broad based general education. The essential learning under the core curriculum needs to be provided through content and learning experience related to different subject areas (216:28-37).

Mathematics as a discipline has been enriched by the way of the problem posed by thinkers to their contemporaries. These problems have paved the path of progress in the development of new branches to the activity of problem solving. As human endeavor mathematics has arisen out of process of solving practical and intellectual problems. Therefore, problems and problem solving are the two integral part of mathematics. Many educationists consider problem solving ability in mathematics as the highest intellectual perseverance. Due to these reasons mathematics is considered as the “queen of all sciences” and “key to all sciences”.
The major role of mathematics education is to develop efficient problem solving ability in mathematics among students.

There has been tremendous expansion and explosion of knowledge which has greatly increased the awareness of one’s capacity to be creative. Mathematical knowledge enables the individual to confront the problematic situation in life and become good problem solvers by providing innovative and novel solutions to each problem. Hence, this necessitates problem solvers to be creative persons also.

In the present situation we are in a time when our prospects for the future are increasingly dependent on managing ourselves and handling our relationship more artfully. Even the students with high intellect cannot always be successful. Grades at school and college or high intelligent quotient (IQ) cannot predict unerringly who will be successful and who will not be in real life. The present education system does not give any guarantee for successful life.

Even the subsequent result also seems to be lower than the expected. It can be observed from the Pre-university course (P.U.C.) results of 2002-2006 as given in the Table 1.1.
Table 1.1: Karnataka State Second Year Pre-University Course Results from 2002 to 2006 (Subjectwise)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Subjects</th>
<th>Yearwise (Subject Average)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>April 2002</td>
</tr>
<tr>
<td>1.</td>
<td>Kannada</td>
<td>94.32%</td>
</tr>
<tr>
<td>2.</td>
<td>English</td>
<td>62.28%</td>
</tr>
<tr>
<td>3.</td>
<td>Physics</td>
<td>62.31%</td>
</tr>
<tr>
<td>4.</td>
<td>Chemistry</td>
<td>56.49%</td>
</tr>
<tr>
<td>5.</td>
<td>Mathematics</td>
<td>45.85%</td>
</tr>
<tr>
<td>6.</td>
<td>Biology</td>
<td>68.44%</td>
</tr>
</tbody>
</table>

(Source: http://puc.kar.nic.in)

The above table indicates that mathematics is one of the core subjects where the rate of failure in mathematics is considerably higher than in other subjects every year. Many students find mathematics to be a difficult subject. Failure in mathematics may be due to students inability to read, understand and interpret mathematical symbolism in a meaningful way. Social, cultural and psychological factors are acting on it. Students inability to solve problems efficiently in the subject may be the main cause for failure.

Problems are the core of the subject mathematics. Hence, possessing problem solving competence has become necessary for mathematics learning. If students acquire better problem solving skills, the number of failures decreases in mathematics.

Apart from this the public and the parents find fault with the teachers and the education system as a whole. The investigator interviewed some second year Pre-university science students who have
secured less marks in first year Pre-university mathematics when compared to other science subjects. They have scored more marks in other subjects. This is a problem requiring close scrutiny.

Another reason is that students study science subjects without having good aptitude in it. As some students are getting admission to science stream, other parents also wish to get their children admitted to science course. They think that getting seat in science stream is a matter of prestige for them. Pre-university colleges are not conducting aptitude test for admitting students to science stream. This prompted the investigator to take up the present study and to find out the effects of these variables on problem solving ability in mathematics.

Even the districtwise percentage of second year Pre-university course seems in northern part of Karnataka is seems to be less. The table 1.2 mentioned in the next page gives the same information.
Table 1.2: Karnataka State Second Year Pre-University Course Results from April 2002 to April 2006 (Districtwise)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>Placement</td>
<td>%</td>
<td>Placement</td>
<td>%</td>
</tr>
<tr>
<td>1.</td>
<td>Udupi</td>
<td>79.65</td>
<td>2</td>
<td>76.72</td>
<td>1</td>
<td>75.26</td>
</tr>
<tr>
<td>2.</td>
<td>South Kenara</td>
<td>80.33</td>
<td>1</td>
<td>76.20</td>
<td>2</td>
<td>75.53</td>
</tr>
<tr>
<td>3.</td>
<td>Kodagu</td>
<td>66.93</td>
<td>4</td>
<td>60.63</td>
<td>3</td>
<td>60.38</td>
</tr>
<tr>
<td>4.</td>
<td>Chikkamagalur</td>
<td>66.34</td>
<td>5</td>
<td>54.02</td>
<td>6</td>
<td>59.18</td>
</tr>
<tr>
<td>5.</td>
<td>North Kenara</td>
<td>67.93</td>
<td>3</td>
<td>57.80</td>
<td>4</td>
<td>60.22</td>
</tr>
<tr>
<td>6.</td>
<td>Bangalore North</td>
<td>58.05</td>
<td>7</td>
<td>50.86</td>
<td>7</td>
<td>57.03</td>
</tr>
<tr>
<td>7.</td>
<td>Bangalore South</td>
<td>63.26</td>
<td>6</td>
<td>50.35</td>
<td>8</td>
<td>53.71</td>
</tr>
<tr>
<td>8.</td>
<td>Shimoga</td>
<td>58.02</td>
<td>8</td>
<td>54.31</td>
<td>5</td>
<td>56.80</td>
</tr>
<tr>
<td>9.</td>
<td>Hasana</td>
<td>53.79</td>
<td>10</td>
<td>44.51</td>
<td>10</td>
<td>51.04</td>
</tr>
<tr>
<td>10.</td>
<td>Belgaum</td>
<td>51.28</td>
<td>11</td>
<td>35.62</td>
<td>19</td>
<td>46.53</td>
</tr>
<tr>
<td>11.</td>
<td>Tumkur</td>
<td>51.28</td>
<td>11</td>
<td>48.35</td>
<td>9</td>
<td>48.30</td>
</tr>
<tr>
<td>12.</td>
<td>Mysore</td>
<td>50.19</td>
<td>12</td>
<td>41.15</td>
<td>11</td>
<td>48.30</td>
</tr>
<tr>
<td>13.</td>
<td>Raichur</td>
<td>31.35</td>
<td>25</td>
<td>22.22</td>
<td>29</td>
<td>35.15</td>
</tr>
<tr>
<td>14.</td>
<td>Bangalore Rural</td>
<td>45.35</td>
<td>20</td>
<td>33.70</td>
<td>21</td>
<td>44.88</td>
</tr>
<tr>
<td></td>
<td>District</td>
<td>Mean</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>---</td>
<td>---------------</td>
<td>------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>15</td>
<td>Dharwad</td>
<td>48.66</td>
<td>15</td>
<td>41.02</td>
<td>12</td>
<td>45.06</td>
</tr>
<tr>
<td>16</td>
<td>Davangere</td>
<td>49.82</td>
<td>13</td>
<td>39.73</td>
<td>14</td>
<td>45.10</td>
</tr>
<tr>
<td>17</td>
<td>Haveri</td>
<td>46.12</td>
<td>18</td>
<td>36.38</td>
<td>17</td>
<td>54.28</td>
</tr>
<tr>
<td>18</td>
<td>Bijapur</td>
<td>28.09</td>
<td>27</td>
<td>24.62</td>
<td>27</td>
<td>46.11</td>
</tr>
<tr>
<td>19</td>
<td>Chamarajanagar</td>
<td>49.03</td>
<td>14</td>
<td>39050</td>
<td>15</td>
<td>39.36</td>
</tr>
<tr>
<td>20</td>
<td>Kolar</td>
<td>46.03</td>
<td>19</td>
<td>38.47</td>
<td>16</td>
<td>42.71</td>
</tr>
<tr>
<td>21</td>
<td>Gadag</td>
<td>48.04</td>
<td>16</td>
<td>32.38</td>
<td>23</td>
<td>45.08</td>
</tr>
<tr>
<td>22</td>
<td>Bagalkote</td>
<td>43.76</td>
<td>21</td>
<td>32.96</td>
<td>22</td>
<td>47.50</td>
</tr>
<tr>
<td>23</td>
<td>Mandya</td>
<td>46.59</td>
<td>17</td>
<td>40.58</td>
<td>13</td>
<td>43.24</td>
</tr>
<tr>
<td>24</td>
<td>Bellary</td>
<td>41.43</td>
<td>22</td>
<td>30.24</td>
<td>25</td>
<td>39.82</td>
</tr>
<tr>
<td>25</td>
<td>Chitradurga</td>
<td>39.87</td>
<td>23</td>
<td>28.08</td>
<td>26</td>
<td>41.13</td>
</tr>
<tr>
<td>26</td>
<td>Gulbarga</td>
<td>31.20</td>
<td>26</td>
<td>22.43</td>
<td>27</td>
<td>30.81</td>
</tr>
<tr>
<td>27</td>
<td>Bidar</td>
<td>20.20</td>
<td>30</td>
<td>16.57</td>
<td>28</td>
<td>37.24</td>
</tr>
<tr>
<td>28</td>
<td>Koppal</td>
<td>37.60</td>
<td>24</td>
<td>31.10</td>
<td>24</td>
<td>36.72</td>
</tr>
</tbody>
</table>

(Source: [www.kar.examresults.nic.in](http://www.kar.examresults.nic.in))
Districtwise result of second year Pre-university science students is collected from Karnataka state Pre-university board. Table 1.2 clearly shows that Bellary, Raichur, Koppal, Mandya and Chitradurga districts performed very poorly during the last five years (221).

Out of these 5 districts, Bellary is one of the districts which is getting very poor result with low percentage among science students. Bellary district has an average percentage of 38.91. Hence, the investigator is interested in knowing the cause for poor result. He wants to check whether emotional intelligence is one of the causes for ability to solve problems and also host of other factors. The poor performance of Bellary district prompted the investigator to take up Bellary district for the present study.

1.3 Need and Importance of the Study

In the modern world, Mathematics is being increasingly used in science, technology, industry, economics, education and other subjects. The computers and other devices used often and often in mathematics. Mathematics has a prominent position in school and college level curriculum. Though the world is more mathematically inclined, the students in school and college feel that it more abstract subject.

The subject mathematics is an ancient discipline. It was studied systematically by students even in Pythagorean times. Mathematics is a vehicle of sense making rather than a collection of arbitrary rules for symbol manipulation. In the contemporary society mathematics has become a crucial tool for anyone wishing to participate in public discussion of current social, ecological, technological and economic issues.
Mathematics is the only subject that enables the individual to confront the problematic situation in life. The power of critical thinking, logical reasoning, process of induction, generalization, establishment of relationship between different components can be developed through teaching of mathematics.

Problem solving ability is one of the key concepts to understand the students ability to solve the problem provided in a situation, by making use of his previous knowledge and technique to find solution to the present situation. In psychology “Problem” usually means a task that can be defined external to the individual such as maze, anagram, mathematical problem or other tasks in which an observation or openly stated answer or situation is provided (119:1-13).

Problem solving ability is very essential in mathematics because problems and problem solving ability are the integral part of mathematics. Problem solving is the highest level of learning which depends on the mastery over lower types of learning and it involves application of principles and facts to explain and solve new phenomena or predict consequences from known conditions. Hence, problem solving can be defined as a process of overcoming difficulties that appear to interfere with the attainment of a goal. Problem solving is far more useful as a guide to preparing students to be effective problem solvers in their everyday life.

The advancement in science and technology needs an individual to develop skills and competencies to cope with the external demands zeal, persistence, motivation and regulation of emotions and behavior. The success and the chances of a productive life of a student are directly dependent on how much the teachers enhance the emotional quotient.
The concept of emotional intelligence in the Indian context is embedded in its highly valued social concerns, virtues, religious traditions and cultural practices. Indians develop a morality of caring which emphasizes broad and contingent interpersonal obligation in a familial view of interpersonal relationship and contextual sensitivity.

Social scientists are uncovering the relationship of emotional intelligence to traits, such as leadership, interpersonal exchange, managing change, conducting performance evaluation and so on (77:392). Many educators and psychologists believe that students who receive an exclusively academic environment may be ill equipped for future challenges, both as individuals as well as members of the society. Certain instances come in our day-to-day life where in the brightest students in a class did not succeed later in their lives as individuals having well rounded personalities as compared to their less intellectual counter parts.

Emotional intelligence is the capacity to create positive outcomes in relationships with others and with one self. Thus emotional intelligence is an umbrella term that captures a broad collection of interpersonal skills. Emotional intelligence plays a key role in determining life success. It becomes more and more important as people progress up the career ladder of their life. Emotions are our feelings; hence emotional intelligence is our life (99:153-155).

In the components of emotional intelligence, the most important is self awareness. It is on this the other components are built. When people are able to demonstrate self awareness, it would be possible for them to recognize their emotion, their etiology and the likely outcome of their state of feeling. For example a student who is aware that he / she is
test anxious will work towards managing it so as it to enhance his performance in examination. The role of emotion in education just as in other fields has largely been ignored. Recent development has shown that there is a strong linkage between emotion and reason, feelings and thoughts (211:44-48).

Personality is a complex dynamic integration and is shaped by the inborn potentials as modified by experiences common to culture. As a general rule every healthy individual has some sort of integration. The peculiar forms of integration in a particular individual are his personality traits. Personality is not only the collection of traits but a particular organization of these traits. The different conditions of infancy, childhood, adolescence, youth and old age play an important role in modifying these traits from time to time. In the different stages of development of personality different changes are visible in particular traits of the individual. The period of 6-18 years is particularly a significant phase of life for building wholesome personality of an individual as a growing organism.

The aim of education has always been the complete development of the individual which includes not only a development of intellect but also of the personality. To achieve this aim, education should be diversified to suit the abilities and aptitudes of every individual. Different states in India have, therefore introduced diversified courses that are suitable for different types of abilities and aptitudes at the higher secondary stage. But admission of these diversified courses is more often determined not only by the abilities and aptitudes of the child but by the glamour of the future prospects that some of the courses seen to have in store for the students. This results in large scale wastage in the form of
the failure and under achievement. This wastage is not only in terms of economy but also affects the personality of the child adversely and his future achievement. Motivation suffers a serious set back.

Now-a-days the students are getting higher marks and ranks in their examination but they are not able to succeed in their life. Now it is found that, “college age” is an important period in student’s life as they are young, energetic and enthusiastic in this stage. Emotional intelligence and human personality are two important aspects of student’s achievements and ability to solve complex problems. Personality provides the context in which emotional intelligence operates and it is found that it is a better predictor of future success (188:58-69).

The personality development in this stage is so crucial and important for the selection of career. Basically a student who learns to learn is much more apt to succeed. Emotional intelligence is more important than cognitive intelligence to get an individual success in their life situation. Emotionally intelligent adults make better decisions, they love with integrity, they use their emotions as a source of energy and direction, they are more effective at solving problems.

Scientific research indicates that the formation of emotional skills and personality traits is much easier in the “formative years from birth to the late teens”. Especially among college students highly achieving students are facing a lot of problems like lack of self confidence, violence, lack of motivation, drug abuse, examination anxiety, disinterest in their study habits, inability to manage their self, improper management of emotions, lack of leadership qualities etc., it may hamper on their cause for the poor achievement and inability to solve in their day to day
problems. And even it may sometimes lead to suicidal tendency among them (114:237-242).

Mathematics is taught at the Pre-university science classes as a core subject. It occupies an important place in the Pre-university science curriculum because of its utilitarian, disciplinary, aesthetic and cultural values. Mathematics is a sequentially developed subject. The concepts, operations, principles, skills etc., of mathematics are interrelated. If a student fails to catch the basics of mathematics in the primary grades, he/she definitely cannot understand what goes on in the mathematics classrooms at the higher grades because primary education is the basis of any education system. Mathematics is considered as an essential part of general education. Each child should be skilled to have mathematical competencies necessary for daily living. These competencies are expected to be achieved by the child at the primary stage. Firm foundation in the basic concepts allows students to move ahead in mathematics.

Many of the studies conducted in India and abroad have concentrated research mainly at the primary and secondary level. The investigator feels that emotional intelligence, personality traits and problem solving ability in mathematics concerning the gap between these three variables and the Pre-university course is an important stage in the education of an individual. It is a stage to select diversified courses in his educational career. Most of the science students are aspiring for professional / technical / higher courses. In order to fulfill their desire, they will put maximum efforts in their academic work for better future.

Problem solving skills are very important for the students to obtain high scores and place themselves favourably in competitive
examinations. So, students will become increasingly effective problem solvers more reflective and rational in life situations and solve more and more complex problems with greater independence and self confidence. Although freedom and independence is the foundation for better of humanism (39, 58 and 91).

Among the various factors that affect the problem solving ability in mathematics, the investigator has considered emotional intelligence and personality traits as some of the factors which affect problem solving ability in mathematics. In the light of this, the investigator decided to find out the relationship between emotional intelligence, personality traits and their impact on problem solving ability in mathematics among college going Pre-university science students. In such a situation this motivates the investigator to undertake the present study.

1.4 Statement of the Problem

The problem of the present investigation is stated as follows:

“A study of the relationship between emotional intelligence and personality traits on problem solving ability in mathematics of college going first year Pre-university science students of Bellary district”.

1.5 Objectives of the Study

The present study is undertaken with the following broad objectives:

1. To measure the emotional intelligence of first year Pre-university science students.
2. To measure the personality traits of first year Pre-university science students.
3. To measure the problem solving ability in mathematics of first year Pre-university science students.

4. To find out the relationship between emotional intelligence and problem solving ability in mathematics of first year Pre-university science students.

5. To find out the relationship between personality traits and problem solving ability in mathematics of first year Pre-university science students.

6. To find out the interaction effect of emotional intelligence, personality traits on problem solving ability in mathematics of first year Pre-university science students.

7. To develop the regression equation for problem solving ability in mathematics as criterion variable and using emotional intelligence and personality traits as predictor variables among first year Pre-university science students.

8. To find out the percentage contribution of predictor variables towards development of problem solving ability in mathematics among first year Pre-university science students.

1.6 **Scope of the Problem**

In the present study, the investigator intends to study the problem solving ability in mathematics of first year college going science students studying in rural and urban Pre-university colleges of Bellary district in relation to certain psychological factors like emotional intelligence and personality traits. The sample consists of 680 college going first year Pre-university science students studying in rural and urban area government and private Pre-university colleges of Bellary district during the academic year 2009-10. The study was limited to first year
Pre-university science students of Bellary district (with Physics, Chemistry, Mathematics and Biology combination) only.

1.7 Conceptual Frame Work

1.7.1 Origin of Emotional Intelligence

A relatively new concept, “Emotional intelligence” with its significance being more than one’s general intelligence has emerged on the educational and social scenario. Although the roots of emotional intelligence can be traced back to beginning of mankind years, the famous psychologist E.L. Thorndike through his concept of social intelligence laid down a solid foundation for the essence of emotional intelligence in 1920. Thorndike (196:227-235) defined social intelligence as “the ability to understand and manage men and women, boys and girls and act wisely in human relations”.

The concept changed only when Harward Gardner’s 1983 book ‘Frames of Mind’ refuted the narrow intelligent quotient (IQ) view and extended the concept to include spatial capacity, physical fluidity, musical intelligence, interpersonal intelligence, intra personal intelligence etc., The operative word in his view of intelligence was multiple and not the unitary concept of intelligence.

Later on Sternberg (183:317-330) also carried out the concept of social intelligence in the name of contextual intelligence through his Triarchic theory of intelligence. This component of one’s intelligence (other components being componential and experimental) relates with one’s capacity for making adjustment to various contacts with a proper selection of contexts so that one can improve one’s environment in a proper way. As a follow up study, it was later on discovered that without having a high intelligent quotient (IQ) one can have high contextual intelligence i.e, the ability to lead one’s life successfully (214:121-123).
1.7.2 Definitions of Emotional Intelligence

The term emotional intelligence was first defined by Peter Salovey and John Mayer (1990). In their persistent efforts for going into the nature of emotional intelligence they have tried to defined as “ability to perceive accurately, appraise and express emotional, generate feelings that facilitate thoughts and an ability to regulate emotions to promote growth”. This definition points towards ability of an individual (159:185-211).

Daniel Goleman (1995) defines “emotional intelligence as the capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships”. This definition gives a set of abilities that helps to get along with other people in all kinds of life situations and achievement for success in life (77:375-378).

In generally emotional intelligence as the accumulation of all cognitive, non cognitive and non physical capabilities, competencies and skills a person has, that help him / her to deal with the demands and pressures of everyday life.

1.7.3 Components of Emotional Intelligence

The term emotional intelligence encompasses the following five basic as components (207:65-70).

1. Self-awareness

The self awareness knows one’s internal state, preferences, resources etc. It indicates the ability to recognize, understand and accept one’s emotions as well as to see how these affect other people.
2. **Self-regulation**

Self-regulation refers to managing and handling impulses, distressing feeling and upset rather than denying or repressing these feelings it implies knowledge to express our feelings and helps to think clearly even under pressure.

3. **Motivation**

It helps in the achievement of goals with energy and persistence.

4. **Social-awareness**

This skill is a foundation skill of all the social competencies. Emotionally balanced people are generally empathetic and not sympathetic. It means that one has to put one self into another’s shoe and look at the things from the others point of view.

5. **Social skills**

Social skill is an ability to build rapport with various sections of society and create network of people.

The dimensions of emotional intelligence are given in the table 1.3.
Table 1.3: Components of Emotional Intelligence

I. PERSONAL COMPETENCE
These Competencies determine how we manage ourselves

SELF AWARENESS
Knowing one's internal states, preferences, resources, and intuition
EMOTIONAL AWARENESS
Recognizing one's emotions and their effects
ACCURATE SELF ASSESSMENT
Knowing one's strengths and limits
SELF CONFIDENCE
A strong sense of one's self worth and capabilities

SELF REGULATION
Managing one's internal states impulses and resources
SELF CONTROL
Keeping disruptive emotions and check
TRUST WORTHINESS
Maintaining standards of honesty and integrity
CONSCIENTIOUSNESS
Taking responsibility for personal performance
ADAPTABILITY
Flexibility in handling change
INNOVATION
Being comfortable with novel ideas, approaches and new information
INITIATIVE
Readiness to act on opportunities
OPTIMISM
Persistence in pursuing goals despite obstacles and set backs

MOTIVATION
Emotional tendencies that guide or facilitate reaching goals
ACHIEVEMENT DRIVE
Striving to improve or meet a standard of excellence
COMMITMENT
Aligning with the goals of the group or organization

II. SOCIAL COMPETENCE
These competencies determine how we handle relationships

EMPATHY
Awareness of others feelings needs, concerns
UNDERSTANDING OTHERS
Sensing others, feelings and perspectives and taking an active interest in their concerns
DEVELOPING OTHERS
Sensing others, Development needs and bolstering their abilities
SERVICE ORIENTATION
Anticipating, Recognizing and meeting custom needs
LEVERAGING DIVERSITY
Cultivating opportunities through different kinds of people
SERVICE ORIENTATION
Anticipating, Recognizing and

SOCIAL SKILLS
Adaptiness and inducing desirable responses in others
INFLUENCE
Wielding effective tactics for persuasion
COMMUNICATION
Listening openly and sending convincing messages
CONFLICT MANAGEMENT
Negotiating and resolving disagreements
LEADERSHIP
Inspiring and guiding individuals and groups
CHANGE CATALYST
Initiating or managing change
BUILDING BONDS
Nurturing instrumental relationships
COLLABORATING CO-OPERATION
Working with others towards shared goals
TEAM CAPABILITIES
Creating groups synergy in pursuing collective groups
Emotional intelligence is the best instrument to attain the goal. It is therefore the need of the hour to shift our attention to the concept of emotional intelligence in our educational curriculum as it envisages holistic formation of students. In doing so, educators are also preparing students for the tests of life, for the citizenship, and for adopting a lifestyle that is literate, responsible, non violent and caring. It is a great responsibility and it deserves great effort. Therefore, in this fast growing society emotional quotient (EQ) is very important in all stages of life for becoming successful individual.

1.7.2 Personality

Education is the superior adjustment of a physically and mentally developed conscious human being to his intellectual and emotional environments. This social effectiveness is achieved by the organization of psychological systems within the individual. This process of adjustment and organization of one’s capacities is conveyed by one unique word personality.

Psychologically speaking personality is all that a person is. It is the totality of one’s behavior toward one self and others as well. It includes everything about the person, his physical, emotional, social, mental and spiritual make up. It is all that a person has about him.

The term personality signifies something deeper than mere appearance or outward behavior. It is very difficult to define the term ‘personality’. Actually its subjective nature does not allow us to reach a clear cut, well agreed definition.
Some of these well known attempts at defining personality are presented below.

1.7.2.1 Definitions of Personality

According to Morton Prince (150:532) “Personality as a sum total of all the biological innate dispositions, impulses, tendencies, appetites and instincts of the individual and the dispositions and tendencies acquired by experience”.

This definition puts emphasis on heredity and environment.

According to Watson (210:182-210) “Personality is the sum of activities that can be discovered by actual observation over a long enough period of time to give reliable information”.

In this manner Watson gives emphasis upon the behavior of an individual and says that personality is nothing but useful effect one makes upon the person coming into this close contact.

Eysenck (55:32-40) looked at personality as “the more or less stable and enduring organization of person’s character, temperament, intellect and physique, which determine his unique adjustment to the environment”.

Garden Allport (8:34-42) believed that “Personality is the dynamic organization with in the individual of those psycho-physical systems that determine his unique adjustment to his environment”.

It is most often described in terms of measurable traits that a person exhibits. The dynamic aspect of personality organization implies that individuals are always open to change as a result of new experiences and
A more recent workable definition of personality comes from Mischel (135:151-165) a noted personality theorist. He says “personality usually refers to the distinctive patterns of behavior (including thoughts and emotions) that characterize each individual’s adaptation to the situations of his or her life”.

It may also be defined as “a particular pattern of behavior and thinking prevailing across time and situations that differentiate one individual from another.”

1.7.2.2 Dimensions of Personality

Personality is an integrated whole with certain concrete and some abstract dimensions. Each dimension has a specific purpose and a significant role to play in the totality of one’s being. The maturational changes as a result of chronological growth and environmental interaction, which an individual has thought out largely, determine the extent to which his personality – potential shall be developed. Various aspects of personality are not only interdependent but also so meticulously integrated that what happens in one aspect has its relative effect on other compartments.

Further, our personality determines our attitude and behavior which in turn influences our awareness, abilities and so on. Hence, it is the right time to give a shape to the dream of a healthy nation which emphasizes an “environmentally literate citizenry”. However, for the sake of convenience and better understanding, personality is compartmentalized.
into physique, mind and intellect, self confidence, emotionality, sociability, leadership, emotional control etc...

The dimensions of personality are as follows:

i) Physique (Body)

Body is the very basis of man's being, the plinth of personality. It is a gift of nature, and a solid, fixed and unalterable part of human personality. The physical traits are determined by the laws of genetics. Being a visible dimension, the physique creates the first impression of personality on others.

ii) Mind and Intellect

The progress of mankind solely depends on human intellect while body is the solid part, mind and intellect comprise the substantial aspect of personality. The qualities of mind and intellect are cultivated through psychic and social interaction as well as education and training. High thinking ability, sound reasoning, judgment, intuition, imagination, decision making etc., are hall marks of an amiable personality. The existence of personality with mind and intellect is enviousable (56:2-40).

iii) Self-confidence

According to Carl Rogers (1959), human beings show, any positive characteristics and more, over the course of their lives towards becoming fully functioning persons. He suggests that they are people who strive to experience life to the fullest, who live in the here and now, and who trust their own feelings. They are sensitive to the needs and rights of others but do not allow society's standards to shape their feelings or actions to an excessive degree. "They live more intimately with their feelings of pain, but also more vividly with their feelings of ecstasy" (29: 63-85).
iv) Persistence

Persistent people are curious, adaptable and spontaneous. They start many tasks, want to know everything about each task and often find it difficult to complete a task. Ross Reishold (1999) stated that an understanding of personality type can help broader definitions cover the different ways people persistence, different ways they make decision different styles. He also states that the impact of old scientific management of human resources profession.

v) Co-operativeness

Karen Harney (98:322-352) states that co-operativeness is in the form of three modes. First mode is social behavior moving towards others involves excessive compliance. A second mode of social behavior moving against others involves pursuit of satisfaction through ascendance and domination over others. Self protection is provided via one’s power over others. A third type approach moving away from others is self protection, by withdrawal. Karen Harney believed that normal people use all three modes of social interaction at times, but in a relatively balanced and flexible manner, adjusting their approach to situational demands. Neurotic people, she urged, allow one approach to their social interaction and this rigidity gets them into trouble.

vi) Emotional stability and Emotional control

According to Kleginginna and Kleinginna (1981) emotion should say something about the way we feel when we are in emotion, mention the physiological or bodily, basis of emotional feelings and it includes the effects of emotion, perception, thinking and behavior (103:345-379).

According to Robert Plutchink K. (155:365-383) emotion has proposed descriptive theory that is concerned with ways called primary or
basic emotions and ways they can be mixed together. He assumes the emotion differs in three ways.

a) Intensity
b) Similarity to one another
c) Polarity or Oppositeness

Emotional stability is a sign of mental health and an important ingredient of personality. Emotionality, psychologists believe may be an in born quality, but emotional control can be acquired through education and training.

viii) Sociability

Man is gregarious by nature and sociability is a refined form of gregariousness. With the onward march on the road to culture and civilization man’s dependence on his fellow beings has ever been increasing. Nature created man simply as an animal; society made him a social being. The processes of humanization and socialization, which give birth to man’s social self, take place only in society, particularly through infancy and childhood. Sociability is an unimpeachable quality of human personality. How an individual interacts with others, how he is influenced by others and influences others, how he adjusts in the social environment and how he makes social environment more congenial for others, is an important aspect of sociability. Human personality without sociability is like a castle built in the air. Social dimensions of personality offer a much wider perspective than physical or intellectual dimensions because good attitudes, interpersonal relationships value systems and social attributes like co-operation, co-existence, etc., are developed only in social environment.
viii) Leadership

Leadership is inspiring and guiding individuals and groups. It is to set an example to others. An emotionally mature leader is the source of inspiration to everyone. Emotionally balanced leader helps a person to articulate and arouse enthusiasm for a shared vision and mission. He is able to see things in right perspective. He is not perturbed or perplexed by small things. He is person oriented and not result oriented in his / her approach.

ix) Initiative

Initiative means displaying proactivity and persistence. People with emotional balance take a lot of initiatives and they are generally optimistic. They don’t operate in haste. Readiness to seize opportunities, pursuing goals beyond the requirement or expectation, being flexible to get the jobs done, mobilizing others through unusual enterprising efforts, showing persistence in seeking goals in spite of obstacles and setbacks, operating from hope of success rather than fear of failures, seeing setbacks as due to manageable circumstances rather than a personal flow are the various ways through which these types of personality people express their competence.

x) Attitude towards life and Attitude towards self

Several kinds of identifiable personality traits revolve around what could be considered the students attitude towards self and life. Traits such as self regard, self-consistency, self-esteem, self-assurance, self-enhancement and self respect all evolve out of this elaboration of a persons self image.

The term self is generally defined as being bi-dimensional. The first dimension, self as an object deals with the persons attitudes,
perceptions, feelings, thoughts and evaluations of himself as an object. The second dimension, self as a process, deals with self as a "doer" and considers it a function of him as an object is generally known as a person’s self, whereas the concept of self as a process is referred to as ego. That is, self refers to a person’s conception of the word with reality. Though there are some evidences (Rentz and While, 1967) indicating that these two dimensions are not completely independent, there is little doubt that there is considerable interaction between them.

The identification of self-concept in personality trait evaluations of the students has been initially established. Considerably parallel research in education and psychology has been directed along investigation of self concept and academic achievement, and the results are more than encouraging in terms of direct application for teachers and students.

xi) Courtesy

   Courtesy involves treating others with respect, preventing problems by keeping others informed of one’s decisions and actions that may affect them and passing along information to those who may find it useful. This is also one of the dimensions of personality, in which individual with courteous behavior an act or usage intended to honor of gracious politeness.

xii) Sense of responsibility

   In this dimension of personality, the individual has the ability to think and act rationally, and hence it is accountable for ones behavior.

   The teacher creates the emotional climate in the classroom just being friendly or unfriendly, tolerant or over critical generous or severe, calm or nervous. This directly affects the children themselves because
children learn attitudes and behavior by example. Emotional tensions, for instance, are contagious; a teacher who is fearful, tense and generally hostile can induce fear, worry and insecurity in his students. The learning situation is also affected by the personality and behavior of the teacher, for the student response to what is being taught is largely determined by his response to the teacher. Most of the authorities in the field of personality are in agreement that behavior is a function of person and situation.

1.7.3 Problem Solving Ability

Life is full of problems and challenges. Problems are inevitable in life. Handling a problem is a skill. It is a life skill since it is a part and parcel of life. Every step in our lives, every moment in our lives we have to face problems. The problems may be small or big. Different problems are faced in different stages of life. Also the problems can be different degrees and intensities. A problem solving ability must satisfy 3 criteria viz., acceptance, blockage and exploration.

A problem will no longer be a problem once it can easily be solved by algorithms that have been previously learned.

![Fig. 1.1 Criteria of a Problem Solving Ability](image)
1.7.3.1 Definitions of Problem Solving Ability

This is the cry of the hour terms like concept formation, creative thinking, reasoning, insight and learning are a part of definitions of problem solving. Deliberately avoiding the use of these terms in the following definitions of problem solving are considered.

i) Problem solving may be defined as a planned attack upon a difficulty or perplexity for the purpose of finding a solution. There is, then, resource to reflective thinking which is a process of careful conscious consideration of facts, beliefs or other elements of mental experience for the purpose of arriving at rational conclusions relevant to some problem or perplexity.

ii) Problem solving is a form of thinking which is characterized by a conscious, deliberate striving for a needed answer, conclusion or solution. It is a form of purposeful behavior and therefore involves movement toward a goal. In problem solving activities, a person reorganizes his ideas or restructures his experience in order to overcome obstacles and attain goals.

Problem solving is a process. It is the means by which an individual uses previously acquired knowledge, skills and understanding to satisfy the demands of an unfamiliar situation. The student must synthesize what he has learnt and apply it to the new and different situation. Problem solving skills should be considered as a distinct body of knowledge and should be taught as such.
1.7.3.2 Thought Process Involved in Problem Solving Ability

Recent analysis of cognition as information processing throws new light on problem solving as cognitive activity. These analyses attempt to account for the human mind's ability, with a limited capacity for processing information, to solve complex problems that require planning and strategy. Studies of expert problem solvers and computer simulations of problem solving processes show that the solution of a complex problem requires:

i) a rich store of organized knowledge about the content domain,

ii) a set of procedures for representing and transforming the problem, and

iii) a control system to guide the selection of knowledge and procedures.

1.7.3.3 Reasoning in Problem Solving Ability

Reasoning is the highest form of thinking that needs a well organized brain. The process of reasoning requires two conditions first, that the person's mind should have completely formed concepts, and second, that he should be endowed with the power of reaching decisions. In the process of reasoning, the individual reasons from the past known circumstances to the present or future unknown conditions on the basis of past experience. In this manner, reasoning helps to reach certain conclusions concerning the future without anything having been achieved in actual practice. Evidently such an application needs some imagination as an essential part.

Reasoning is an essential part of problem solving which itself is regarded as a complex factor comprising induction deduction and
restrictive or general reasoning. Controversies on it are avoided by including it in problem solving.

1.7.3.4 Dimensions of Problem Solving

Problem solving could be understood better by understanding its different dimensions that surround the skill. These dimensions of problem solving skill have to be understood in detail to develop the skill (206: 49-61).

1. Self knowledge

It is the ability to understand and learn about ones capacities, emotions and actions, and in relation to the socio cultural milieu that one lives in solving the problem. It is necessary to know about ones own capacities, strengths, weaknesses, behavior keeping one’s own social background and the context of the problem in mind while managing problems. The self knowledge is quite limited and it is necessary for us to realize our strengths, weaknesses, likes, dislikes, feelings, thoughts and our behavior at large in various problem contexts of our lives in relation to the problems that we are facing at a given point of time.

2. Positive attitude

It is the ability of being hopeful and confident in the way of approach to the problem. It is well known and accepted both by the lay individuals as well as professionals and all those belonging to different walks of life that being positive attitude goes a long way in managing problems. Those positive qualities like hope, success, happiness, joy, contentment, love and affection, liking, optimism etc., make a major impact on one’s life in general and problem solving in particular.
3. Objectivity

It is the ability to view one’s own problem from a third person perspective as they are. Problem solving is a cognitive activity. It is found that when cognitive is working, emotionally reduces and when emotionality is at work, cognition reduces. In problem solving objectivity is very important for it to be effective and successful. This is an ability, in which one can be trained.

4. Rationality

It is the ability to solve problems based on reasons and logic than using crude methods or trial and error. One can attempt to solve a problem in many ways. Sometimes one might have tried to solve a problem impulsively or by trial and error method and by chance succeeded.

5. Divergent thinking

It is the ability to think in multiple ways, to view and manage a problem from different perspectives. Life has multiple facts. Any problem that is in life, be it personal, social, interpersonal person in interaction with the society, has a different origin, cause, management and solution. One has to train oneself to think from multiple perspectives.

6. Logical thinking

It is the ability to understand and deal with the problem in a systematic, orderly fashion. There is an order, system and logic in any situation. One has to understand that systematic approach to the problem which many of the problems solving strategies also suggest is very important in problem solving. The system involves various aspects from
realizing that there is logical order in understanding the problem, analyzing the different aspects of the problems finding various alternatives to manage the problem and the implementation of the strategy chosen to manage the problem.

7. Analytic Synthetic ability

It is the ability to break down and understand and put together, the various aspects of the problem and dealing with the problem. A problem will have different aspects, levels, and perspectives, to be understood. Also, the given problem will have multiple alternatives which can be used for managing it.

8. Anticipation of consequences

It is the ability to infer or foresee the after effects of the problem and / or the strategies used to manage the problems. Anticipation of consequences is an ability which one can and should train oneself in it.

1.7.3.5 Problem Solving and Education

In school, we have seen that the teachers have problems. Likewise, the children also have problems. The intensity, degree and nature of the problems may vary. But problems are there. School being the centre where the children get their basic training in life skills and life skills training becoming a part of their schooling process makes a fertile ground where they can develop the skill of problem solving.

Problem solving is a ‘major force’ and ‘central activity’ of all teaching of mathematics is the development of various components of problem solving skills during their schooling years among the students. This would go along way in dealing with problems in life.
Schools and colleges have changed their purposes from just academic empowerment to life skills empowerment which is much more comprehensive and useful in the world today. The schools and colleges have realized the importance of non academic activities in the success of students lives. And so, the children have to be formally and scientifically trained to face life using life skills appropriately. Problem solving being one of the important life skills can also be developed at the school and college level.

Since 10 years the investigator is serving in College of Education as method master of Mathematics. He also feels that there is gap between above mentioned areas. Hence, the investigator selected this problem for investigation.

1.8 Resume of the Succeeding Chapters

The research study is presented in five chapters. The chapter plan is as follows.

Chapter 1 titled introduction, which deals with the background of the study which consists of genesis of the problem, need and importance of the study, statement of the problem, objectives of the study and scope of the problem. It has also dealt with conceptual framework of emotional intelligence, personality and problem solving ability.

Chapter 2 titled review of related literature, which deals with the review related studies which helped the investigator to design the present study. First section deals with the reviews related to emotional intelligence. The second section deals with the reviews related to personality factors and the third section deals with the reviews related to problem solving ability.
Chapter 3 under the heading methodology of the study, gives the details regarding method of research, statement of the problem, selection and classification of variables, definition of technical terms, hypotheses needed to be tested for the study, description of the various tools used for the collection of data, sampling and statistical techniques used for analysis of data.

Chapter 4 titled analysis and interpretation of data deals with analysis techniques, tables and description of findings pertinent to each hypothesis. In this chapter, using the research hypotheses set-up have been tested by using co-efficient of correlation, single classification, two way classification ANOVA, comparison of means using DUNCAN’s procedure and regression analysis.

Chapter 5 titled summary of the findings, educational implications and suggestions, which deals with the brief summary of the earlier chapters, findings and conclusions of the study, limitations of the study, educational implications of the study and suggestions for further research.