Chapter III

Research Methodology, Plan and Procedure of the Study
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RESEARCH METHODOLOGY,
PLAN AND PROCEDURE OF THE STUDY

“A method is the means or manner of determining whether a theoretical construct or proposition is true or false. Each of the specific discipline has developed criteria and conventions about what constitute legitimate tests of theory and what lines of development researchers are to follow as they move from data to knowledge claims. Methodology has as much to do with reasoning as it does with data. There are rules for testing knowledge, and it is the set of rules that define methodology in a discipline”.

-Rychlak (1968)

Research methodology is a way to systematically investigate a research problem. It involves various steps for the conduct of research in a systematic manner. It is essential to define the problem and state the objectives and hypotheses, clearly. The research design provides the details, regarding what, where, when, how much by what means, concerning an inquiry.

The plan and procedure spell out the description of the sample, the measures used and the steps taken in carrying out the investigation. A detailed description of the sample is needed in order for the reader to assess the generalisability of research findings. This is also helpful to determine the degree to which the research sample is representative of the population. The population from which the sample is drawn should be defined clearly and a detailed description needs to be given in the procedure for selecting the sample.

Plan and procedure basically highlight details of the work carried out by the investigator, and determine, in turn, its destiny. It is the character of the technique on which the degree of precision, objectivity, reliability and validity of the results depend. The selection of the technique and devices by an investigator is determined by the nature of the problem, objectives of the study, cost, time, function, availability of the subjects and other resources at the disposal of the investigator, followed by a presentation of the steps of the procedure adopted for the conduct of the study. The
statistical techniques required to be used at various stages of the study need also to be briefly described.

3.1. RESEARCH DESIGN

Research is a systematic activity and, as a process, it employs a scientific methodology. A research design provides a framework within which the activity is conducted.

According to Johada and Cook (1957), a research design is the arrangement of condition for the collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.

As a blueprint of the research design involved in this study, the following components would constitute the format of the investigation.

- Methods of the Study
- Tools of the Study
- Sample of the Study
- Data Collection
- Techniques used for Data Analysis

Descriptive method is concerned with the present conditions, situations, events and practices and deals with relationship among variables.

The present investigation mainly uses the descriptive method to study creative thinking among senior secondary school students in relation to psychological factors and Organizational Climate.

Descriptive Method

"Descriptive research is concerned with hypotheses formulation and testing and the analysis or relationship between non-manipulated variables and the development or generalizations¨.

- Best and Kahn

3.2 VARIABLES OF THE STUDY

Variables of a study are of two types:
A. **Dependent Variables**

The dependent variables are the conditions or characteristics that appear, disappear or change as the investigator introduces, removes or changes independent variables. In the present investigation, the dependent variable of the study refer to creativity and it's factors.

B. **Independent Variables**

An independent variable is the condition or the characteristics that the investigator observes or controls in attempt to ascertain its relationship to observed phenomena. The independent variables of the study in hand refer to various conditions, characteristics and factors related to-

1. Personality
2. Anxiety and
3. Organizational Climate.

The present investigation attempts to study the role of independent variables in determining creativity. It also intends to see the relationship between independent variables and the dependent one.

### 3.3 OBJECTIVES OF THE STUDY

**Objectives**

1. To study the incidence of creative thinking among Senior Secondary School Students.
2. To study the relationship of creativity of senior secondary school students with their anxiety.
3. To study the relationship of creativity of senior secondary school students with their personality factors.
4. To study the relationship of creativity of senior secondary school students with organizational climate and its dimensions.
5. To compare male and female senior secondary school students on fluency as a factor of creative thinking.
6. To compare male and female senior secondary school students on flexibility as a factor of creative thinking.
7. To compare male and female senior secondary school students on originality as a factor of creative thinking.

8. To compare male and female senior secondary school students on creativity as a whole.

9. To compare rural and urban senior secondary school students on fluency as a factor of creative thinking.

10. To compare rural and urban senior secondary school students on flexibility as a factor of creative thinking.

11. To compare rural and urban senior secondary school students on originality as a factor of creative thinking.

12. To compare rural and urban senior secondary school students on creativity as a whole.

13. To identify the role of personality factors (A, B, C, E, F, G, H, I, L, M, N, O, Q₁, Q₂, Q₃, Q₄), Anxiety, organizational climate and its dimensions (disengagement, aloofness/alienation, esprit, intimacy, psycho-physical hindrance, consideration/controls, production-emphasis and humanized thrust) in determining creativity among senior secondary school students.

14. To identify the role of personality factors (A, B, C, E, F, G, H, I, L, M, N, O, Q₁, Q₂, Q₃, Q₄), Anxiety, organizational climate and its dimensions (disengagement, aloofness/alienation, esprit, intimacy, psycho-physical hindrance, consideration/controls, production-emphasis and humanized thrust) in determining fluency among senior secondary school students.

15. To identify the role of personality factors (A, B, C, E, F, G, H, I, L, M, N, O, Q₁, Q₂, Q₃, Q₄), Anxiety, organizational climate and its dimensions (disengagement, aloofness/alienation, esprit, intimacy, psycho-physical hindrance, consideration/controls, production-emphasis and humanized thrust) in determining flexibility among senior secondary school students.

16. To identify the role of personality factors (A, B, C, E, F, G, H, I, L, M, N, O, Q₁, Q₂, Q₃, Q₄), Anxiety, organizational climate and its dimensions (disengagement, aloofness/alienation, esprit, intimacy, psycho-physical
hindrance, consideration/controls, production-emphasis and humanized thrust) in determining originality among senior secondary school students.

3.4 HYPOTHESES

1. There is no significant relationship between creativity and anxiety of senior secondary school students.

2. (a) There is no significant relationship between creativity and personality factor A (Reserved Vs Outgoing as scored on 16 PF) of senior secondary school students.

   (b) There is no significant relationship between creativity and personality factor B (Less Intelligent Vs More Intelligent) of senior secondary school students.

   (c) There is no significant relationship between creativity and personality factor C (Affected by Feelings Vs Emotionally Stable) of senior secondary school students.

   (d) There is no significant relationship between creativity and personality factor E (Humble Vs Assertive) of senior secondary school students.

   (e) There is no significant relationship between creativity and personality factor F (Sober Vs Happy-go-Lucky) of senior secondary school students.

   (f) There is no significant relationship between creativity and personality factor G (Expedient Vs Conscientious) of senior secondary school students.

   (g) There is no significant relationship between creativity and personality factor H (Shy Vs Venturesome) of senior secondary school students.

   (h) There is no significant relationship between creativity and personality factor I (Tough minded Vs Tender minded) of senior secondary school students.
(i) There is no significant relationship between creativity and personality factor L (Trusting Vs Suspicious) of senior secondary school students.

(j) There is no significant relationship between creativity and personality factor M (Practical Vs Imaginative) of senior secondary school students.

(k) There is no significant relationship between creativity and personality factor N (Forthright Vs Shrewd) of senior secondary school students.

(l) There is no significant relationship between creativity and personality factor O (Placid Vs Apprehensive) of senior secondary school students.

(m) There is no significant relationship between creativity and personality factor Q₁ (Conservative Vs Experimenting) of senior secondary school students.

(n) There is no significant relationship between creativity and personality factor Q₂ (Group Dependent Vs Self Sufficient) of senior secondary school students.

(o) There is no significant relationship between creativity and personality factor Q₃ (Undisciplined Self-Confident Vs Controlled) of senior secondary school students.

(p) There is no significant relationship between creativity and personality factor Q₄ (Relaxed Vs Tense) of senior secondary school students.

3. There is no significant relationship between creativity and organizational climate of senior secondary schools.

(a) There is no significant relationship between creativity and disengagement as a dimension of organizational climate of senior secondary schools.
(b) There is no significant relationship between creativity and aloofness as a dimension of organizational climate of senior secondary schools.

(c) There is no significant relationship between creativity and espirit as a dimension of organizational climate of senior secondary schools.

(d) There is no significant relationship between creativity and intimacy as a dimension of organizational climate of senior secondary schools.

(e) There is no significant relationship between creativity and psycho-physical hindrance as a dimension of organizational climate of senior secondary schools.

(f) There is no significant relationship between creativity and consideration as a dimension of organizational climate of senior secondary schools.

(g) There is no significant relationship between creativity and production-emphasis as a dimension of organizational climate of senior secondary schools.

(h) There is no significant relationship between creativity and humanized-thrust as a dimension of organizational climate of senior secondary schools.

4. There is no significant difference between male and female senior secondary school students on fluency as a factor of creative thinking.

5. There is no significant difference between male and female senior secondary school students on flexibility as a factor of creative thinking.

6. There is no significant difference between male and female senior secondary school students on originality as a factor of creative thinking.

7. There is no significant difference between male and female senior secondary school students on creativity as a whole.

8. There is no significant difference between rural and urban senior secondary school students on fluency as a factor of creative thinking.
9. There is no significant difference between rural and urban senior secondary school students on flexibility as a factor of creative thinking.

10. There is no significant difference between urban and rural senior secondary school students on originality as a factor of creative thinking.

11. There is no significant difference between rural and urban senior secondary school students on creativity as a whole.

12. Personality factors, anxiety, organizational climate and its dimensions will have significant role in determining creativity among senior secondary school students.

13. Personality factors, anxiety, organizational climate and its dimensions will have significant role in determining fluency among senior secondary school students.

14. Personality factors, anxiety, organizational climate and its dimensions will have significant role in determining flexibility among senior secondary school students.

15. Personality factors, anxiety, organizational climate and its dimensions will have significant role in determining originality among senior secondary school students.

3.5 DELIMITATIONS OF THE STUDY

1. The geographical area of the study has been delimited to the senior secondary schools of Rohtak district in Haryana.

2. Only 300 adolescents have been selected on multi-stage random basis.

3. Since creativity covers a wide area, the research has been delimited to verbal creativity; only three components of creativity viz.: fluency, flexibility and originality have been taken into consideration for the requirement of the study. It was decided to use 'Verbal Test of Creativity Thinking by Baquer Mehdi.'

4. Anxiety was measured only on those aspects which are covered by Sinha's Comprehensive Anxiety Test (SCAT).
5. As the scope of personality is vast, it was not possible to go beyond available personality tests. Hindi version of 16 PF by S.D.Kapoor has been taken to assess personality of subjects under study.

6. School Organizational Climate Description Test by Moti Lal Sharma was found most suitable to study the organizational climate of senior secondary schools in Indian contexts. It was not possible for the investigator to investigate all the aspects of organizational climate. So the study was confined to see the relationship of creativity and organisational climate and its eight dimensions and the role of organizational climate and its eight dimensions in determining creativity.

3.6 PARADIGMS OF RESEARCH

Research methodology has two major paradigms, namely, the qualitative and quantitative. The qualitative paradigm makes use of a logical analysis of rich, soft, verbal, descriptive data obtained, whereas the quantitative paradigm makes use of statistical techniques to describe the sample, to test the hypotheses and to draw inferences based on hard, quantifiable data. The quantitative paradigm is aimed at making generalizations.

The present investigation obtains hard numerical data and makes use of statistical procedures to test and verify preconceived hypothesis. Therefore, it employs the quantitative paradigm of research.

Descriptive research methodology has been classified differently by various authors.

According to Best and Kahn descriptive research includes case studies, ethnographic studies, follow up studies and causal comparative approaches.


- Survey studies are conducted to give an accurate description of the existing phenomenon so as to justify current conditions and practices;
- Developmental studies refer to those investigations which research into a subject or a phenomenon over a period of time; and
Inter-relationship studies describe not only the existing phenomenon but also attempt to ascertain relationship among variables.

**Inter relationship studies can be further classified as:**

- Case study which attempts to examine an individual unit in detail and analyses the various factors/dimensions of the unit.
- Casual comparative or ex-post-facto studies attempt to ascertain the relationship between two variables where one may be the cause of another.
- Correlation and prediction studies usually attempt to find relationship among variables with the help of co-efficient of correlation on the basis of which predictions are also made about the variables.
- Cross-cultural and comparative researches compare simultaneous phenomena or societies on a particular aspect/factor dimension.

**3.7 METHOD FOLLOWED**

**Correlational and predictional approach**

According to *Borg* and *Gall*, (1983), “Two variables are said to be related to one another if values of one variable are predictional from values of another variable”. Further, “The correlational method provides information regarding the degree of relationship and explores possible causal factors through the use of the coefficient of correlation”.

As the study attempts to ascertain relationship amongst the dependent and independent variables and to identify the role of independent variables in predicting creativity among senior secondary school students, it follows the correlational and predictional approach.

**3.8 SAMPLE OF THE STUDY**

A sample refers to the sub-group of a larger population under study from which inferences are drawn about the larger population. The study aims to check the incidence of creativity among senior secondary school students in relation to psychological factors and organizational climate. It, therefore, requires the data to be collected from the concerned categories of all subjects who form the population of the study. In the present study, 300 senior secondary school students and teachers of Rohtak district in the State of Haryana form the sample.
According to Vockeli (1983), “Sampling refers to the strategies which enable the researcher to pick a sub-group from a large group and use this as the basis for making judgements about the large group”.

The Sampling Technique used

In the present study, the multistage random sampling technique has been used to select the subjects from the population. A list of Govt. and non-Govt. Sr. Sec. Schools was obtained from the concerned District Education Officer of district Rohtak and 30 schools (15 rural and 15 urban) were selected randomly. Further, from each school the students were also selected randomly by adopting lottery system. The stratification of the sample is as follows:

![Sample Diagram](image)

So far as teachers are concerned, all teachers teaching senior secondary classes were taken into consideration.
Table 3.1: The list of schools selected for the purpose is given below:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of School</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Govt. Sr. Sec. School, Ghudhan</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>Govt. Sr. Sec. School, Katesara</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>Shivam Sr. Sec. School, Nigana</td>
<td>10</td>
</tr>
<tr>
<td>4.</td>
<td>Govt. Girls Sr. Sec. School, Chiri</td>
<td>10</td>
</tr>
<tr>
<td>5.</td>
<td>H.D. Sr. Sec. School, Meham</td>
<td>10</td>
</tr>
<tr>
<td>6.</td>
<td>Govt. Sr. Sec. School, Dobh</td>
<td>10</td>
</tr>
<tr>
<td>7.</td>
<td>Govt. Sr. Sec. School, Lahli</td>
<td>10</td>
</tr>
<tr>
<td>8.</td>
<td>S.D. Sports Sr. Sec. School, Mokhra</td>
<td>10</td>
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<tr>
<td>9.</td>
<td>Govt. Sr. Sec. School, Bhali</td>
<td>10</td>
</tr>
<tr>
<td>10.</td>
<td>Govt. Boys Sr. Sec. School, Nigana</td>
<td>10</td>
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<tr>
<td>11.</td>
<td>Jyoti Prakash Sr. Sec. School, Bhalaut</td>
<td>10</td>
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<tr>
<td>12.</td>
<td>Arya Sr. Sec. School, Madina</td>
<td>10</td>
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<tr>
<td>13.</td>
<td>Govt. Sr. Sec. School, Baniani</td>
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<tr>
<td>14.</td>
<td>B.P.S. Sr. Sec. School, Bhaini Maharajpur</td>
<td>10</td>
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<tr>
<td>15.</td>
<td>Arya Sr. Sec. School, Farmana</td>
<td>10</td>
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<tr>
<td>16.</td>
<td>I.B. Sr. Sec. School, Rohtak</td>
<td>10</td>
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<tr>
<td>17.</td>
<td>D.A.V. Sr. Sec. School, Rohtak</td>
<td>10</td>
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<tr>
<td>18.</td>
<td>M.D.N. Sr. Sec. School, Rohtak</td>
<td>10</td>
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<tr>
<td>19.</td>
<td>S.R.S. Sr. Sec. School, Rohtak</td>
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<tr>
<td>20.</td>
<td>Hari Krishan Memorial Sr. Sec. School, Rohtak</td>
<td>10</td>
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<tr>
<td>21.</td>
<td>Saini Boys Sr. Sec. School, Rohtak</td>
<td>10</td>
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<tr>
<td>22.</td>
<td>Swami Nityanand Sr. Sec. School, Rohtak</td>
<td>10</td>
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<tr>
<td>23.</td>
<td>S.D. Girls Sr. Sec. School, Rohtak</td>
<td>10</td>
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<tr>
<td>24.</td>
<td>Chhotu Ram Sr. Sec. School, Rohtak</td>
<td>10</td>
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<tr>
<td>25.</td>
<td>Model Sr. Sec. School, Rohtak</td>
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<tr>
<td>26.</td>
<td>Indus Sr. Sec. School, Rohtak</td>
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<tr>
<td>27.</td>
<td>Pathania Sr. Sec. School, Rohtak</td>
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<tr>
<td>28.</td>
<td>Sanskriti Sr. Sec. School, Rohtak</td>
<td>10</td>
</tr>
<tr>
<td>29.</td>
<td>Jyoti Prakash Sr. Sec. School, Rohtak’</td>
<td>10</td>
</tr>
<tr>
<td>30.</td>
<td>D.G.V. Sr. Sec. School, Rohtak</td>
<td>10</td>
</tr>
</tbody>
</table>
3.9 TOOLS USED

"If the tools used possess all the necessary and desirable attributes, then the potential for the sound research is present".

-F.J. Fox

Findings of any research study are based on data collection; data collection, in turn, depends on the tools used. The research tools should have reliability, validity, availability, appropriateness, ease in administration, scoring and objectivity.

Keeping in view the above, the following tools which suited the requirements of the study in hand and had also been tested on the touchstone of various test requirements on reliability, validity etc. by their authors, were preferred to be employed for collection of the data for the study.

1. Verbal Test of Creative Thinking (T.C.W) by Baquer Mehdi.
3. Sinha’s Comprehensive Anxiety Test (Dr. A.K.P Sinha and Dr. R.P. Singh)
4. School Organizational Climate Description Questionnaire (SOCDQ) by Motilal Sharma.

3.9.1 Description of Verbal Test of Creative Thinking

The verbal test, which has been used in this study, is a part of the total battery which consists of both verbal and non-verbal test. This test is widely used in studies of creativity in India.

The verbal test of creativity (VIC) includes four sub tests namely, consequences test, unusual uses test, New Relationship Test and product improvement test.

(I) Consequences Test:

This test consists of three hypothetical situations (a) What would happen to man if he could fly like birds? (b) What would happen if our schools had wheels? (c) What would happen if man did not have any need for food? alongwith an example.

The subject is required to think of as many consequences of these situations as he can and write them under each situation in the space provided. The situations being
hypothetical minimize the effect of experience and also provide the subject with an unlimited opportunity to make up responses. The test encourages free play of imagination and originality. The time allowed for the three problems is 4 minutes each.

(II) Unusual Uses Test:

The test presents the subject with the names of three common objects (a) piece of stone (b) a wooden stick and (c) water and requires him to write as many novel, interesting and unusual use of these objects he may think of, this test measures the subjects ability to retrieve items of information from his personal information storage. Evidently, it also measures the subject’s ability to shift frames of reference to use the physical environment in an original way. An example is provided as a specimen. The time allowed for the three tests is 5 minutes each.

(III) New Relationships Test:

This test presents the subject with three pairs of words apparently different tree and house, chair and ladder, air and water and requires him to think and write as many novel relationship as possible between the two objects of each pair in the space provided. This test provides an opportunity for the free play of imagination and originality. The time allowed for each pair of words is 5 minutes i.e. 15 minutes in all.

(IV) Product Improvement Test:

In this test the subject as asked to think of a simple wooden horse toy and suggest improvements without worrying about the cost to make it more interesting for the children to play. The time allowed is 6 minutes.

The total time required for administering the test is 48 minutes in addition to the time necessary for giving instructions, passing out test booklets to children and collecting them back.

The Technical Information About This Test:

The technical informations about this test are tabulated in the manual. The item validity of the test is established and the factor validity is also determined.
Reliability of the test:

The test-retest reliabilities of the factor scores and also the total scores were obtained on the small sample (N=31) which range from 0.896 to 0.959. The inter-scores reliability for the factor scores in one study were found to range from 0.653 to 0.981.

Validity of the Test

The validity coefficients for factor scores and the total creativity scores are high enough (significant beyond 0.01 level).

Administrating and Scoring

It is recommended that the test administrator should first get himself acquainted with the test by carefully going through the test booklets which contain both the general instructions and instructions for each activity. The timings given for each activity should be strictly adhered to.

Procedure for Scoring:

Keeping in mind the nature of the test, great care has to be exercised at the time of scoring. The following points have to be kept in mind while scoring. The maker of the test suggests:

(1) Each item is to be scored for fluency, flexibility, and originality.

(2) The scores may be directly entered into the answer sheet by closely following the scoring guide.

(3) If the scorer comes across responses, which are not mentioned in the scoring guide, we should briefly mention them on the backside of the answer sheet and score them for originality after all the test scripts have been scored. The instructions for scoring the new responses for originality are also given on the answer sheet. Instructions for scoring are provided in the manual.

Scoring Summary:

A table has been provided in the answer sheet to summarize the scores for fluency, flexibility and originality obtained in different activities. The total fluency, flexibility and originality scores have to be entered in the appropriate columns of the table. The composite creativity scores should be entered after converting the raw
scores into standard scores. The maker of the test suggests that it is necessary because the standard deviation of the three scores sometimes markedly vary, and if raw scores are added up then the ranking will be greatly affected.

The interpretation and norms of the test are established on the basis of a study conducted on students of classes VII and VIII from rural and urban samples.

3.9.2 Description of 16 P. F. Test (Form-A)

In the present study, Indian adaptation by (S.D. Kapoor, 1970) Form A of 16 personality factors test was used to measure the personality of the subjects. The 16 PF test is an objectively scorable test devised by basis research in psychology to give the most complete coverage of personality possible in brief time. This test was prepared by R.B. Cuttell, Eber and Tatsuoka (1970) originally. It was published in English version and later it was adapted by S.D. Kapoor who translated both instructions and items into Hindi. This test consists of 187 questions and takes approximately 45 minutes to complete. Two scoring keys are available to find out the raw scores of respondents on the 16 personality factors and norms are provided to convert these raw scores into sten scores. The profile of each respondent can be prepared to have quick glance at the 16 traits he/she possess.

The sixteen factors/dimensions measured by 16 PF test are essentially independent i.e. any item in the test contribute to the score on one and only one factor so that no dependencies were introduced at the level of scale construction. Moreover the experimentally obtained correlation among the 16 PF scales are generally quite small so that each scale provides some new piece of information about the person being tested.

FACTOR ‘A’

Reserved Vs. Outgoing

The person who scores low on factor ‘A’ tends to be stiff, cool, skeptical and aloof. He likes things-rather than people, asking alone and avoiding compromises of viewpoints. He is likely to be privies and “rigid” in his

The person who scores high on factor ‘A’ tends to be good natured easy going, emotionally expressive, ready to cooperate attentive. To people soft hearted and adaptable. He likes occupations dealing with people. He
way of doing things

readily forms active groups in personal relations. He is less afraid of criticism and better able to remember names of people.

FACTOR ‘B’
Less intelligent
The person who scores low on factor B tends to be slow to learn and grasp. His dullness may be simply a reflection of low intelligence.

Vs. More intelligent
The person who scores high on factor B tends to be quick to grasp ideas, a fast learner and intelligent.

FACTOR ‘C’
Affected by feelings
The person who scores low on factor ‘C’ tends to be low in frustration tolerance for unsatisfactory conditions, changeable and plastic evading necessary reality demands, neurotically fatigued easily emotional and annoyed, active in dissatisfaction and having neurotic symptoms.

Vs. Emotionally stable
The person who scores high on factor ‘C’ tends to be emotionally mature, stable, realistic about life, unruffled possessing ego strength and better add to maintain solid group morale.

FACTOR ‘E’
Humble
The person who scores low on factor ‘E’ tends to give way to others, to be docile and to perform. He is often department, confessing, anxious for obsessional correctness.

Vs. Assertive
The person who scores high on factor ‘E’ is assertive, self assured and independent minded. He tends to be hostile, authoritarian and disregards authority.

FACTOR ‘F’
Sober
The person who scores low on factor

Vs. Happy-go-lucky
The person who scores high on this trait
‘F’ tends to be restrained reticent, introspective. He is sometimes dour, pessimistic and unduly deliberates. He tends to be sober, dependable person.

**FACTOR ‘G’**

Expedient (weaker superego strength)
The person, who scores low on factor ‘G’, tends to be unsteady in purpose. He is often casual and lacking in effort for group understandings and cultural demands. His freedom from group influence may lead to anti-social acts, but at times makes him more effective.

**FACTOR ‘H’**

Shy
The person who scores low on this trait tends to be shy and with drawing. He usually has inferiority feelings. He tends to be slow and dislikes occupations with personal contacts, prefers on or two close friends to large groups and is not given to keeping in contact with that is going on around him.

**FACTOR ‘I’**

Tough-minded
The person who scores low on factor ‘I’ tends to be practical, realistic

tends to be cheerful active, talk a tine frank, expressive and carefree. He is frequently chosen as an elected leader. He may be impulsive and mercurial.

Vs. **Conscientious**

(stronger superego strength)
The person who scores high on factor ‘G’ tends to be exacting in character, dominated by seas of duty, playful and responsible. He prefers hared working people and is usually moralistic.

Vs. **Venturesome**

The person who scores high on factor ‘H’ is sociable, bold, ready, to try new things, spontaneous and abundant in emotional response. He tends to be ‘pushy’ and actively interested in opposite sex.

Vs. **Tender-minded**

The person who scores high on factor ‘I’ tends to be tender to be tender minded,
independent, responsible but skeptical of subjective. He is sometimes unmoved, hard and smug.

day-dreaming and artistic. He is sometimes demanding of attention and help, impatient, and impractical. He dislikes crude people and rough occupations. He tends to slow up group performance and to upset group moral by unrealistic fussiness.

**FACTOR ‘L’**

**Trusting**

The person who scores low on factor ‘L’ tends to be free of jealous tendencies, adaptable, cheerful, uncompetitive, and concerned about other people and a good team works.

**Vs. Suspicious**

The person who scores high on factor ‘L’ tends to be mistrusting and doubtful. He is often involved in his own ego, is self-opinionated and interested in internal, mental life. He is usually deliberate in his actions unconcerned about other people and a poor team worker.

**FACTOR ‘M’**

**Practical**

The person who scores low on factor ‘M’ tends to anxious to do the right things, attentive to practical matters and subject to the dictation of what is obviously possible.

**Vs. Imaginative**

The person who scores high on factor ‘M’ tends to be unconventional, unconcerned over everyday matters, self motivated and imaginatively creative. His inner-directed interests sometimes lead to unrealistic situations adopted by expressive outburst. His individuality tends to cause him to be rejected in group activities.

**FACTOR ‘N’**

**Forthright**

The person who scores low on factor

**Vs. Shrewd**

The person who scores high on this
'N' tends to be unsophisticated, sentimental and simple. He is sometimes crude but easily pleased and content with what comes and is natural and spontaneous.

**FACTOR ‘O’**

**Placid**

The person who scores low on factor ‘O’ tends to be placid and confident. He has a mature unanimous confidence in himself and his capacity to deal with things.

**Vs.** **Apprehensive**

The person who scores high on factor ‘O’ tends to be depressed moody, a warier, full of foreboding and brooding. He has a childlike tendency to anxiety in difficulties. He does not feel accepted in groups or free to participate.

**FACTOR ‘Q1’**

**Conservative**

The person who scores low on factor ‘Q’ is confident in what he has been taught to believe. He tends to oppose and postpone change, is inclined to go along with tradition, is more conservative in religion and tends not to be increased in analytical “intellectual” thought.

**Vs.** **Experimenting**

The person who scores high on factor ‘Q’ tends to be interested in intellectual matters and has doubts on fundamental issues. He is skeptical and inquiring regarding ideas either old or new. He tends to be more well informed, less inclined to experiment in life generally and more tolerant of inconvenience and change.

**FACTOR ‘Q2’**

**Group-dependent**

The person who scores low on factor ‘Q2’ prefers to work and make decisions with other people, likes and depends on social approval and administration. He tends do go along

**Vs.** **Self-sufficient**

The person who scores high on this factor is temperamentally independent, accustomed to going his own way, making decisions and talking action of his own. He does not need their
with the group and may be locking in individual resolution.

**FACTOR ‘Q3’**

Undisciplined self-confident Vs. Controlled

The person who scores low on factor ‘Q3’ will not be bothered with will control and regard for social demands. He is not overly considerable, careful or painstaking. He may feel mal-adjusted and many maladjustments show Q3.

**FACTOR ‘Q4’**

Relaxed Vs. Tense

The person who scores low on factor ‘Q4’ tends to be relaxed and satisfied. In some situations, over satisfaction can lead to laziness and low performance in the sense that low motivation produces little trial and error. Conversely high tension level may disrupt school and work performance.

**Scoring of 16 Pf**

Three hundred senior secondary school adolescents were selected for the present study. These were divided into two main groups: Male/Female and Rural/Urban. Scoring of answer sheets were done with the help of two scoring keys. One scoring key covered factors A, C, F, H, L, N, Q1, Q3 and other covered the factors B, E, G, I, M, O, Q2, Q4. first scoring key was placed over the answer sheet. The scores were counted which were visible through the holes for factor A, allowing either 2 or 1, as indicated by the number printed adjacent to the hole. Sum these
scores and enter the total in the space indicated for factor A, but in factor B each correct mark visible in a hole gives a score of 1 only. Similarly, each factor was scored and raw scores of each factor was obtained. The raw scores were converted into sten scores with the help of given tabular supplement for 16 PF.

**Reliability and Validity of 16 Pf**

For knowing the personality traits of the adolescents selected for the study, the investigator used the Cattell’s personality Questionnaire 16 PF. It is most competent and valid test of personality.

The Cattle’s personality test is an objectively scorable test. It measures 16 dimensions or traits of personality, which have been found by psychologists. It is planned for the adult range and most appropriate for the fully literate person.

**Table 3.2: Reliability and Validity**

<table>
<thead>
<tr>
<th>Factors</th>
<th>Reliability</th>
<th>Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.83</td>
<td>0.92</td>
</tr>
<tr>
<td>B</td>
<td>0.69</td>
<td>0.82</td>
</tr>
<tr>
<td>C</td>
<td>0.73</td>
<td>0.85</td>
</tr>
<tr>
<td>E</td>
<td>0.81</td>
<td>0.89</td>
</tr>
<tr>
<td>F</td>
<td>0.86</td>
<td>0.93</td>
</tr>
<tr>
<td>G</td>
<td>0.66</td>
<td>0.77</td>
</tr>
<tr>
<td>H</td>
<td>0.79</td>
<td>0.89</td>
</tr>
<tr>
<td>I</td>
<td>0.58</td>
<td>0.71</td>
</tr>
<tr>
<td>L</td>
<td>0.62</td>
<td>0.74</td>
</tr>
<tr>
<td>M</td>
<td>0.76</td>
<td>0.84</td>
</tr>
<tr>
<td>N</td>
<td>0.62</td>
<td>0.74</td>
</tr>
<tr>
<td>O</td>
<td>0.84</td>
<td>0.92</td>
</tr>
<tr>
<td>Q₁</td>
<td>0.58</td>
<td>0.70</td>
</tr>
<tr>
<td>Q₂</td>
<td>0.69</td>
<td>0.83</td>
</tr>
<tr>
<td>Q₃</td>
<td>0.59</td>
<td>0.72</td>
</tr>
<tr>
<td>Q₄</td>
<td>0.77</td>
<td>0.88</td>
</tr>
</tbody>
</table>
3.9.3 Description of Sinha’s Comprehensive Anxiety Test

During the past three decades or so the concept has figured prominently in the psychological literature, on the examination of various tests of Anxiety in existence (Both Indian and foreign) authors found that they were not converting certain facets of Anxiety.

Further, they exist a good deal of disagreement and confusion concerning the concept of anxiety. Several aspects of anxiety appeared to be ignored. All these consideration/controls led to the development of this comprehensive test of anxiety incorporating a variety of anxiety indices proposed by different investigations from time to time, keeping in view the conditions available in this country.

Initially 315 items were prepared in Hindi. These items were given to five judges (all engage in counseling and psychological testing work) for examining the merit of each item for inclusion in the test of anxiety. They were also asked to score out those items which were thought redundant. On the basis of judges 100% agreement among the judges. Seventy of three hundred fifteen items were eliminated. No time limit was imposed. The subjects were required to report to each items of ‘Yes’ or ‘No’ the ‘yes’ to any item was indicative of anxiety and was given score of one. A score of zero was given to ‘No’ response. For item analysis, the points biosocial were computed. The criterion of a coefficient or correlation, being significant at .001 levels was fixed for the inclusion of an item in the initial test. Out of 245 coefficients of correlations, were significant at or beyond .001 levels. Consequently, those go items which were fulfilled the criterion constitute the test in its final form.

The coefficient of reliability was determined by test-retest method (N=100). The product movement method of correlation was employed and found 0.8. The internal consistency reliability was ascertained by adopting odd even procedure N=100. Using spearman Brown formula, reliability coefficient of test was found to be 0.92.

The coefficient of validity was determined by coefficient of correlation between scores on comprehensive Abnormity test and Taylor’s manifest anxiety test scale. It was 0.62 which is significant beyond .001 level of coefficient.
The inventory can be scored accurately by hand and no scoring key or stencil is provided so far. For any response indicated 'Yes' the testee should be awarded the score of one and zero for 'No'. The sum of the entire positive or yes responses would be total anxiety score of the individual.

3.9.4 Description of School Organizational Climate Description Questionnaire (S.O.C.D.Q.)

Organizational climate Descriptive Questionnaire (O.C.D.Q.) was first developed by Halpin and Croft (1963) to measure organizational climate of elementary schools. It consists of 64 Likert type items. The sixty four items of the questionnaire were assigned to eight sub-tests, of which four refer to the characteristics of the teachers as a group and other four refer to that of the principal as a leader.

Indian adaptation of Organizational Climate Descriptive Questionnaire (O.C.D.Q.), done by Moti Lal Sharma (1973), is known as School Organizational Climate Descriptive Questionnaire. The analysis of S.O.C.D.Q. at item level (64 items) resulted in eight dimensions of organizational climate but out of these eight dimensions, four sub-tests differ in structure and contents from those identified by Halpin and Croft (1963). The four common dimensions identified in both the studies are:

- Disengagement
- Esprit
- Intimacy
- Production-Emphasis

The four new dimensions discovered by Sharma (1973) were:

- Psycho-physical Hindrance
- Alienation
- Controls
- Humanized- thrust
Dimension 1: Disengagement

It refers to the teachers’ tendency to be “not with it”. This dimension describes a group that is not in gear with respect to the task at hand. (Halpin and Croft, 1963, p. 150)

Dimension 2: Alienation

It refers to the behaviour patterns among the group (faculty), including the leader (Principal), which are characterized as highly formal and impersonal. It reveals the degree to which the Principal goes by the book and adheres to policies rather than dealing with the teachers in an informal face-to-face situation. It also indicates the emotional distance between the group and the leader, and, at the same time among the group members (Sharma, 1973, p. 199).

Dimension 3: Esprit

It refers to moral. The teachers feels that their social needs are being satisfied and that they are, at the same time, enjoying a sense of accomplishment in their job (Halpin and Croft, 1963, p. 151)

Dimension 4: Intimacy

It refers to the teachers’ enjoyment of friendly social relations with each other. (Halpin and Croft, 1963, p. 151).

Dimension 5: Psycho-physical hindrance

It refers to the feeling among the group members that the principal burdens them with routine duties and other administrative requirements, which they consider as unnecessary. At the same time they perceive principal as highly dictatorial in his behaviour, playing a role of a ‘straw boss’. His trend of communication tends to go only in one direction, and is not sensitive to feedback from the staff (Sharma, 1973, p. 204).

Dimension 6: Controls

It refers to the degree to which the principal’s behaviour can be characterized as bureaucratic and impersonal in nature. Although task-oriented in behaviour, it involves the extent to which he tries to raise the degree of effectiveness and efficiency by helping the group work towards the common goal by providing adequate operational guidance and secretarial services (Sharma, 1973, p.205).
Dimension 7: Production Emphasis

It refers to the principal’s behaviour which is characterized by close supervision of the staff. He is highly directive and plays the role of a ‘Straw Boss’. His communication tends to go in one direction only, and he is not sensitive to feedback from the staff (Halpin and Croft, 1963, p. 151).

Dimension 8: Humanized Thrust

It refers to the behaviour of the principal which is marked by his attempt to motivate the teachers through personal example. He is characterized by an inclination to treat the teachers humanly and tender-heartedly and attempts to do something extra for them in humanistic terms and consequently, it is viewed favourably by the teachers (Sharma, 1973, p. 209).

• Types of climates

Sharma (1973) identified six types of climates as defined below:

1. Open Climate

It refers to an environment in which teachers obtain social needs-satisfaction as well as job-satisfaction and enjoy a sense of accomplishment in their job. They perceive their principal (leader) as highly considerate and democratic in behaviour and hence, the group members as well as the principal feel ‘all of a piece’. So the group enjoys high integration and authenticity of behaviours (Sharma, 1973, p. 252).

2. Autonomous Climate

It refers to an environment in which the teachers enjoy a friendly relationship and high degree of group morale. They satisfy their needs, to a great extent moderate and enjoy a degree of job-accomplishment. Absence of active leadership mixed with average controls on the part of the principal is perceived as an element of Psychophysical Hindrance (Sharma, 1973, p.p. 254-55).

3. Familiar Climate

It is characterized by the conspicuously friendly behaviours of both the principal and the teachers. The teachers have established personal friendship among themselves, and socially, at least, every one is a part of a large happy family. Social needs-satisfaction is extremely high. The principal exercises leadership in an indirect manner and tries to keep production satisfactory. His behaviour is job-oriented but
does not hinder the social needs-satisfaction on the part of the teachers. He does not apply high controls (Sharma, 1973, p.p. 256-57).

4. **Controlled Climate**

It refers to an environment which can be characterized as highly task-oriented at the cost of social needs-satisfaction of the members (teachers). Leadership acts in a dictatorial manner. Group involvement is never encouraged. The human aspect of the individual is neglected and communication is always one sided. Teachers get little job-satisfaction out of task accomplishment (Sharma, 1973, p.261).

5. **Paternal Climate**

It refers to a situation in which there is very little scope for the members to satisfy their social needs and derive job-satisfaction. The faculty has to work in the way the principal wants but, at the same time, the principal as a paternal guardian of the school faculty, does not ignore the individual interest and hence, his behavior is perceived as highly considerate in character (Sharma, 1973, p.264).

6. **Closed Climate**

It is characterized by a high degree of apathy on the part of all members of the organization. The organization is not ‘moving’. This climate lacks authenticity of behaviour. The principal constrains the emergence of leadership acts from the groups. The group members secure neither social needs-satisfaction nor job-satisfaction stemming from task accomplishment (Sharma, 1973, p. 266).

Diagrammatic description of the six climates defined above is Table 3.7 presents.

**Table 3.3: Diagramatic Description of Organisational Climates**

<table>
<thead>
<tr>
<th>Climate</th>
<th>Group Behaviour Characteristics</th>
<th>Leader Behaviour Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disengagement</td>
<td>Alienation</td>
</tr>
<tr>
<td>Open</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>Autonomous</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>Familiar</td>
<td>L</td>
<td>H</td>
</tr>
<tr>
<td>Controlled</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>Paternal</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>Closed</td>
<td>H</td>
<td>H</td>
</tr>
</tbody>
</table>

L = Low  
M = Moderate  
H = High
Reliability of S.O.C.D.Q.

KR-20 (Kuder-Richardson Formula) was used for calculating the coefficients of reliability (Internal Consistency) for each of the sub-tests. The communalities of each sub-test were also calculated. High communalities can be regarded as evidence of equivalence or adequacy of item sampling and consequently the communality itself may be viewed as a coefficient of equivalence (Halpin and Croft, 1963). Co-efficients of internal consistency and communality estimates have been presented in Table 3.8.

Table 3.4: Estimates of Internal Consistency and of Equivalence for the Eight SOCDQ Sub-tests

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Disengagement</td>
<td>0.67</td>
<td>0.18</td>
<td>0.51</td>
</tr>
<tr>
<td>Alienation</td>
<td>0.61</td>
<td>0.24</td>
<td>0.52</td>
</tr>
<tr>
<td>Esprit</td>
<td>0.73</td>
<td>0.43</td>
<td>0.69</td>
</tr>
<tr>
<td>Intimacy</td>
<td>0.34</td>
<td>0.28</td>
<td>0.10</td>
</tr>
<tr>
<td>Psycho-Physical Hindrance</td>
<td>0.68</td>
<td>0.61</td>
<td>0.60</td>
</tr>
<tr>
<td>Controls</td>
<td>0.59</td>
<td>0.37</td>
<td>0.50</td>
</tr>
<tr>
<td>Production Emphasis</td>
<td>0.81</td>
<td>0.54</td>
<td>0.70</td>
</tr>
<tr>
<td>Humanized Thrust</td>
<td>0.72</td>
<td>0.51</td>
<td>0.65</td>
</tr>
</tbody>
</table>

Validity of S.O.C.D.Q.

This tool was given to 15 experts in the field of educational administration. They were requested to examine the content of each sub-test, in the light of the definitions of different sub-tests and climates which were provided to them, whether the content of the sub-tests of the SOCDQ measure what we intend to measure through them? All the experts with minor differences were found to agree with each other to a great extent. This indicated high face validity of the SOCDQ.

Secondly, no significant difference was found between the proportionate climate-distributions in the two samples, that of Halpin and Croft study (1963) and
Sharma’s study (1973), having different organizational structure and located in two different cultures. This further ascertained the validity of the tool- SOCDQ.

Again, to validate the results of the study Sharma (1973) developed a rating scale and sent the same to the district inspectors of schools of each district, along with the definitions of eight dimensions and climates types, and requested them to rate the schools of their respective districts included in Sharma’s study (1973). Coefficient of Correlation between the ratings of the inspectors and the results observed by the investigator (Sharma, 1973) by administering the SOCDQ was calculated. It was found to be .63 which was significant at 0.01 level of significance. This further indicated the Validity of the tool SOCDQ.

**Collection of Data**

After the selection of tools, the investigator visited the selected schools of district-Rohtak. To ensure quick and complete return of questionnaire, they were personally given to the selected sample of students and teachers of senior secondary schools. Before, giving the questionnaires, proper rapport was established with the subjects. Then, the purpose of the questionnaire was explained to them. The students and teachers were assured that the present questionnaires were meant for the research purpose and would not affect them in any way.

**3.10 STATISTICAL TECHNIQUES USED**

The data after collection, has to be processed and analysed in accordance with the outline laid down for the purpose at the time of developing the research plan. This is essential for a scientific study and for ensuring that we have all relevant data for making contemplated comparisons and analysis. Technically speaking, processing implies editing, coding, classification and tabulation of the collected data so that they are amenable to analysis. Thus, “in the process of analysis, relationships of different supporting or conflicting with original or new hypotheses should be subjected to statistical tests of significance to determine with what validity the data can be said to indicate any conclusions”.

Having obtained the data representing the variables in the study, its proper statistical organization and processing is needed. It makes the data meaningful and understandable. The statistical techniques which were chosen keeping in view the
requirements of the objectives and hypotheses of the study used in the analysis of data in the present investigation are given below:

- **Mean**: It has been used to describe the average of an entire sample of scores.
- **S.D.**: The standard deviation, a measure of variability, is a measure of the extent to which scores in distribution, on an average, deviate from their mean.
- **Graphical Technique**: Bar diagram has been used wherever required.
- **Correlation Co-efficient**: The Pearson ‘r’ correlation co-efficient has been used to study the linear relationship between two variables. In the present study, Pearson’s ‘r’ correlation co-efficient has been used to study the relationship between creativity, 16 personality factors, anxiety, organizational climate and its 8 dimensions.
- **Stepwise multiple regression**
  Stepwise multiple regression has been used to identify the role of 16 personality factors, anxiety, organizational climate and its 8 dimensions in determining creativity.

**‘t’-test**

The test of significance between two means is known as ‘t’ test. It involves computation of ratio between observed differences between two sample means and the error variance (the sampling error factor). To compare the different subjects in terms of creativity between male/female and rural/urban the ‘t’ test has been used in this study.