CHAPTER – 3

METHODOLOGY AND PROCEDURE
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The concept of emotional intelligence as "the ability to perceive emotions, to access and generate emotions, to assist thought, to understand emotions and emotional knowledge and to relatively regulate emotions, to promote emotional and emotional growth" (Mayer and Salovey, 1997) appears to be closely related to the academic achievement of a student and to his/her stress level, which largely forms the basis of the present study. In order to understand the relation of these three variables, we need to report an account of the methodology and procedure followed in the present study. Chapter 3 embodies the above account in detail. Subsequently, the results of data analysis will be reported in Chapter 4.

3.1 VARIABLES

Chapter 1 of this dissertation was devoted to the detailed discussion on the major variables, their concepts and characteristics. Before we deal further with the methodology, a brief summary of the variables with their operational definitions is presented here for the sake of convenience.

3.1.1 EMOTIONAL INTELLIGENCE

Emotional intelligence is defined as the capacity for recognising our own feelings and those of others, for motivating ourselves, and in our relationships (Goleman, 1998). Goleman adapted the model of Salovey and Mayer (1990) into a version which he found most useful for understanding the effect of emotional intelligence on social life. His adaptation includes five basic emotional and social competencies, which have been found most suitable for the present study.

3.1.1.1 Self-awareness:

Knowing what we are feeling in the moment, and using those preferences to guide our decision making, having a realistic assessment of our own abilities and a well-grounded sense of self-confidence.
3.1.12 Self-regulation:
Handling our emotions so that they facilitate rather than interfere with the task at hand, being conscientious and delaying gratification to pursue goals, recovering well from emotional distress.

3.1.13 Motivation:
Using our deepest preferences to move and guide us towards our goals, to help us to take initiative and strive to improve, and to persevere in the face of setbacks and frustrations.

3.1.14 Empathy:
Sensing what people are feeling, being able to take their perspective, and cultivating rapport and attunement with a broad diversity of people.

3.1.15 Social Skills:
Handling emotions in relationship well and accurately reading social situations and networks, interacting smoothly, using these skills to persuade and lead, negotiate and settle disputes for co-operation and team-work.

3.1.2 STUDENTS STRESS
Stress is defined as a psychological state arising out of a condition that is characterized by excessive environmental demand against a limited psychophysiological resources. When an individual fails to cope with the environmental demands psychologically and physically, the resulting condition is that of stress.

Stress is the process that occurs in response to situations or events (stressors) that disrupt, or threaten to disrupt, our physical or psychological functioning.

In this study, the physiological counterpart of stress has been kept out of purview. Students stress arises out of some specific stressors which are distinctly different from those typical of non-students. However, this does not mean that other common stressors in general, or for people at large are absent in their life.
With the above assumption, students' stress have been perceived and categorised in terms of stressors. The following dimensions of stress, according to the stressors are taken into account for the present study.

3.1.2.1 Stress due to Home Environment:
Stress arising out of shortage of space, crowding, unconducive home environment, etc. have been named as stress due to home environment.

3.1.2.2 Stress due to parental attitude:
Here, attitude has been termed as broad spectrum of negative perception of parents which includes unrealistic expectations, and parent-centred dealings with their son and daughter.

3.1.2.3 Stress due to Teacher and Institution:
This includes stress due to general climate of the institution, teachers' mode of teaching, and behaviour and similar other factors.

3.1.2.4 Stress due to Examination:
Due to over emphasis on the examination performance, this is considered to be a single stressor that causes maximum pressure upon at least a section of the students.

3.1.2.5 Stress due to outer environment:
Outer environment refers to all socio-political and economic factors including uncertainty of future employment and varieties of unrest.

3.1.2.6 Stress due to personal limitations:
Bad or slow handwriting, personal habits, distractability, are some of the stressors due to personal limitations.

3.1.3 ACADEMIC ACHIEVEMENT
Academic achievement has been defined in the Oxford Dictionary of Psychology, simply as scholastic attainment. This implies that academic achievement is the level of attainment of an individual after going through an academic or scholastic programme. From this perspective, academic achievement
has been assessed in terms of the level of attainment of a student after going through a course of study.

3.1.4 SAMPLING VARIABLES
Since the population of the present study belong to college students, there could be three sources of variation, namely - age, sex and course of study.

3.1.4.1 Age:
So far as the present day admission norms are concerned, most of the students reach college stage, at a uniform age level. Therefore, any study with college students is likely to have homogenous groups in respect to their age.

3.1.4.2 Course of Study:
Conventionally, in our colleges, the subjects of study are broadly classified into three categories, namely - Arts, Science and Commerce. The academic achievement of the students who are admitted to these three streams, vary widely at the entry point where, science students occupy the creamy layer. Academic achievement at the entry point of degree courses vary, considerably and at the same time academic pressure is also different in different courses of study. Therefore, course of study is also accepted as a sampling variable in the present study.

3.1.4.3 SEX:
Both the variables, emotional intelligence and stress, have been found to vary among the male and female students by other researchers. Whether academic achievement varies between the two sex groups is a matter of debate because such differences are never assessed under appropriate controlled conditions. But still, sex cannot be ignored as a variable in any study involving emotional intelligence, stress and academic achievement.
A summary of the variable is presented in the Table 3.1 given below

### TABLE 3.1: SUMMARY OF THE VARIABLES

<table>
<thead>
<tr>
<th>NAME</th>
<th>DIMENSIONS</th>
<th>CATEGORY</th>
</tr>
</thead>
</table>
| **EMOTIONAL INTELLIGENCE** | 1. Self Awareness  
2. Self Regulation  
3. Motivation  
4. Empathy  
5. Social Skills | Independent Variable                          |
| **STUDENTS STRESS**   | Stress due to:  
1. Home Environment  
2. Parental Attitude  
3. Teacher and School  
4. Examination  
5. Outer Environment  
6. Personal Limitations | Dependent variables to Emotional Intelligence, Independent of Academic Achievement. |
| **ACADEMIC ACHIEVEMENT** | Marks obtained by the students in-  
School Final Examination  
Higher Secondary Examination | Dependent Variable                           |
| **SAMPLING VARIABLES** | • Age  
• Gender  
• Course of Study  
(a) Arts (b) Commerce  
• Further explanation is given along with sampling |                                |
3.2 TOOLS

From the objectives of the present study and description of the variables, it is evident that the researcher primarily needed two good research tools, one for the assessment of Emotional Intelligence and the other for students' stress.

3.2.1 Emotional Intelligence

In order to select a scale for the assessment of college students’ emotional intelligence, many tests were thoroughly examined. These tests or scales of emotional intelligence have been developed by different authors following different models of emotional intelligence. It was noted that there were predominantly three models. A brief account of these models and the emotional intelligence scale developed upon these is given below.

3.2.1.1 Tests on Specific Ability Model

These tests intend to measure non-verbal perception. Non-verbal perception includes deciphering social information, along with the accurate recognition of emotional expression. Some of the non-verbal measures used specialized models of emotional accuracy. For example, one model aimed to assess a person's accuracy at perceiving emotion in child and adult faces, voices and postures (Nowicki & Duke, 1994). Two frequently used measures of perceptual accuracy in emotion are the Diagnostic Analysis of Non-Verbal Accuracy Scales [(DANVA and DANVA-2) – Nowicki & Duke, 1994], and the Japanese and Caucasian Brief Affect Recognition Test (JACBART, Matsumato et. al; 2000), though there are others, (e.g., Elfenbein et al. 2006). Generally speaking, these scales present pictures of faces and of postures, gestures, or recordings of voice tones. The participants' task is to correctly identify the emotion expressed. For example, the DANVA-2 employs stimuli that express one of the four emotions of happiness, sadness, anger and fear.

None of these scales provide any psychometric data about their reliability and validity. Also, the nature of stimulation used were considered unsuitable
because these might be culturally biased. Again, the specific ability model did not feature as the basis of this study.

3.2.1.2 Tests on Integrative Model:

The key element in integrative models of E.I. is the joining of several specific abilities to obtain an overall measure of E.I. For example, Izard’s Emotional Knowledge Test (Izard et al. 2001), asks test takers to match an emotion such as sadness with a situation such as “your best friend moves away”, as well as to identify emotions in face. It provides an integrative measure of EI, focusing in particular on emotional perception and understanding. Izard’s test is also important because it is designed for use with younger age groups (e.g., as early as 3-4 years old) relative to other measures of E.I. Izard (2001) sometimes prefer to speak to emotional knowledge as opposed to emotional intelligence. Psychologists often speak about an aptitude - knowledge continuum (e.g. Litcher & Wainer, 2000). Both intelligence and knowledge tests operate according to similar principles and rely on assessing a person’s knowledge. Generally speaking, intelligence tests emphasize general breadth and rate of learning as well as the ability to reason with unfamiliar problems. Knowledge tests, by contrast, measure attained knowledge. Both concepts fit within the scope of EI studies.

3.2.1.3 Tests on Four Branch Model:

This model is also integrative in nature (Salovey and Mayer, 1990). The model views overall EI as joining abilities from four areas: (a) Accurately perceiving emotion, (b) using emotions to facilitate thought, (c) understanding emotion, and (d) managing emotion (Mayer and Salovey, et. al.,1997, 2003).

A series of instruments have been developed on the four branch model, the most recent of which is Mayer - Salovey - Caruso Emotional Intelligence Test, or MSCEIT (Mayer et. al, 2002b). This test is composed of eight individual tasks similar to those described in individual areas above. Two tasks are used to measure each branch of the model.
Emotional management of oneself and others is measured by presenting test takers with vignettes describing a social situation and asking them how emotions might be managed in the situation (Mayer et. al., 2002a). The MSCEIT replaced the earlier, lengthier, Multifactor Emotional Intelligence Scale (MEIS, Mayer et. al., 1999).

Although, Mayer and Salovey model has very close relevance to the present study, the recent version of MSCET, particularly, the tasks used in it, did not suit the population selected for the present study. In this case also authors did not categorically mention the magnitude of reliability and validity and how these were obtained.

3.2.1.4 Tests on Mixed Model:

The fourth approach to assess EI is often referred to as a Mixed Model approach because of the mixed qualities that such models target. These approaches use very broad definitions of EI that include “non-cognitive capability, competency, or skill” (Bar-On, 1997) and/or “emotionally and socially intelligent behaviour” (Bar-On 2004, p. 122), and “dispositions from the personality domain” (Petrides & Furnham 2003, pp. 278-280). Tett et al (2005) drew on Salovey and Mayer’s original EI model, which they interpreted in a broader, more mixed model fashion than the authors had intended.

Most measures in this category assess one or more EI attributes, such as accurate emotional perception, but then to varying degrees of mix. Other scales are like that of happiness, stress-tolerance, and self-regard (Bar-On, 1997); adaptability (low) impulsiveness and social competence (Boyatzis & Sala, 2004, Petrides and Furnham 2001); and creative thinking, flexibility, and intuition versus reason (Tett et. al., 2005). Relative to the conceptual development, these mixed-in attributes lack a primary focus on E.I.
Some typical important scales of EI under mixed model are described below briefly.

(a) **Emotional Quotient Inventory - EQ-I (Bar-On, 1997)**: It is a 133 item self-judgement inventory. Items here are divided over 15 subscales such as adaptability, assertiveness, and self-regard that also can be formed into five higher-order factors: intrapersonal, interpersonal, adaptation, stress management, and general mood.

(b) **Self-Report Emotional Intelligence Test (Schutte et. al. 1999)** - SREIT - A 33 item self-report inventory that has most often been used to assess an overall level of EI.

(c) **Multi-dimensional Emotion Intelligence Assessment (Tett et. al., 2005, 2006)** - MEIA - A 118-item self-report inventory employing 10 scales, many of which are based on the original Salovey and Mayer (1990) model of EI and some of which are added.

EQ-I was found to be too lengthy for the college students and so also MEIA. Whereas SREIT attempted to have a global assessment of EI which could not be conceptually related to academic achievement and stress. However, it was ostensibly decided that a scale of EI has to be used which must be of,

(a) self-reporting type,
(b) integrative of many facets comprising E.I., and
(c) adequate psychometric quality.

### 3.2.2 Development of the Test of Emotional Intelligence

As it has been emphasized at the end of the previous section, a Test of Emotional Intelligence was developed following the steps mentioned below.

#### 3.2.2.1 Item Writing:

The spirit and in some cases the contents of items were freely borrowed from the tests described earlier. These items were rephrased and translated into Bengali. There was also an English version of the test. While writing and translating the items, it was carefully kept in mind that the concerned life
experiences or social situations stated in the items, must not be alien to our culture and life style. A set of 90 items were initially prepared which was divided into five sections, namely,

<table>
<thead>
<tr>
<th>TABLE 3.2: NUMBER OF ITEMS IN EMOTIONAL INTELLIGENCE SCALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sections</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>I</td>
</tr>
<tr>
<td>II</td>
</tr>
<tr>
<td>III</td>
</tr>
<tr>
<td>IV</td>
</tr>
<tr>
<td>V</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>

3.2.2.2 Response Format:

Response format for the items differed to some extent from section to section. For the first three sections [Section I, II and III], there were four response options. Depending on the nature of the statement given in a specific item the graded response options were in the form, strongly agree - strongly disagree, Always - Never, Highly true - Not true at all etc. For the remaining two sections (Sections IV and V), there were five or six graded alternative actions mentioned under the statement or situation in the given item (that is, in the 'what do you do when' model). All items and responses were written in the first person.

3.2.2.3 Finalisation of the items for Try-out:

The test was administered on a small sample of 20 college students for editing and initially examining the nature of response endorsement along the graded option. After scrutiny of the items, 10 items were dropped from the item pool and 80 items retained. A birds' eye view of the test may be obtained in Table 3.3.
### TABLE 3.3: SUBSCALES AND THE NUMBER OF ITEMS IN THE EMOTIONAL INTELLIGENCE TEST.

<table>
<thead>
<tr>
<th>Section</th>
<th>Name of the Sub-Scale</th>
<th>No. of Items</th>
<th>Response Alternatives</th>
<th>Scoring Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Self-awareness</td>
<td>26</td>
<td>a, b, c, d</td>
<td>4 3 2 1 &amp; 1 2 3 4</td>
</tr>
<tr>
<td>II</td>
<td>Self-regulation</td>
<td>20</td>
<td>a, b, c, d</td>
<td>4 3 2 1 &amp; 1 2 3 4</td>
</tr>
<tr>
<td>III</td>
<td>Motivation</td>
<td>19</td>
<td>a, b, c, d</td>
<td>4 3 2 1 &amp; 1 2 3 4</td>
</tr>
<tr>
<td>IV</td>
<td>Empathy</td>
<td>8</td>
<td>a, b, c, d, e, f</td>
<td>Random Order</td>
</tr>
<tr>
<td>V</td>
<td>Social Skills</td>
<td>7</td>
<td>a, b, c, d, e &amp; f, g &amp; h *</td>
<td>Random Order</td>
</tr>
</tbody>
</table>

Responses e & f, g & h were of equal order and 5 or 6 were awarded as score for both the responses in pair respectively.

#### 3.2.2.4 Scoring:

Depending on the nature of statement given in the items, scoring was to be done either in the ascending or descending order. It may be noted that (last column of Table 3.2) for sections IV and V, response alternatives were arranged in random order. This was done deliberately to avoid any bias in the response style. Number of alternatives also varied from 5 to 6 implying a score range of 1-5 or 1-6 in the appropriate cases. The reason behind such variation in the number of alternatives is simply because the researcher wanted to incorporate as far as practicable, all possible reactions to a given situation.

#### 3.2.2.5 Try out of the Emotional Intelligence Test:

Since the test under construction was not an ability test and since the population for whom the test was meant had more or less uniform characteristics otherwise (age, academic background etc.) it was not tried out on a very large sample. 100 college students (50 Male and 50 Female) were selected from as many as 4 colleges. The test was taken by them voluntarily and responses were to
be endorsed in presence of the researcher. They were given the following instructions -

There are 5 sections in this booklet. In each section there are certain questions/statements relating to personal situations or experiences. How would you react to that particular experience or situation relating to similar experiences, has been denoted by options a, b, c, d in the case of Section I, II and III. For the remaining two sections, there are five or more probable responses given under each statement. In all the cases (Sections I to V) choose the response alternative that best describes your own reaction.

In the given answer-sheet there is space for marking your answer for each item. Please record your choice in the appropriate place against the serial number of the item. There is no good or bad, right or wrong answer. According to life experiences, every individual is different from the others. Hence, be very confident about your own answer.

- All answers will remain confidential.
- Do not omit any situation (item).
- Complete your answers as soon as possible.
- If at all you wish to change/alter the answer then simply put an X mark over the one you have already noted down and then write your next option clearly beside it.
- Do not write or put any marking on the Booklet.

3.2.2.6 Tabulation:

After scoring the responses according to the scoring key given in Appendix - C, all the individual responses were tabulated item wise. Then the total score in each section obtained by each individual was counted. Scores on Total Emotional Intelligence Test were also worked out. Item variances were calculated first by counting the frequency of responses endorsed by the whole group (N=100) for a particular item separately and then working out its variance and total variances for each subscale and for the whole test were also calculated.
3.22.7 Reliability:

Reliability coefficients for the sub tests and for the whole test were determined using Kuder-Richardson Formula 20 and Cronbach \( \alpha \) (alpha). Results are given below in Table 3.4.

**TABLE 3.4: RELIABILITY COEFFICIENTS OF THE EMOTIONAL INTELLIGENCE TEST**

<table>
<thead>
<tr>
<th>Sub Test</th>
<th>Sum of the Item Variances</th>
<th>Total Variance</th>
<th>Reliability Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>I  Self-awareness</td>
<td>8.8278</td>
<td>43.7185</td>
<td>.83</td>
</tr>
<tr>
<td>II Self-regulation</td>
<td>11.6014</td>
<td>46.4988</td>
<td>.79</td>
</tr>
<tr>
<td>III Motivation</td>
<td>12.1108</td>
<td>41.5251</td>
<td>.75</td>
</tr>
<tr>
<td>IV Empathy</td>
<td>10.0424</td>
<td>34.4804</td>
<td>.81</td>
</tr>
<tr>
<td>V Social Skills</td>
<td>4.4938</td>
<td>12.0062</td>
<td>.73</td>
</tr>
<tr>
<td>Emotional Intelligence (Total Test)</td>
<td>54.5841</td>
<td>361.7984</td>
<td>.86</td>
</tr>
</tbody>
</table>

**TABLE 3.5: RELIABILITY COEFFICIENT USING CRONBACH \( \alpha \)**

<table>
<thead>
<tr>
<th>No. of Sub Tests</th>
<th>Sum of the Sub Test Variances</th>
<th>Total Test Variance</th>
<th>Reliability Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>178.229</td>
<td>361.7984</td>
<td>.63</td>
</tr>
</tbody>
</table>

The test of Emotional Intelligence is quite reliable as per the coefficients presented in the above table. Since the number of subtests is only 5, it is not unusual that the reliability coefficient estimated by Cronbach alpha shows a little lower value.

3.22.8 Validity:

A major criticism against the existing scales of Emotional Intelligence is about their validity. None of the tests can be cross validated against another test. Most of these are satisfied with content validity. External criteria are not so well defined and follow up studies are scanty. Some validity reports are available with professional groups and clinical cases. The present test of Emotional Intelligence assembled many widely used tests abroad as its source of item changing occasionally the specific situation or experience which is alien to our
A preliminary test of internal validity was done on the basis of dimensions selected from a theoretical model. Inter correlation of these dimensions were worked out for the larger sample (N=400). It was noted that the five subtests are positively and moderately correlated between themselves and their correlation with the total tests scores were quite high. A further analysis of these correlations and the actual matrix of correlation coefficients will be presented in Chapter 4, on Results and Discussion. Tentatively, the test can be said to have construct and content validity.

3.2.3 Assessment of Students' Stress

Questionnaire for Students' Stress and Stress Reactions (Datta, 2002) was used to assess students' stress. This is a questionnaire comprising 72 items which measure students' stress in six areas. It is a standardized questionnaire developed relatively on a larger sample of college students (N=325). Item validity were determined by Tetrachoric Correlation and Phi-coefficients and also by expert ratings. Reliability was determined by K-R Formula – 21 which came out to be .89.

Each of the items stated about a stressful experience of students and sought answer in four options, namely: Always to Never. A brief description of the questionnaire is given in Table 3.4 and the specimen of the Questionnaire is annexed in Appendix C.
TABLE 3.6: STUDENTS STRESS QUESTIONNAIRE A BRIEF DESCRIPTION

<table>
<thead>
<tr>
<th>Sub Test</th>
<th>Name</th>
<th>No. of Items</th>
<th>Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>Stress due to home environment</td>
<td>9</td>
<td>All items are scored either 4 3 2 1 or 1 2 3 4 order</td>
</tr>
<tr>
<td>II.</td>
<td>Stress due to Parents</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>II.</td>
<td>Stress due to Teachers and Institution</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>IV.</td>
<td>Stress due to Examination</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>V.</td>
<td>Stress due to Outer Environment</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>VI.</td>
<td>Stress due to personal limitations and anxiety</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

3.2.4 Academic Achievement

Aggregate marks obtained by the students in sample groups in their Madhyamik (Secondary or School Final) and Higher Secondary Examinations were accepted as scores on academic achievement. The reasons behind taking these two sets of marks as scores on academic achievement are given below.

- All the students in sample group completed their secondary and Higher Secondary school education under the West Bengal Board of Secondary Education and Council of Higher Secondary Education, W.B. respectively.

- All of them were evaluated by the same set of principles, under the same curriculum and question papers. All Madhyamik candidates had to follow uniform core curriculum. But diversification was allowed in the Higher Secondary stage.

- The sample group comprised two academic streams namely, Arts and Commerce. The usual practice is that Arts students and Commerce students are admitted to the respective streams in the college degree course from the corresponding higher secondary streams.
• Therefore, the sources of variation due to extraneous factor in their assessment of academic achievement on the basis of these two examinations were very limited.

• However, the aggregate marks were transformed into percentages for the sake of convenience. The students were requested to bring copies of their Madhyamik and Higher Secondary marksheets, where from the marks were directly recorded.

• When the present study was conducted, the student were yet to take any university examination. System of internal testing varies widely from college to college and also within each stream, particularly in Arts, the subjects of study had many variations. Therefore, college examination marks could not be used as a measure of academic achievement.

3.3 SAMPLING

Sampling is the process of inferring something about a large group of elements by studying only a part of it. Most of the educational phenomena consist of a large number of units. It would be impractical, if not impossible; to test, to interview or observe each unit of the population under controlled conditions in order to arrive at principles having universal validity. Sampling is the process by which a relatively small number of individuals or measures of individuals, objects, or events is selected and analysed in order to find out something about the entire population from which it was selected.

3.3.1 Types of Sampling

Sampling methods can be classified under two broad categories:

1. Probability Sampling
2. Non-probability sampling
3.3.1.1 Probability Sampling

The word 'probability' refers to the study of likelihood of events. Probability sampling is the technique in which every element unit in the sampling frame has an equal and independent chance of being included in the sample. Obviously selection of one element/unit will not influence the selection of others. In this technique, the selection of elements/units is made through chance procedures called Random Selection.

Probability Sampling may be defined as a technique that ensures random sampling i.e. a sample which is a representative of the population from which it is drawn. There are many forms of probability sampling of which the major forms are:

**Simple Random Sampling**

A sample in which each element of the population has an equal and independent chance of being included is a random sample. A sample selected by randomization method is known as Simple Random Sample and this technique is known as Simple Random Sampling. The different steps involved in drawing a random sample are:

- Define the population;
- List of all the units in the population and number them from I to N;
- Decide upon the size of the sample or the number of elements/units to be included in the sample;
- Use either of the following methods for the selection of a sample.
  1. Lottery Method.
  2. The use of table of random numbers and
  3. The use of computers.
All these methods are independent of human judgement and hence ensure randomness.

In educational research simple random sampling is very rarely used because the population is often vast in comparison to the sample size.

**Systematic Sampling**

When a frame of population is available or when a population can be accurately listed and is finite, a method of systematic selection will provide a sample which appropriates a random sample. In systematic sampling, elements/units of population are arranged in some systematic manner and then the sample is drawn following a systematic order. Systematic sample is a sample where the units are selected at equal intervals. The mechanics of taking a systematic sample is very simple - the chief advantage being its simplicity. But for a systematic sampling, it is essential that the population is of a known size and each element in it can be arranged systematically.

**Stratified Random Sampling**

At times, a simple random sample particularly a small one, may by chance have an undue proportion of one type of units in it and, therefore, it is necessary to make certain that the units included in the sample are selected in proportion to their occurrence in the population. When the units in a sample are proportional to their presence in the population, the sample is said to be stratified. When employing the method of stratified random sampling, a researcher divides his population into different strata by some characteristic which is known previously. Then sampling is done randomly from each stratum. Thus, in addition to randomness, stratification introduces a secondary element of control as a means of increasing precision and representativeness. Sometimes, sampling frame is not homogeneous and contains subgroups i.e. heterogeneity occurs. These sub-groups are also known as strata. The strata are the partition of the population which are more homogeneous than the complete population. The
members of a stratum are similar to each other and are different from the members of another stratum in the characteristics that we are measuring.

The **stratified sampling** is used whenever these strata are necessary for research purposes.

The main advantage of stratified sampling is that sample is a good representative of the population. When a population is stratified, the units within each stratum are more or less homogeneous than are the units within the entire population. Stratified random sampling provides more accurate results than simple random sampling only if stratification results in greater homogeneity within the strata, with respect to the trait under study than it would be found in the whole population taken as a unit. In educational research stratified (random) sampling is widely used.

**Cluster Sampling**

The cluster sampling is a variation of simple random sampling. It is used when the population under study is infinite, where a list of units of the population does not exist, when the geographic distribution of units is scattered, or when sampling of individual units is not convenient for several administrative reasons.

When the selection of individual members of the population is impractical or too expensive, it may be possible to select groups or clusters of members for the sample. Cluster sampling is a procedure of selection in which the unit of selection called the cluster contains two or more population members. Each member of the population must be uniquely contained in one, and only one cluster. Cluster sampling is useful in situation where the population members are naturally grouped in units that can be conveniently used as clusters e.g. a class, a school building etc.
Multi-Stage Sampling

Multi-stage sampling is used in large scale surveys for a more comprehensive investigation. In this case, the cluster sample approach is combined with random sampling so that there are stages in the sampling process. Such a sampling is called multi-stage sampling. The researcher may have to use two, three or four stage sampling.

Multi-stage sampling is comparatively convenient, less time-consuming and less expensive method of sampling. However, an element of sample bias gets introduced because of the unequal size of some of the selected sub-samples. This method is recommended only when it would be impractical to draw a simple random sample.

Probability Proportion to Size’ Sample

When the units vary in size, such as schools in respect of total enrolment, it is adviseable to select such a sample that the probability of selection of a unit is proportional to its size. Therefore, a school with an enrolment of 800 will get double the chance of being included in the sample compared to a school with an enrolment of 400. Such a sample is known as ‘probability proportion to size’ or PPS Sample.

3.3.1.2 Non-probability Sampling

Non-probability sampling is the sampling technique in which the subjects/elements are not chosen at random. The units are selected at the discretion of the researcher. Such samples use human judgement in selecting units and have no theoretical basis for estimating population characteristics. Elements are chosen on the basis of how they look, where they live or some other criteria. Usually the complete sample is not decided at the beginning of the study but it evolves as the study progress.

Educational researchers, because of administrative difficulties in applying probability sampling methods, often use available groups as samples. The non-
probability sampling methods are very convenient in the situations when the sample to be selected is very small and the researcher wants to get some idea of the population characteristics in a short-time.

3.3.2 Sample of the Present Study

In educational research pure random sampling is very rarely done, particularly when the research problem pertains to student population. Any student population is usually vast and for any individual research programme, a very small number of students is drawn into the sample in comparison to the population. Therefore, often it becomes difficult to claim a sample as random. However, stratification of the population is done conventionally into rural and urban, male and female or into other such categories.

Sample of the study undertaken by the researcher was drawn from the college students in the undergraduate degree courses.

3.3.2.1 Defining the Population –

The college going students which forms the population of the present study needs to be further specified before explaining the actual sampling procedure followed in this study.

Students in the general degree colleges are commonly divided into three streams, depending upon their subjects of study, i.e., Arts, Commerce and Science. There are some specific subject areas common to more than one stream. But till now the degrees are offered in these three streams. Considering the minimum eligibility criteria set for admission to these streams, science students are supposed to be far superior to those in other streams. Since the amount and nature of stress experienced by the students may reasonably depend on the ability or achievement level, science students were eliminated from the population and only Arts and Commerce students were selected. It was further necessary because, many colleges do not offer science courses and girl students, still now, are relatively fewer in number in the science streams, except in the metropolis.
Again, the students in the degree courses usually belong to the late adolescence group (Age 17-20) having many characteristics, both psychological and behavioural, highly similar. Nature of anxiety and stress, their concern for future career, relationship with opposite sex etc. have many similarities and in this sense apparently they form a homogenous group differing only in their personal life experiences, family background etc. In these days, rural-urban divide causes very little impact upon their characteristics as most of the villages have been urbanized with better transport and communication facilities, improved housing, e-communication and availability of other amenities. Even if there may be some exception, there is no well defined psychological and educational criteria of dividing the college student population into rural and urban categories. Therefore, the population under description was categorized only into Arts and Commerce (course of study) and Boys and Girls Gender categories. Emotional Intelligence (Saha 2009) and Stress (Dutta, 2002) both have been found to vary according to gender. Therefore, it is justified to stratify the sample on the basis of gender. Population was restricted to the students studying in the colleges under the University of Calcutta because the curriculum, teaching, examinations and such other factors would also be controlled.

3.3.2.2 The Sample

It is to be noted that considering the homogeneity of the student population it was deemed unnecessary to draw sample from a very wide geographical area. Sample was drawn from 10 (ten) colleges located in Kolkata, South 24 Parganas and North 24 Parganas under the Calcutta University. Recently, the colleges in North 24 Parganas have been separated under a new university. The other two districts, i.e., Howrah and one sub-division of Hooghly districts were left out.
Size of the sample in four categories are given below in Table 3.5.

TABLE 3.7: SAMPLE OF THE PRESENT STUDY

<table>
<thead>
<tr>
<th>GENDER</th>
<th>COURSE OF STUDY</th>
<th>ARTS</th>
<th>COMMERCE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOYS</td>
<td></td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>GIRLS</td>
<td></td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>200</td>
<td>200</td>
<td>400</td>
</tr>
</tbody>
</table>

3.3.2.3 Procedure of Sample Selection

For the present case, firstly the selected Degree Colleges were divided according to the streams - Arts and Commerce. Most of the colleges have Arts stream but it was difficult to locate colleges with both Arts and Commerce students. Then it was also necessary to keep in mind about the gender factor. Equal number of boys and girls were not available in all the colleges. And some of these colleges were either all girls or all boys’ colleges. When the colleges were approached, many of the principals of the colleges did not allow data collection due to some reason or other. Besides, in some colleges, due to shortage of space, no arrangement of data collection could be made even in small groups. In order to maintain uniformity in testing, get honest and sincere responses from the students testing was done from the students who volunteered to co-operate with the researchers. Testing individually one at a time on personal contact was avoided. Thus drawing sample from the colleges required much time. However, the detailed account of the sample college-wise is given in the Table 3.8.
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the College</th>
<th>Type of College</th>
<th>Gender</th>
<th>Course of Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Jogomaya Devi College</td>
<td>Girls</td>
<td>-</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>2.</td>
<td>Narendrapur Ramkrishna Mission College</td>
<td>Boys</td>
<td>50</td>
<td>-</td>
<td>50</td>
</tr>
<tr>
<td>3.</td>
<td>Shivnath Shastri College</td>
<td>Girls</td>
<td>-</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>4.</td>
<td>K.K. Das College</td>
<td>Co-Ed</td>
<td>20</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>5.</td>
<td>Vijaygarh Jyotish Chandra Roy College – Night</td>
<td>Co-Ed</td>
<td>30</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>6.</td>
<td>Rashtraguru Surendranath College, Barrackpore</td>
<td>Co-Ed</td>
<td>40</td>
<td>15</td>
<td>55</td>
</tr>
<tr>
<td>7.</td>
<td>Bangabashi College</td>
<td>Co-Ed</td>
<td>25</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>8.</td>
<td>Loreto College</td>
<td>Girls</td>
<td>-</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>9.</td>
<td>St. Xavier’s College</td>
<td>Co-Ed</td>
<td>35</td>
<td>20</td>
<td>55</td>
</tr>
<tr>
<td>10.</td>
<td>Heremba Chandra College</td>
<td>Girls</td>
<td>-</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>400</td>
</tr>
</tbody>
</table>
3.4 DESIGN AND HYPOTHESES

According to the objectives of this study mentioned in Chapter-I, understanding the relationship of Emotional Intelligence, Stress with Academic Achievement was the main purpose. Therefore, it was necessary to ascertain the variations due to gender and course of study among the sample groups in respect to Emotional Intelligence. Then the obvious choice is correlation design with predictive perspective. Accordingly, the following hypotheses were formulated. It is to be noted that although intergroup differences in stress score and Academic Achievement were not in focus of the present study the relevant hypotheses have been tested because Dutta (2002) obtained differences in stress due to gender and courses of study with exactly the same population.

3.4.1 Hypotheses

Null Hypotheses

\( H_{01} \) : There is no significant difference in the Emotional Intelligence scores due to gender (Boys Vs. Girls).

\( H_{02} \) : There is no significant difference in the Emotional Intelligence scores due to course of study (Arts Vs. Commerce).

\( H_{03} \) : There is no significant interaction effect of the gender and course of study on Emotional Intelligence.

\( H_{04} \) : There is no significant difference in stress scores due to gender (Boys vs Girls)

\( H_{05} \) : There is no significant difference in stress scores due to course of study (Arts vs Commerce).

\( H_{06} \) : There is no significant difference between Boys and Girls in H.S marks.

\( H_{07} \) : There is no significant difference between Arts and Commerce groups in H.S marks.

\( H_{08} \) : There is no significant difference between Boys and Girls in S.F marks.
H₀₀₉ : There is no significant difference between Arts and Commerce groups on S.F marks.

Correlation Hypotheses

1. Emotional Intelligence, Stress and Academic Achievement are significantly correlated.
2. Emotional Intelligence is positively correlated with Academic Achievement but negatively with Stress.
3. Stress is negatively correlated with Academic Achievement.
4. Academic Achievement as Dependent variable can be predicted by Emotional Intelligence and stress scores.
5. Emotional Intelligence and Stress can be mutually predicted.

3.6 PROCEDURE OF DATA COLLECTION

After the Emotional Intelligence Scale and the Answer-sheet format were finalized, the next step was to identify certain colleges, where the data could be collected. Many Principals/Heads of the institutions were approached formally, but a large majority of them did not respond positively. Therefore, colleges were selected from those who cooperated. The colleges selected for this purpose, were scattered over a large area. A few of them were located in Central Kolkata while the others were from South 24 Parganas as well as North 24 Parganas. Almost all the colleges consisted of either or both (Male/Female) students in the Arts Stream, but it was difficult to locate colleges with Commerce Stream which were co-educational (Table 3.8). The Principles of all the selected colleges as well as the Teachers readily co-operated in organizing the classrooms as well as the students for data collection. There were two separate tests - one each for Emotional Intelligence and Stress. The time allotted was 1 hour 30 minutes which meant two periods for both the tests. The students who took the test were made to sit sparsely so that they would not be distracted by others. After distributing the questionnaires, at first a general instruction was given which reads as follows:
General Instructions:

Please listen attentively before you open the booklets given to you. Every individual comes from different families, each one has been reared according to his or her home environment by their parents. In fact no two people are alike in every respect. My sole purpose is to get an idea about your individuality distinctly different from others and not to judge its quality, good or bad what so ever. Therefore, your responses to the questions in these two questionnaires may not match with others' responses. This is quite natural.

Both the questionnaires seek your opinion or exactly what do you feel, do or think in different situations. Your honest and sincere response will help my research immensely. You need not think about others or what should be the best response.

First all of you will answer the questionnaire entitled “Questionnaire regarding personal experience and feelings” and then the “Questionnaire about Students life experience”.

- Read the instructions carefully in each case and answer the questions
- Do not open the second questionnaire till you completely answer the first one.
- Do you understand?
- Now start.

Specific Instructions for the “Questionnaire regarding personal experience and feelings”

There are certain questions relating to personal situations or experiences in the different sections of this Booklet. In every situation how would you react to that particular experience or situation relating to similar experiences, has been denoted by options a, b, c etc.
In the separate answer sheet, space is provided to write your answer against the serial number in each section. Write the serial letter of the response that suits you best in the given space. For example, if your option is "C", then write "C" in the particular space provided as answer for that particular question.

There is no good or bad answer. According to life experiences, every individual is different from the other. Hence, be very confident about your own answer.

- All answer will remain confidential. It will not be produced or published elsewhere.
- Do not omit any situation.
- Complete the questionnaire as soon as possible. (After going through the question). Mention the first option that comes to your mind after going through each situation. Do not linger on any one question for long time.
- If at all you wish to change/alter the answer then simply put an X mark over the one you have already noted down and then write your next option clearly beside it.
- Do not write or put any marking on this Booklet. After completing the Answer sheet, please return it along with the Questionnaire Booklet.

Specific instructions for "Questionnaire about Students life experience"

Some statements are given below. Read each statement attentively, and then decide whether the condition in the statement is applicable in your case. For each statement there are 4 alternatives.

- If the condition is always applicable for you, then write 4.
- If the condition is sometimes applicable for you, then write 3.
- If the condition is often applicable for you, then write 2.
- If the condition is never applicable for you, then write 1.
A separate answer sheet is given to you. In this sheet, serial number of each statement is given. Write your answer against the space provided for the particular statement.

- Do not write on this booklet.
- Do not omit any question.
- Do not spend much time on one question.
- Your response will be kept confidential.
- No personal assessment will be done.

### 3.7 DATA ANALYSIS

After tabulation of all the data collected, Means and Standard Deviations of all the scores were computed separately for all possible sample groups (Male, Female, Arts, Commerce etc.), also for the whole sample.

In order to test the null hypotheses ANOVA was conducted to test the significance of differences due to gender and course of study and their interaction effects. Also t-test was done to examine whether the sample groups differ due to sex and course of study.

Finally, coefficients of correlation were computed in all possible pairs of variables followed by Regression Analysis according to the following schemes (Both for the whole sample and smaller subgroups of Male, Female, Arts and Commerce):

#### TABLE 3.9: SCHEME OF REGRESSION ANALYSIS

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Dependent Variable</th>
<th>Independent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Madhyamik Marks</td>
<td>Emotional Intelligence and Stress.</td>
</tr>
<tr>
<td>2.</td>
<td>Higher Secondary Marks</td>
<td>Emotional Intelligence and Stress.</td>
</tr>
<tr>
<td>3.</td>
<td>Emotional Intelligence</td>
<td>Stress.</td>
</tr>
<tr>
<td>4.</td>
<td>Stress</td>
<td>Emotional Intelligence.</td>
</tr>
</tbody>
</table>