METHOD AND PROCEDURE

Research can be defined as the search for knowledge, or as any systematic investigation, with an open mind, to establish novel facts, usually using a scientific method. The primary purpose for applied research (as opposed to basic research) is discovering, interpreting, and the development of methods and systems for the advancement of human knowledge on a wide variety of matters of our world and the universe.

Research is literally everywhere, and knowing about research methods help us to understand how we come to know what we accept as a fact.

The relevance of the methods is soul of every kind of research. “It is axiomatic that problems and methods of research must be mutually adapted to each other”.

In above statement, Carter V. Good and Sector E. Douglas bring out the vital importance of method in carrying out research on the problem. The success of a research on some problem is possible if the related method for it is according to its nature.

Research methods are variety of techniques that people use while studying a given phenomenon. They are planned, scientific and value-natural. What that means is that good research method doesn’t “just happen”. Instead, they are deliberately employed in a way that is designed to maximize the accuracy of the results. The selection of a method and the specific design within that method appropriate in investigating a research problem in harmony with scientific principles and is adequate enough to lead to depended generalization. A pre-planned and well defined method provides the research a scientific and feasible plan for attacking and solving the problem under investigation.
Research is understood to follow a certain structural process. Though step order may vary depending on the subject matter and researcher, the following steps are usually part of most formal research, both basic and applied:

- Formation of the topic
- Hypothesis
- Conceptual definitions
- Operational definition
- Gathering of data
- Analysis of data
- Conclusion

In social sciences and in many other disciplines, the following two research methods are applied, depending on the properties of the subject matter and on the objective of the research:

- Qualitative research (understanding of human behavior and the reasons that govern such behavior)
- Quantitative research (systematic empirical investigation of quantitative properties and phenomena and their relationships)

Quantitative research is generally made using scientific methods, which can include:

- The generation of models, theories and hypotheses
- The development of instruments and methods for measurement
- Experimental control and manipulation of variables
- Collection of empirical data
- Modeling and analysis of data
- Evaluation of results
Present research is a quantitative research and further is a kind of descriptive research. Descriptive research is also called Statistical Research. The main goal of this type of research is to describe the data and characteristics being studied. The idea behind this type of research is to study frequencies, averages, and other statistical calculations. Descriptive research is mainly done when a researcher wants to gain a better understanding of a topic. It is quantitative and uses surveys and panels and also the use of probability sampling. The term descriptive research refers to the type of research question, design, and data analysis that can be applied to a given topic.

Descriptive statistics tell what is, while inferential statistics try to determine cause and effect. Descriptive research is the exploration of the existing certain phenomena. Descriptive research is used to obtain information concerning the current status of the phenomena to describe “what exists” with respect to variables or conditions in a situation. The methods involved range from the survey which describes the status quo, the correlation study which investigates the relationship between variables, to developmental studies which seek to determine changes over time.

Descriptive research fit neatly into the definition of both quantitative and qualitative research methodologies, and it can utilize elements of both, often within the same study. The type of question asked by the researcher ultimately determines the type of approach necessary to complete an accurate assessment of the topic in hand.

Descriptive research involves collections of quantitative information that can be tabulated along a continuum in numerical form, such as scores on a test or the number of times a person chooses to use a certain feature of a multimedia program, or it can describe categories of information such as gender or patterns of interaction when using technology in a group situation. Descriptive research involves gathering data that describe events and then organizes, tabulates, depicts, and describes the data collection. It often uses visual aids such as graphs and charts to aid the reader in understanding the data distribution. Because the human mind cannot extract the full import of a large mass of raw data, descriptive statistics are very important in reducing the data to manageable
form. When in-depth, narrative descriptions of small numbers of cases are involved, the research uses description as a tool to organize data into patterns that emerge during analysis. Those patterns aid the mind in comprehending a qualitative study and its implications. Most quantitative research falls into two areas: studies that describe events and studies aimed at discovering inferences or causal relationships.

Descriptive studies aim at finding out "what is," so observational and survey methods are frequently used to collect descriptive data. Descriptive studies reports data such as measures of central tendency including the mean, median, mode, deviance from the mean, variation, percentage, and correlation between variables. Survey research commonly includes this type of measurement, but often goes beyond the descriptive statistics in order to draw inferences.

Three main purposes of research are to describe, explain, and validate findings. Description emerges following creative exploration, and serves to organize the findings in order to fit them with explanations, and then test or validate those explanations.

Educational researchers use observational, survey, and interview techniques to collect data. These data is then used to recommend specific strategies for improving teaching strategies. Descriptive studies have an important role in educational research. They have greatly increased our knowledge about what happens in schools.

**METHOD**

Present research is a descriptive research and survey method is used for such studies. A survey is conducted to collect data, and then the data was described and analyzed in the light of formulated objectives and hypotheses.

Survey studies are conducted to collect detailed descriptions of existing phenomena with the intent of employing data to justify current conditions and practices or to make more intelligent plans for improving them. Their objective is not only to analyze, interpret and report the status of an institution, group or area in
order to guide practice in the immediate future, but also to determine the adequacy of status by comparing it with established standards.

The present study is also a correlation and prediction study. Correlation studies are frequently used types of descriptive research concerned with determining the extent of relationship existing between variables. They are used to obtain description of existing phenomenon and enable a researcher to ascertain the extent to which variations in one variable are associated with variations in another. In the present study the researcher worked on five variables—vocational maturity, self concept, occupational aspiration, family environment and academic achievement.

**SAMPLING**

In order to collect the requisite data, a researcher has to sample the population concerned, as it is not possible to cover the entire population. The process of using a part, as a basis of an estimate to the whole, is known as sampling. The conclusions are drawn and generalizations are done on the basis of sample. Therefore, in any research study, the investigation should try his best to select the sample such as truly represents a large group of individuals and the whole population.

So, keeping in mind the time and sources available, in present study students are taken through random sampling from border area of Firozpur district and it represents both urban and rural population proportionately.

The present study is conducted on Senior Secondary class students studying in schools affiliated to Punjab School Education Board (P.S.E.B). The sample comprise of 800 students. 400 students are boys and rest of 400 is girls. Out of these 400 boys students, 200 are the students studying science subjects i.e. who have taken Medical or Non-Medical streams and the rest 200 are the students of Humanities stream. Similarly 200 girls are taken from science stream and 200 from
Humanities stream. Each set of these 200 students comprise of 100 students from rural area and 100 from urban areas.

**DESIGN**

Research design provides the glue that holds the research work together. A design is used to structure the research, to show how all of the major parts of the research work—the samples or groups, measures, treatments or programs, and methods work together to address the central research questions. Keeping in mind the importance of a research design in a study, the design of sample is prepared as shown below:

```
800 Adolescents
     /    \
  400 Boys 400 Girls
     /    \
200 Science 200 Arts 200 Science 200 Arts
     /    \
100 Rural 100 Urban 100 Rural 100 Urban 100 Rural 100 Urban 100 Rural 100 Urban
```

Students are taken from senior secondary classes only. Students are taken from various schools of Firozpur district of Punjab. The schools are selected randomly and a class is taken for collection of data at a time form each selected school. Equal representation of Rural and Urban School students are taken for the sample.
DATA COLLECTION

After preparation of a research design data-collection is the next step for a research work. Data-collection techniques allow us to systematically collect information about our objects of study and about the settings in which they occur. In the collection of data we have to be systematic. If data are collected haphazardly, it will be difficult to answer our research questions in a conclusive way.

Various data collection techniques can be used such as:

- Using available information
- Observing
- Interviewing (face-to-face)
- Administering written questionnaires
- Focus group discussions
- Projective techniques, mapping, scaling

For the present study standardized questionnaires are administered. The data is collected in a set of four visits to a single schools selected for the sample. The permission from the principals of the selected schools is taken. A complete class is taken for the data collection at a time. The students are given a single test at a time. The instructions of the test are made clear to them. After that, the test is administered on them and the answer sheets are collected. The same class is visited after one week and the next test is administered in them in the same way. The same procedure is repeated for all the tests for all the schools selected for the sample. For academic achievement percentage of marks obtained of the students in Matriculation Examination of PSEB from gazette are taken.
TOOLS

Following tools are used to collect the data required for the present study:

1. Vocational Attitude Maturity-Scale (VAMS) by Dr. (Mrs.) Manju Mehta
2. Self Concept Questionnaire (SCQ) by Dr. Raj Kumar Saraswat
3. Occupational Aspiration Scale (OAS) by Dr. J.S. Grewal
4. Family Environment Scale (FES) by Dr. Harpret Bhatia and Dr.N.K. Chadha

1. VOCATIONAL ATTITUDE MATURITY SCALE BY DR. (MRS.) MANJU MEHTA

The scale is prepared by Dr. (Mrs.) Manju Mehta. The scale contains 20 items, these 20 items are distributed among eight factors underlying vocational attitude maturity. These eight factors are as under:

1. Vocational aspiration level
2. Influence and money in job choice
3. Altruism and passivity in job choice
4. Lack of job awareness and chance in job performance
5. Indecisiveness in vocational choice
6. Vocational understanding
7. Lack of independence
8. Chance factor in vocational choice

The scale is a self-administrating scale. It can be administered on individuals and groups. There is no time limit for the scale but it can be easily completed in 10 minutes.
**Scoring:** one score is awarded to the subject for each item on which his response agree with the response expected from a vocational mature subject. Other wise a zero is given to the subject.

<table>
<thead>
<tr>
<th>Category</th>
<th>Vocational Maturity Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocationally Mature (VM)</td>
<td>12-20</td>
</tr>
<tr>
<td>Vocationally Immature (VI)</td>
<td>0-11</td>
</tr>
</tbody>
</table>

**Reliability:** Reliability of the scale was determined by Kuder Richardson formula. The reliability coefficient comes out to be 0.89, which is very high.

**Validity:** To find out the validity of the scale, tetracoric between the total scores on 20 selected items and total scores on 100 items pool of preliminary draft was calculated, which is .0875.

**Norms:** Percentiles norms are developed on the basis of data obtained. The raw scores are converted into percentile scores with the help of given table.

2. **SELF CONCEPT QUESTIONNAIRE BY DR. RAJ KUMAR SARASWAT**

The self-concept questionnaire is developed by Dr. Raj Kumar Saraswat. The inventory contains total of 48 items. The inventory provides six different dimensions, which are as follows:

1. Physical
2. Social
3. Temperamental
4. Educational
5. Moral
6. Intellectual
The code A, B, C, D, E, and F are given to these dimensions in same serial order. Each dimension contains 8 items. Five alternatives are given for each item. There is no time limit by it can be easily completed in 20 minutes.

**Scoring:** There are five alternatives for each item. The alternatives are arranged in such away that the scoring system for all the items remain the same i.e. 5,4,3,2,1 whether the items are positive or negative. The first alterative is given 5 marks, second one 4, third 3, fourth 2 and the last one is given 1 mark if a tick is marked on them.

**Reliability:** Reliability of the inventory is found by test retest method and it as found to be 0.91 for the total self-concept measure. Reliability coefficient for various dimensions varies 0.67 to 0.88 as shown in table given below:

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Dimension</th>
<th>Reliability Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Physical</td>
<td>0.77</td>
</tr>
<tr>
<td>B</td>
<td>Social</td>
<td>0.83</td>
</tr>
<tr>
<td>C</td>
<td>Temperamental</td>
<td>0.79</td>
</tr>
<tr>
<td>D</td>
<td>Educational</td>
<td>0.88</td>
</tr>
<tr>
<td>E</td>
<td>Moral</td>
<td>0.67</td>
</tr>
<tr>
<td>F</td>
<td>Intellectual</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>Total self concept</td>
<td>0.91</td>
</tr>
</tbody>
</table>

**Validity:** Expert’s opinions have been obtained to establish the validity of the inventory. The content and construct validity were established for the inventory.

**Norms:** the sum total of all the dimensions gives the total self concept score. The score is classified into five categories. The interpretation and classification of raw score for all the dimensions and total score is given as below:

<table>
<thead>
<tr>
<th>Total Self Concept score</th>
<th>Interpretation (category)</th>
</tr>
</thead>
</table>

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3. OCCUPATIONAL ASPIRATION SCALE (OAS) BY DR. J.S. GREWAL

The OAS scale is prepared by Dr. J. S. Grewal. The OAS can be administrated in a group testing situation. The eight items are prefaced by asset of written instructions, which the tester reads over group at the time of beginning of the test period.

**Scoring** - All the eight items are scored in the same way. There are ten alternatives for each item. Only one alternative may be checked. The scores for each alternative are as follows:

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>
The total score is the sum of the scores for each of the eight items.

<table>
<thead>
<tr>
<th>Occupational Aspiration Scale</th>
<th>Interpretation (category)</th>
</tr>
</thead>
<tbody>
<tr>
<td>48-80</td>
<td>High Occupational Aspiration (HOA)</td>
</tr>
<tr>
<td>47 and below</td>
<td>Low Occupational Aspiration (LOA)</td>
</tr>
</tbody>
</table>

**Reliability:** Coefficient of stability as determined by test retest method was found to be 0.84. The test was further divided into two parallel halves for assessing the internal consistency. The coefficient of internal consistency between the two halves was found to be 0.54.

**Validity:** The OAS has been validated against Haller and Miller Occupational aspiration scale. The coefficient of validity was found to be 0.75.

**Norms:** The raw scores may be converted in to standard of T-scores depending upon the purpose of the study.

4. **FAMILY ENVIRONMENT SCALE (FES) BY DR. HARPRET BHATIA AND DR. N. K. CHADHA**

   This Family Environment Scale is based on the family environment scale by Moos (1974). The scale is divided into sub scales and dimensions as follows

   - **Relationship dimensions**
     1. Cohesion
     2. Expressiveness
     3. Conflict
     4. Acceptance and caring

   - **Personal growth dimensions**
     1. Independence
     2. Active recreational orientation

   - **System maintenance dimensions**
     1. Organization
     2. Control
### Family Environment Scale

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Interpretation (category)</th>
</tr>
</thead>
<tbody>
<tr>
<td>210-345</td>
<td>High Score Group</td>
</tr>
<tr>
<td>158-209</td>
<td>Average Score Group</td>
</tr>
<tr>
<td>157 and below</td>
<td>Low Score Group</td>
</tr>
</tbody>
</table>

**Reliability:** split half reliability was found for the present scale. The reliability coefficient was found to be 0.95.

**Validity:** Both face and content validity was tested by giving the scale to experts to evaluate items.

**Norms:** Specific qualitative norms were prepared for each sub scale and dimension.

**DATA ANALYSIS**

The data thus collected is tabulated as per the need of the study and is analyzed according to the objectives and hypotheses formed. In social research the data analysis involves three major steps, done in this order:

- Cleaning and organizing the data for analysis (Data Preparation)
- Describing the data (Descriptive Statistics)
- Testing Hypotheses and Models (Inferential Statistics)

Data Preparation involves checking or logging the data in; checking the data for accuracy; entering the data into the computer; transforming the data; and developing and documenting a database structure that integrates the various measures. Descriptive Statistics are used to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data. With
descriptive statistics we simply describing what is, what the data shows. Inferential
Statistics investigate questions and hypotheses.

The description of statistical techniques for present study are as given below:

1. **Mean** - Mean is the "standard" average. It is a method to derive the central
tendency of a sample space. It is calculated by

   \[ \bar{x} = \frac{1}{n} \cdot \sum_{i=1}^{n} x_i \]

   where \( n \) = total sample

   \( x_i \) summation of all the values.

2. **Standard Deviation** -

   Standard deviation is a widely used measurement of variability or diversity used
in statistics and probability theory. It shows how much variation or 'dispersion' there is
from the 'average' (mean, or expected/budgeted value). A low standard deviation
indicates that the data points tend to be very close to the mean, whereas high standard
deviation indicates that the data is spread out over a large range of values.

   In the case where \( X \) takes random values from a finite data set \( x_1, x_2, \ldots, x_N \), with each
value having the same probability, the standard deviation is

   \[ \sigma = \sqrt{\frac{1}{N} \left[ (x_1 - \mu)^2 + (x_2 - \mu)^2 + \cdots + (x_N - \mu)^2 \right]}, \]

or, using summation notation,

   \[ \sigma = \sqrt{\frac{1}{N} \sum_{i=1}^{N} (x_i - \mu)^2}. \]

\( \mu \) = mean value
3. **t-test** - Student's t-test is a test which can indicate whether the null hypothesis is correct or not. In research it is often used to test differences between two groups and is used to test differences between two means.

4. **3 way ANOVA** - When there are more than two means, it is possible to compare each mean with each other mean using many t-tests. Then ANOVA is used.

   There are four basic assumptions used in ANOVA.
   
   - the expected values of the errors are zero
   - the variances of all errors are equal to each other
   - the errors are independent
   - they are normally distributed

   3-way ANOVA is used to compare the mean of three samples

5. **4 way ANOVA** - It is used to compare the mean of four samples.

6. **Karl Pearson’s Coefficient of Correlation** - Pearson Product-Moment Correlation is one of the measures of correlation which quantifies the strength as well as direction of such relationship. It is usually denoted by Greek letter ρ. The coefficient (ρ) is computed as the ratio of covariance between the variables to the product of their standard deviation.

   In the study of relationships, two variables are said to be correlated if change in one variable is accompanied by change in the other – either in the same or reverse direction