CHAPTER III

METHODOLOGY

3.1 THE PROBLEM:

Individual differences in academic performance among the bright and the gifted are quite apparent. There is a large number of individuals of a very high intelligence who do not perform at the required levels to indicate that general intelligence alone does not ensure performance commensurate with ability. The problem of these grossly underachieving individuals among the brilliants is one of the social concern as well as of the individual welfare and happiness. Greatness of a nation is not to be measured in terms of geniuses it produces but it has to be measured in terms of the widest scope and opportunity offered to every child to enable its personality to flower to its fullest bloom. Considerable attention has been paid to the gifted children in schools and colleges, who fail in their studies or achieve results quite below their ability and standard expected of them. Concern about underachievers, who are regressive or fluctuating in achievement, reflects the concern about the waste of human potential which India as a developing country needs to avoid.

Achievement, on which much successful living depends, is admittedly determined by a large number of factors. Hundreds of studies have been made to assess and ascertain the extent to which
such factors separately or conjointly contribute towards achievement. Some of the factors which have been found to be important contributors to achievement in various spheres of life appear to be intelligence, personality, previous attainment, interest and the like. These factors are mainly of two categories: cognitive and affective. Each of these factors has its specific role in determining the nature and extent of achievement in any particular sphere of life. The affective factors seem to deserve particular attention in the sense that effective application of the cognitive factors, such as intelligence, largely depends on proper motivation of the individual i.e. on his affective dynamicity having its source on the trait of his personality as well as his interests.

3.2 OBJECTIVES OF THE STUDY

It is evident from the overall picture of existing literature on achievement that varied research designs have emerged and numerous research findings have been reported but most of the findings are inconclusive and partial and far from consistent and complete. Education theorists and Scientists are still at a variance in regard to identification of all the variables which could explain the complex phenomenon of achievement in its entirety.

In case of education, which as a process is a continuum so far as development is concerned, it is more important to have empirical evidence that affect can be changed to benefit both cognitive and affective development of the learner. It seems to be of interest to know whether personality and interest have conjointly any role in
determining achievement. If any correlation between these factors are found to exist, the nature of their relationship and the degree of influence one exerts on another may be studied to predict future achievement of an individual. The objective of the present study is to examine to what extent personality factors and interests of an individual are responsible for his progress, deterioration, stability or fluctuation, as the case may be, in his academic performance throughout his educational career. The study may produce indications, the knowledge of which may generate scopes to change the performance of regressive and fluctuating achievers to move on progressive plane by offering effective and meaningful guidance to pupils right from the initial stage of education both in academic institution and at home.

Assuming that with the help of a carefully designed study and better control over above factors it will be possible to have a more conclusive picture of the achievement phenomenon, the present study was undertaken with the objective of investigating the factors affecting scholastic success or achievement.

More categorically, the objectives of the present study may be further specified in the following:

1. To study if there is any difference in the personality pattern of the four groups of people showing progressive, regressive, stable and fluctuating achievement.
2. to study if there is any difference in the interest pattern of the four groups of people mentioned above.

3. To study if such patterns of personality and interest are different from male to female.

3.3 KEY VARIABLES:

During any activity, individuals come out with some amount of achievements (Woodworth and Marquis, 1947). Achievements are important goals for most people and achieving a goal is rewarding for work. The direct evidence of achievement is actual performance. Thus the measures of a student's achievement constitute the evaluation of his educational progress and attainment determining honours, opportunities for further education or future employment. These also direct and motivate student learning (Ebel, 1966). Education is an extensively diverse complex enterprise in terms of achievement. Some of the educational outcomes are quantitative and some are qualitative. There do exist problems in quantifying educational outcomes but McCall (1939) observes that "anything that exists in amount can be measured". Under certain circumstances some of the important outcomes of education are measurable when there exists some observable differences between different students experiencing the process of education (Ebel, 1966). Achievement measures constitute an almost unlimited number of determinants. Any exclusive relationship cannot be convincingly established. But two most important variables namely personality and interest and their impact has been studied. It
practically, does not seem very useful to find relationship with some other variables. Achievement being a dynamic and continuous factor, its trend throughout the career of individuals appear to be more important variable. Thus, the three important variables, namely, Achievement, Interest and Personality, among others, being affective ones, and their relationship, the degree of dependence, if any, or their Correlation constitute the main elements of our study.

The study has been designed first to identify achievement pattern of individuals who have undergone a sequence of studies from secondary to post-graduate level through higher secondary and undergraduate programmes. In order to maintain certain amount of control over different standards of education and variations in curriculum as well assessment of performance, data have been collected on students who have had their education under West Bengal Board of Secondary Education, West Bengal Council of Higher Secondary Education, the University of Calcutta and its affiliated colleges. Their performance in public examinations has been accepted as their achievement since these examinations are, to a considerable extent, standard forms of measuring mental acquisition through a process of administered curriculum and tests.

3.4 MEASURES OF ACHIEVEMENT:

From the achievement profile of individuals taken as samples four distinct categories have been identified: namely, Progressive, Regressive, Stable and Fluctuating.
Achievement of students showing betterment in successive stages registering an upward trend is considered progressive achievement and those who show such trend are called progressive achievers.

On the contrary, achievements showing gradual worsening or deterioration in successive stages may be termed as regressive achievement and those who show such downward performance are called regressive achievers;

When achievement or academic performance is more or less similar in successive stages it is called stable achievement and those who reflect such achievement are called stable achievers; and

The exceptionals to the above three forms may, however, be classified as fluctuant achievers whose performance in successive stages of occurrence do not show any regular pattern.

Thus, the progressive, regressive and stable achievers show an upward, a downward, and a horizontal trend whereas the exceptions to them do not reflect any regular trend in their performance in successive examinations. These have been schematically presented in Figure 1.1 in Chapter-I.

3.5 PERSONALITY ASSESSMENT:

The history of psychology is, in large part, a history of the study of personality and personality disorders. The most
straightforward approach to assessment of personality is by directly observing an individual's behaviour in real-life situations. Another approach is to describe hypothetical situations for which an individual reports a typical response. In both direct and indirect personality assessment, we are interested in assessing the typical behaviour of that individual.

The personality pattern is composed of traits, or specific qualities of behaviour, which characterise the individual's unique adjustment to life as reflected in his behaviour and thoughts. The core of the personality pattern is the 'concept of self' as a person related to the world in which he lives, and an integrated system of learned responses, the 'traits'. These are interrelated, with the core influencing the traits, which are individuals characteristic methods of adjustment to life situations.

The personality pattern is founded on the individual's hereditary endowment. But it is not inherited. It is the product of learning during the course of prolonged social relationship with people. Personality becomes organised around nodal points or experiences which have received particular emphasis and much reiteration. Learning in its various forms, especially, conditioning, imitation, trial and error, training or learning under the guidance and direction of another (coaching), plays a prime role in the development of personality pattern. Attitudes towards self, characteristic modes of responding to people and situations, attitudes toward the assumption of socially approved roles, and
methods of personal and social adjustment, including the use of
defence mechanisms, are learned through repetition and are reinforced
by the satisfaction they bring. Gradually, the self-concept is built
up and the learned responses become habitual, constituting the
'traits' in the individual's personality pattern.

3.6 INTEREST PREFERENCES:

The question of measuring interests stems from the assumption
that if somebody wants to know what a child or an adult likes to do
or wants to be, the thing to do is to ask him about his main
interests. In the opinion of many in the field of psychological
measurement, however, there are considerable differences between
expressed and measured interests. Darley and Hagenah (1955) concluded
that 'claimed interests have somewhat less permanence than measured
interests; claimed interests emerge from different casual factors
--factors more associated with prestige, family pressures,
aspirational levels, transient consideration, and misconceptions of
the world of work-- than do measured interests'. Craven (1961)
pointed out that 'measured interests usually tap only affective
responses- likes and dislikes and preferences. Expressed interests
may have the same affective components, but they also represent
conscious efforts to integrate pressures and needs, hopes and
aspirations ....." These efforts might result in a false picture of
the individual's interests and camouflage the disparity between his
real interests and his aspirations.
Nunnally (1959) cited evidence to show that stated preferences for occupations are unrealistic particularly among adolescents and young adults. Young people, he maintained, are usually quite unaware of the specific activities entailed in different occupations; the individually stated preferences for occupations are often 'prompted by glamorized stereotypes.'

Often children express a preference for a particular occupation because someone they admire is in that occupation or because schoolmates have mentioned it as their choice or because it has acquired a spectacular quality through prominence in the news. A child might express a different preference later for a number of reasons; the child might learn more about occupations or might become aware of more occupations through acquaintances— or some new glamour occupation might come to his attention through a news event. In addition, expressed interests may change as individuals are exposed to new experiences that lead them into new interests. As they mature and participate in a variety of experiences, past experiences are often integrated, which results in greater interest in some things and less in others.

The popular impressions that children's interests have little stability appears to be based largely on the observation that they frequently change their minds about what they want to be when they grow up. The fact that there are not many occupations with which a child is really familiar may contribute as much to his change of mind as does an actual change in basic interests.
Cronbach (1960) pointed out that a single direct question such as "would you like to be a teacher?" does not yield adequate information for guidance, because the individual's answer may be based on ignorance or superficial understanding of a vocation. Further, the measurement of interest is frequently objected to on the assumption that they lack stability. But stability of interests varies from person to person depending on such things as age, the interval between the testings, and particularly how strong a person's interests are. Although it is true that preferences measured at an early age and again at a later date may show variability rather than stability, there are some good reasons for measurement at school level. One is to determine how realistic a young person's interests are, considering his or her abilities and the other factors that must influence curricular and vocational decisions. As Holland (1973) has suggested, one important function of the teacher is to help students broaden their experiences, which can lead to changes in their interest patterns. Data on abilities, achievement and home environment can be used to develop discussions with students and their parents about the kinds of supplementary experiences that would be most likely to help them select appropriate educational and vocational goals. Such supplementary experiences are particularly important when, for example, a student's pattern of interests seem to conflict with other relevant information about him or her.

Interests provide the best basis for classifying the students according to specialities. Super in his paper read at the Third International Congress on Educational and Vocational Guidance, Paris, 1962 observed that the amount of interest in a field is related to
choice of, persistence in, and completion of study or training in that field. Interests are even more important determinants of field or type of education than are other indicators such as aptitudes, temperament or personality. Interests may be viewed as determinants of direction of effort and activity whereas aptitudes play a more important part in determining the level of attainment. Interest tests are of little practical value by themselves, but when considered together with aptitude and achievement patterns they can be a useful aid for helping a student select a career pattern or course of study. A comprehensive report that gives both interest and ability scores for an examinee as well as his chances of success in various academic and occupational pursuits has immense value for self-guidance (Stanley and Hopkins, 1972).

3.7 TOOLS AND TECHNIQUES:

3.7.1 Personality:

There are two most commonly used inventories for testing personality, namely the Minnesota Multiphasic Personality Inventory (MMPI), which has been developed using criterion validation methods, the Sixteen Personality Factor Test (16-PF), which has been developed using trait or construct validation procedures. The MMPI was originally developed for the specific purpose of distinguishing individuals considered normals from those suspected of demonstrating some degree of psychopathology and the Sixteen Personality Factor Test was designed to assess the personality traits of normal
subjects. The 16-PF is a factor analytically developed personality inventory in contrast with MMPI which is primarily concerned with criterion validity. Cattell (1957) has educed sixteen dimensions of personality for use with young adults (from age 16 or 17 years) to late maturity though parallel younger age versions of the test can be used for personality assessment down through adolescence to age 6 or 7 years (the HSPQ, CPQ and ESPQ tests). We accept 16-PF test as best suited to our purpose of assessing personality of school and college students.

The Sixteen Personality Factor Questionnaire (16-PF) is an objectively scorable test devised by basic research in psychology to give the most complete coverage of personality possible in a brief time. Planned for the youth through the mature adult age range, its reading level varies for different forms and is most appropriate for the fully literate person, the person whose educational level is equivalent to that of the normal graduate. The test can be machine or hand scored i.e. a simple paper and pencil test, a self-report inventory through which the individual describes himself.

Coverage of personality is insured by the sixteen functionally-independent and psychologically meaningful dimensions isolated by over twenty years of factor analytic research on normal and clinical groups. Moreover, a scoring is provided whereby, from the sixteen factors, one can extract and work with only four broader (and less specific) traits-- anxiety, extraversion, alert poise, and
independence. The use of sixteen traits gives actual prediction superior to those from single-scale measures or from arbitrary scale not based upon true functional units. The scales here are psychologically meaningful because basic statistical and clinical research on personality structure has preceded the construction of the 16-PF and its relative scales at the younger age levels (HSPQ, CPQ, ESPQ etc.).

These sixteen dimensions or scales are virtually self-administering and essentially independent; that is to say, the correlation between one and another is usually quite small. Therefore, having a certain position on one does not prevent the person's having any position whatever on any other. Thus, each of the sixteen scales brings an entirely new piece of information about the person, a condition not found in many alleged multi-dimensional scales. The essential point is that their psychological reality enables more knowledgeable predictions to be made from them than from merely Statistical Scales.

The 16-PF Test's comprehensiveness of personality coverage means that once the scores are obtained they become applicable over and over again, in different weightings, to predict any number of diverse criteria (without constructing and giving a separate new test for predicting each new criterion).
7.2 Design and construction of the test:

Form A of the 16 PF, which we have used in our study, contains 87 items to provide reasonable reliability to the scores. Twenty to twenty-six questions (items) in toto are provided for each of the 16 factors. This means that there are ten to thirteen items for each factor. The questions are arranged in a roughly cyclic order determined by a plan to give maximum convenience in scoring by stencil and to insure variety and interest for the examinee.

Three alternative answers are provided for each of the questions, since the two-alternative 'forced-choice' situation forbidding any 'middle of the road' compromise tends to force a distorted distribution and may produce aversion to the test on the part of the examinee.

Questionnaires are often, justifiably, considered susceptible to motivational distortion and deliberate faking. Test construction is aimed at minimisation and, if possible, avoidance of this type of motivational distortion effects. Actually, items have been chosen to be as 'neutral' in value as possible, to emphasize both desirable and undesirable aspects at both ends of each factor scale. Furthermore, items which are not 'face valid' i.e. which do not obviously refer to the trait but which correlationally are known to measure it, have been chosen as a 'built-in' protection against distortion. Faking and acquiescence are partially controlled by a few strategically located 'buffer' items, and by utilising items in which the socially
The subtests are scaled using a sten transformation, and the resulting scores are plotted on a profile form, which provides an individual's profile on the 16 dimensions.

Reliabilities of the subtests, as dependability coefficients, tend to be lower than desirable but bring evidence on the stability of the trait, not the test. As is expected for personality tests, test retest (stability and correlations) are lower than the equivalence coefficients. Split-half reliabilities (Cattell and Eber, 1962) for each of the 16 primary factor subtests range from 0.71 to 0.93, with an average around 0.84.

Using the principle that a test validity can be as high as the square-root of the reliability, Cattell and Eber (1962, pp.8) also report the validity coefficients of the subtests as the square-root of the internal consistency reliability estimates. These validity coefficients average about 0.91. By design Homogeneity Coefficients (Cattell and Tsujioka, Educ. Psychol. Measmt-XXIV, 1964) are kept at moderate values, reducing the correlations among items relative to their correlations with the factor, in order to give maximum breadth to the measured personality factor manifestations.

The validity of the test itself is meant to be a concept (or 'construct') validity. The test questions (or items) are chosen as being good measures of the personality factors since these are the desirable response is not obvious.
survivors from several thousands of items originally tried, and constitute only those which continue to have significant validity against the factors after three successive factor analyses on different samples. These analyses have both verified the existence and natural structure of the sixteen factors, and cross-validated the test items in their correlation with the factors on different adult population samples. The mean correlation of all single items with the factors they represent is about +0.37 and, assuming a mean intercorrelation of the items of +0.10, the mean correlation of each group of items with the factor it represents, i.e. the concept validity turns out to be about +0.85, which is an acceptable performance for so brief a test.

Personality Description of the High and Low scores on the 16 PF factors

<table>
<thead>
<tr>
<th>person with a low score on the factor is described as:</th>
<th>A person with a high score on the factor is described as:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserved, detached, critical, cool</td>
<td>outgoing, warmhearted, easygoing, participating.</td>
</tr>
<tr>
<td>Less intelligent, concrete thinking</td>
<td>More intelligent, abstract thinking, bright.</td>
</tr>
<tr>
<td>Affected by feelings emotionally less stable, easily upset.</td>
<td>Emotionally stable, faces reality, calm</td>
</tr>
<tr>
<td>Humble, mild, obedient, conforming</td>
<td>Assertive, Independent, aggressive, stubborn.</td>
</tr>
<tr>
<td>Sober, prudent, serious, taciturn</td>
<td>Happy-go-lucky, heedless, gay, enthusiastic.</td>
</tr>
<tr>
<td>G</td>
<td>Expedient, a law to himself, bypasses obligations.</td>
</tr>
<tr>
<td>H</td>
<td>Shy, restrained, diffident, timid</td>
</tr>
<tr>
<td>I</td>
<td>Tough-minded, self-reliant, realistic, no nonsense.</td>
</tr>
<tr>
<td>L</td>
<td>Trusting, adaptable, free of jealousy, easy to get on with</td>
</tr>
<tr>
<td>M</td>
<td>Practical, careful, conventional, regulated by external realities, proper.</td>
</tr>
<tr>
<td>N</td>
<td>Forthright, natural, artless, sentimental</td>
</tr>
<tr>
<td>O</td>
<td>Placid, self-assured, confident, serene</td>
</tr>
<tr>
<td>Q₁</td>
<td>Conservative, respecting established ideas, tolerant of traditional difficulties.</td>
</tr>
<tr>
<td>Q₂</td>
<td>Group-dependent, a 'joiner' and good follower</td>
</tr>
<tr>
<td>Q₃</td>
<td>Casual, careless of protocol, untidy, follows own urges</td>
</tr>
<tr>
<td>Q₄</td>
<td>Relaxed, tranquil, torpid, Unfrustrated.</td>
</tr>
</tbody>
</table>

Conscientious, preserving staid, rule-bound.
Venturesome, socially bold, uninhibited, spontaneous.
Tender-minded, sensitive.
suspicious, self-opinionated, hard to fool.
Imaginative, wrapped up in inner urgencies, careless of practical matters, bohemian.
shrewd, calculating, worldly, penetrating.
Apprehensive, worrying, depressive, troubled.
Experimenting, critical, liberal, analytical, free thinking.
Self-sufficient, prefers own decisions, resourceful.
Controlled, Socially precise, self-disciplined, compulsive.
Tense, driven, overwrought, fretful.

These descriptions are found in 'About the 16 PF,' published by the Institute of personality and Ability Testing, Champaign, III, a four-page, uncopyrighted brochure.
The Special standard score Procedures for Second order Factors:

The 16-PF test can be used as a measure of four secondary dimensions, are broader tests, Scorable from the component primary factors. In the case of these broader 'Secondary traits, just as in the case of the sixteen 'primaries', the proof of their functional unity and the availability of psychological knowledge regarding their nature make possible a much more sophisticated and effective use. One can proceed to more kinds of individual analysis and prediction than are possible with empirical scales which are merely item-homogeneous, but otherwise arbitrary composites. The second-order scores are obtained by using second order factoring i.e. factoring of the Subtests. The second-order scores are more general and while the combining of subtests results in a loss of some information, combining correlated subtests does result in increased reliability, and more generalised behaviour descriptions.

These scores consist of the following well-known dimensions, for which it has recently become possible to give unique experimental definition.

I. Adjustment Vs. Anxiety
II. Introversion Vs. Extroversion
III. Tender minded Emotionality Vs. Alert Poise
IV. Subduedness Vs. Independence

Second-order scores are not derived from raw sources on the
primaries but from the stens into which the former have first been converted. If the primary sten sources are combined, with weights as shown in the manual, they will come out as stens for the second orders, directly.

However, they will not come out exactly as stens because, for convenience, whole numbers are used for weights whereas in the refined weights given for second-order test the exact decimal fractions are employed. Therefore, the second-order scores are to be considered approximations though quite suitable for our purpose. In addition to multiplying each primary sten by a weight a constant has been added to the whole to bring it to the ultimate 5.5 mean of all sten scales.

What it means to be above or below average (fixed at 5.5) on these second-order, is indicated by the following descriptions.

**FACTOR-I**

<table>
<thead>
<tr>
<th>Low Score Direction</th>
<th>High Score Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Anxiety (Adjustment) Vs.</td>
<td>High Anxiety</td>
</tr>
</tbody>
</table>

The person who scores low on this factor tends to be one whose life is generally satisfying and one who is able to achieve those things that seem to him to be important. However, an extremely low score can mean lack.

The person who scores high on this factor is high on anxiety. He need not be neurotic, since anxiety could be situational, but it is probable that he has some
of motivation for difficult tasks, as is generally known in studies relating to anxiety to studies.

maladjustment i.e., he is dissatisfied with the degree to which he is able to meet the demands of life and to achieve what he desires. Very high anxiety is generally disruptive of performance, and productive of physical disturbances.

**FACTOR-II**

**Introversion**  

The person who scores low on Factor-II tends to be shy, self-sufficient, and inhibited in interpersonal contacts. This can be either a favourable or unfavourable finding, depending upon the particular situation in which the person is expected to function; e.g., introversion is a favourable predictor of precision workmanship.

**Extraversion**  

The person who scores high on this factor is a socially outgoing, uninhibited person, good at making and maintaining interpersonal contacts. This can be very favourable in situations that call for this type of temperament, e.g., salesmanship but should not be considered necessarily favourable as a general predictor, e.g., of scholastic achievement.
FACTOR-III

Tenderminded Emotionality Vs. Alert Poise

The person who scores low on Factor-III is likely to be troubled by pervasive emotionality, and may be of a discouraged, frustrated type. He is, however, sensitive to the subtleties of life, likely to be artistic and rather gentle. If he has problems, they often involve too much thought and consideration before action is taken.

FACTOR-IV

Subduedness Vs. Independence

The person who scores high on this factor is likely to be an enterprising, decisive and resilient personality. However, he is likely to miss the subtle relationships of life, and to orient his behaviour too much toward the obvious. If he has difficulties, they are likely to involve rapid action with insufficient consideration and thought.
Clearly, the above descriptions are only brief suggestions as to the nature of the factors, but they are very helpful as predictive indicators of socially important behaviour or personality pattern of individuals.

3.7.3 Measurement of Interest:

The first systematic effort to measure interests have been made in 1915 at the Carnegie Institute of Technology where James Miner developed a questionnaire to assist students in their vocational choices. Giant steps forward in interest appraisals were taken in 1927 when Strong published the first edition of his Vocational Interest Blank (SVIB) and in 1939 when Kuder made available the initial form of the Kuder preference Record (KPR). Buros (1965) cited approximately 50 different published measures of vocational interests, but the SVIB and the KPR have dominated the field for many years.

If one studies the historical development of interest inventories, it becomes apparent that the early work had a highly practical orientation. It approached the problem from a strictly empirical view, that is, the validation procedure focussed on criterion validation. Strong's interest in prediction of behaviour led to Criterion Keying i.e. he developed scoring keys related to a wide variety of occupations. By way of contrast, Kuder (1960) developed the Kuder Preference Record—Vocational by selecting items
that reflect interest traits. Operating from a more theory-oriented position, he developed what can be called homogeneous or trait keying. Kuder selected items on the basis of their intercorrelations with other items. Thus, a homogeneous set of items (items having high correlations) can be said to reflect a common interest trait. In Criterion-Keyed Scoring, such as the SVIB, the responses of those Ss in a given group, such as an occupation, are compared to responses of Ss not in the group. The Kuder-Vocational test contains ten relatively independent categories from which inferences to vocational choices are made. A forced-choice format is used, resulting in an ipsative score. The ten vocational interest categories were mentioned Outdoor, Mechanical, Computational, Scientific, Persuasive, Artistic, Literary, Musical, Social Services and Clerical.

Each of the ten scores has a description and suggested vocational areas. For example, a high score on the outdoor scale means the individual prefers work that keeps him outside a great deal of the time, usually working with animals and growing things. Suggested occupations are forest ranger, naturalist, and farmer. The form can be used for both males and females.

In order to attain the relative independence of the ten Kuder Scales, and to minimise faking, a forced-choice format has been used. All the items reflect an activity, the subject responding to each item is confronted with an activity triad. In responding to the triad, he is forced to select the activity in the triad he likes most and another that he likes least. Each triad reflects three different
categories from the ten interest category scales. Since the subject is forced to respond to each triad, each person makes the same number of selections and rejections, thereby systematically inflating or deflating various interest categories. This type of forced-choice format results in an ipsative score, as opposed to a normative score. Thus, the pattern of interest is based on the individual himself, rather than on some normative group.

With Kuder test, we can describe the person relative to scientific, artistic or other constructs. We get a clear picture of the individual relative to the constructs that underlie his interests. It is a self-scored instrument and allows for a rational interpretation. The potential of this trait theory to describe a person is logical, defensible and compelling. The self-scoring format is highly innovative, much simpler, and more convenient than the complex scoring of the SVIB.

The Kuder-Vocational has been widely used in high school and college counselling programmes with school and college-age students for choice of subjects and successful completion of curriculum. We accept here this Kuder General Interest Survey technique as our suitable tool for ascertaining interest pattern commensurate with achievement of students in high school and college age.

Most people probably have scores that are high in some areas, low in some, and average in others. Looking at all scores is important, because most school subjects and jobs involve a
combination of two or more interests. For instance, nurses probably are as interested in science as they are in social service.

The more interested a person is in a school subject, a job, or anything he does, the greater his chances are for success in it. It is easier and more satisfying to put his efforts into activities that he enjoys than in those he dislikes. Of course, no one can do only what interests him or her. Studying one's interests, however, helps direct one's activities mainly into channels where he is more likely to achieve satisfaction.

High interests are not better than low interests; nor is one better or worse than another. What counts is knowing what a person's interests are and consider them whenever he has an important educational or vocational decision to make.

**Meaning of Kuder's Ten Interest Areas:**

Outdoor interest means preference for work or activity that keeps a person outside most of the time usually dealing with plants or other growing things, animals, fish, or birds. Foresters, naturalists, fish and game managers, telephone line installers, and farmers are among those high in outdoor interest.

Mechanical interest means preference for working with machines and tools. If a person likes to put together modules, repair small engines, or watch a house being constructed, one might enjoy taking
shop classes. Carpenter, toolmaker, machinist, plumber, automobile mechanic and engineer are among the many jobs involving high mechanical interests.

Computational interest indicates a preference for working with numbers and an interest in mathematics courses in school. Book-keepers, accountants, bank tellers, engineers and most scientists are usually high in computational interest.

Scientific interest is an interest in the discovery and understanding of nature and the solution of problems, particularly with regard to the physical world. A person with high score in this area, probably enjoys working in science lab., reading about new scientific discoveries, or doing science experiments as a hobby. Physician, chemist, engineer, laboratory technician, meteorologist, dietician, and pilot are among the occupations involving high scientific interest.

Persuasive interest is an interest in meeting and dealing with people, in convincing others of the justice of a cause or a point of view or in promoting projects or things to sell. One having a high score in this area may enjoy such activities as public speaking, selling tickets for a school or community event, or raising money for a local charity.

Artistic interest indicates a preference for doing creative work
with the hands—usually work involving design, colour or materials. If someone likes to paint, draw, sculpture, decorate a room, design clothes or work on sets of amateur plays, he is probably high in this interest. So are artists, sculptors, clothes designers, architects, beauticians, and interior decorators.

Literary interest is an interest in reading and writing. Persons with literary interest include novelists, language teachers, poets, editors, news reporters and librarians. If anybody has a high score on literary scale, language is probably one of his favourite subjects and he may enjoy writing for a magazine, a thesis, or doing publicity for an organisation.

Musical interest usually is demonstrated by persons who enjoy going to concerts, playing an instrument, singing, or reading about music and musicians. Musicians, music teachers and music critics are among those who have directed high musical interest into a career.

Social service interest indicates a preference for activities that involve helping people. Nurses, scout leaders, vocational counsellors, tutors, social workers, hospital attendants, and clergy are among those high in this interest area.

Clerical interest means a preference for work that is clearly defined—work that involve specific tasks requiring precision and accuracy. If a person has high clerical interest, he or she probably
enjoys school subjects and activities that require attention to detail, such as filing and organising materials. Jobs such as bookkeeper, accountant, file clerk, sales clerk, statistician, teacher of human subjects, and travel agent fall in this area.

For a clear understanding of a person and prescription for his success, six RIASEC personality types may also be considered along with interest patterns. We give below a brief description of these personality types [adapted from Holland (1985): "Making Vocational Choices: A Theory of Careers."]

The Realistic (R) type prefers activities that involve working with real things, such as tools, machines or animals and least like activities that involve teaching or working with people. R-Types often have athletic or mechanical ability but may feel that they lack skills in dealing with people.

The Investigative (I) type likes finding out about the physical, biological, and cultural world but prefers not to get involved in leadership activities. I-types tend to do well in Mathematics and science and are thought as intelligent.

The Artistic (A) type prefers activities that involve creativity and originality, such as art, music, drama or literature. A-types are expressive and independent and are likely to avoid activities that involve system and order. They may be unconcerned about what others think of them.
The Social (S) type prefers activities that involve teaching or helping people in various ways. S-types see themselves as caring. They tend to avoid Conventional and Realistic activities.

The Enterprising (E) type prefers activities that involve working with people to achieve organisational goals or to earn a lot of money. E-types think of themselves as popular, sociable, good speakers and leaders but generally think they lack ability in science.

The Conventional (C) type prefers activities that involve order and system, such as keeping records, organising data in systematic ways. C-types tend to avoid situations in which there are few directions such as art or other creative activities. They are most comfortable working as part of a team.

The ten interest areas and the six personality types are not the only ones; nor are the classification system the only one possible. The interest areas described, however, are the ones that probably mean most to a person in making decisions about school subject and fields of work to explore.

3.8 SAMPLING

'Sampling' denotes the selection of a part of the aggregate statistical material with a view to obtaining information about the whole. A social scientist is typically concerned with making conclusions that are applicable to some general population. It is really, if ever, possible to measure all of the members of a given
population and hence we are satisfied with samples drawn from the population. Furthermore, it may be necessary to enumerate all or nearly all of a population to arrive at valid conclusions.

There are various ways in which a sample may be selected from a population. No matter which of these is employed, it must be remembered that the cardinal purpose is to obtain a representative sample, i.e. one which contains all elements in the same proportion as in the population from which it is drawn. In general, there are two main objectives of sample study, namely, (1) to use the sample information to test hypotheses about the parent population and (2) to make inferences about the nature of the parent population. The sample study, apart from saving money, time and energy, gives best possible values of the parameters.

If a sample is drawn in such a way that each item selected, each item in the population (or universe) has an equal chance of being drawn the sample is a random one. This is unrestricted or simple random sampling to differentiate it from sampling procedures that combine random sampling with other requirements, for example, the initial division of a non-homogeneous population into appropriate homogeneous subgroups. When populations are homogeneous, in regard to the characteristics in which we are interested, random samples may be expected to produce satisfactory results. But when a population is known to be heterogeneous, and when that heterogeneity has a bearing on the characteristic being studied, the population may be divided
into strata and random samples drawn from each Stratum. Stratified sampling can be used only when information about the population and strata is available. Stratified sampling is most advantageous when the strata differ from each other as much as the population will allow but there should be homogeneity within each stratum. For a non-homogeneous population, a properly stratified sample may be expected to yield more reliable results than a random sample of same size. From this it follows that the same reliability may be had from a smaller stratified sample.

Rummel (1964) pointed out that all research studies in education may be considered as sample studies. To lend the data of a research to proper generalisations, a research should attempt to obtain a sample that is truely representative of a larger group or population and sampling must be based upon the established purpose of the investigation, a precise description of the population to be investigated and of the sources of the population from which the sample units are selected and finally the type of sampling procedure to use and the size of the sample to be drawn must be determined.

The sample in the present study is a purposive one with male-female variants. The method followed for selection of the sample is stratified random sampling by dividing total sample into subgroups with different strata like sex, and achievement indicators. Of 400 responses, 200 for boys and 200 for girls, 30 each of progressive, regressive, stable and fluctuating achievements were taken for analysis which may be accepted as representative sample as suggested
3.9. DESIGN AND HYPOTHESES:

So far the nature of variables, sample and other relevant factors have been discussed, it appears that the sample can well be classified into several groups. At the first instance, the entire sample can be divided according to sex i.e. into male and female groups. Again, both the groups can be divided into four groups according to their achievement. Then, there are four factors of personality and six factors of interest taken into account for investigation. Thus, the most appropriate design seems to be the $2 \times 4 \times 4$ and $2 \times 4 \times 6$ factorial design with 2 levels of sex, 4 levels of achievement and 4 personality factors and 6 interest patterns.

**Hypotheses:**

**General:** The four achievement groups differ significantly in respect of their personality and interest pattern.

**Specific:** There is no male-female difference in the personality and interest pattern.

**Personality:** Factor I, for both male and female

$H1: \bar{x}_p < \bar{x}_r, \bar{x}_p < \bar{x}_f, \bar{x}_s < \bar{x}_f$ and $\bar{x}_s < \bar{x}_f$
Factor-II

\[ H_2 : \overline{X}_p < \overline{X}_R, \, \overline{X}_s < \overline{X}_R \text{ and } \overline{X}_p < \overline{X}_F. \]

Factor-III

\[ H_3 : \overline{X}_p > \overline{X}_R, \, \overline{X}_p > \overline{X}_F, \, \overline{X}_s > \overline{X}_F \text{ and } \overline{X}_s > \overline{X}_R. \]

Factor-IV

\[ H_4 : \overline{X}_p > \overline{X}_R, \, \overline{X}_p > \overline{X}_F \text{ and } \overline{X}_s > \overline{X}_R. \]

Interest: Realistic, for both male and female

\[ H_5 : \overline{X}_p > \overline{X}_R, \, \overline{X}_p > \overline{X}_F, \, \overline{X}_s > \overline{X}_F \text{ and } \overline{X}_s > \overline{X}_R. \]

Investigative

\[ H_6 : \overline{X}_p > \overline{X}_R, \, \overline{X}_p > \overline{X}_F, \, \overline{X}_s > \overline{X}_F \text{ and } \overline{X}_s > \overline{X}_R. \]

Artistic

\[ H_7 : \overline{X}_p < \overline{X}_R, \, \overline{X}_p < \overline{X}_F, \, \overline{X}_s < \overline{X}_F \text{ and } \overline{X}_s < \overline{X}_R. \]

Social

\[ H_8 : \overline{X}_p < \overline{X}_R, \, \overline{X}_p < \overline{X}_F, \, \overline{X}_s < \overline{X}_F \text{ and } \overline{X}_s < \overline{X}_R. \]

Enterprising

\[ H_9 : \overline{X}_p > \overline{X}_R, \, \overline{X}_p > \overline{X}_F, \, \overline{X}_s > \overline{X}_F \text{ and } \overline{X}_s > \overline{X}_R. \]

Conventional

\[ H_{10} : \overline{X}_p < \overline{X}_R, \, \overline{X}_p < \overline{X}_F, \, \overline{X}_s < \overline{X}_F \text{ and } \overline{X}_s < \overline{X}_R. \]

Where \( \overline{X} \) stands for mean score, P,R,S and F for Progressive, Regressive, Stable and Fluctuating groups respectively.
3.10 ANALYSIS

As it is evident from the design of the study, the most appropriate chief mode of analysis will be ANOVA for this investigation.