# Chapter 3

# Research Methodology

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# RESEARCH METHODOLOGY

## 3.1 Introduction

The theoretical background of the study is presented along with the significance, objectives and hypotheses in chapter 1. A review of related literature along with research findings and rationale of the study is written in the previous chapter. The present chapter is devoted to the description of the methodology given in the present study. In this chapter, the discussion will be in detail about the variables, population, sample, tool used for collecting the data, steps for tool construction, the procedure of the data collection, and statistical techniques used for the given study.

## 3.2 Research Method

The research method is basically supervising the research in a specific manner so that the problem can be solved effectively and efficiently. It is a format through which the investigator is aware of how to proceed with the research problem and arrive at the result. It includes the entire process that is involved in the research part from the initial process of planning, execution, drawing interpretations and promulgating the results.

The present study is basically quantitative and results are obtained. It is designed and carried out on the lines of the survey under descriptive methodology. The main agenda is to describe the relationship that exists and in between the variables.

## 3.3 Research Design

The research design is done for the purpose of the following conditions

1. Collection and analyzing the data in a manner that aims to merge it in a proper manner.
2. It is a decision-making process as the plan of action is prepared by the investigator before taking over any study.
3. It is an arrangement of the conditions for collecting and analyzing data in a well-organized manner.

4. It is a conceptual framework within which the research is conducted and it constitutes the blueprint for the collection, measurement and analyzing data in a meaningful and structured way.

5. It enables the investigator to save a great deal of time, resources and labor.

The main aim in the present study is related to academic achievement and self efficacy and inter-relationship between them.

## 3.4 Variables in the Study

Variables are basically the periphery in the research part. It is basically the entity that can take any value and can vary. The dependent variable is the factor that is measured to determine the effect of the independent variable. It is on which the research is being studied. A dependent variable is one on which an investigator makes a prediction on. Here in this, academic achievement is taken as a dependent variable and self-efficacy is taken as an independent variable. Gender is taken as a demographic variable.
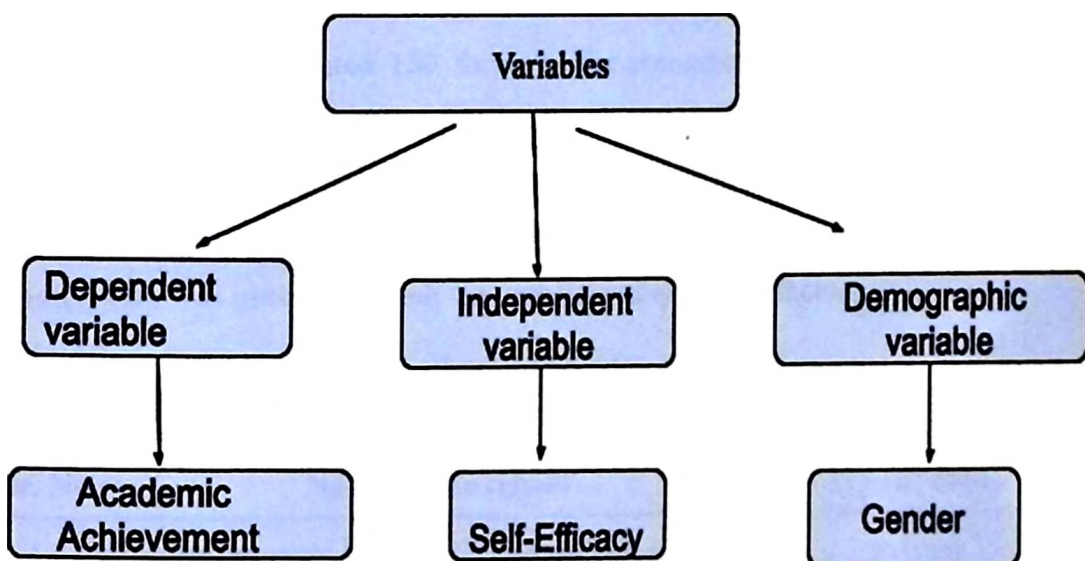


*Figure 3.1*: Showing schema of variables

## 3.5 Population

It is a group of individuals that share common characteristics which distinguish them from other groups. In the present study, the population comprises of class 10th of the New Delhi region.

## 3.6 Sample

Data collection is essentially an important part of the research process so that the hypotheses tentatively held may be identified, rejected, or not rejected and inferences

are made. For the data collection process, the investigator needs to take the sample from the population. The process of obtaining information about the entire population by examining only a part of it is referred to as sampling. The sample of the research is taken from both private and government schools located in East Delhi region. For the data collection, the investigator has listed schools of both types. In total data of 106 students were collected.

**Table 3.1**

*Description of students from type of schools*

| Sr. No. | Types of Schools | Number of students |
|---------|------------------|--------------------|
| 1. | Private | 68 |
| 2. | Government | 38 |

## 3.7 Response Rate

The investigator distributed 150 forms to the secondary school students and in the final sorting, only 106 were selected as many respondents did not fill the forms carefully. Some returned it with incomplete questionnaires, did not fill in the demographic information, etc. Hence those forms were rejected. In this way, 71% response rate was obtained which was considered quite satisfactory.

**Table 3.2**

*Description of sample according to name and type of school*

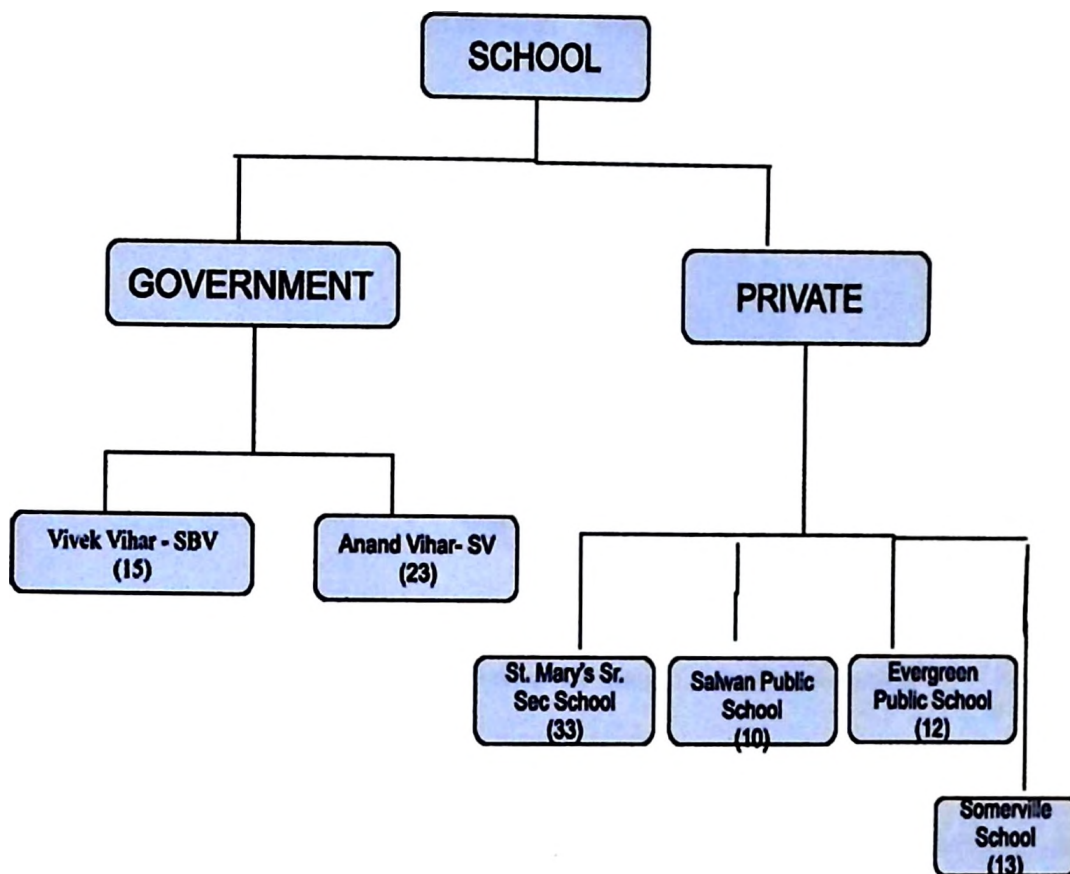| Sr. No. | Name of the school | Type of school |
|---------|--------------------|-----------------|
| 1. | St. Mary's Senior Secondary School | Private |
| 2. | Salwan Public School | Private |
| 3. | Evergreen Public School | Private |
| 4. | Somerville School | Private |
| 5. | Vivek Vihar-SBV | Government |
| 6. | Anand Vihar-SV | Government |

*Figure 3.2 : Schema of types of schools*

**Table 3.3**

*Distribution of sample on the basis of gender*

| Gender | Number of Students | Percentage |
|--------|--------------------|-----------|
| Male | 57 | 53.77 % = 54% |
| Female | 49 | 46.23 % = 46% |
| Total | 106 | 100% |

The perusal of the above table shows that out of 106 secondary students, there are 57 (54%) male students and 49 (46%) female students. Figure 3.2 represents the distribution of the sample according to gender.
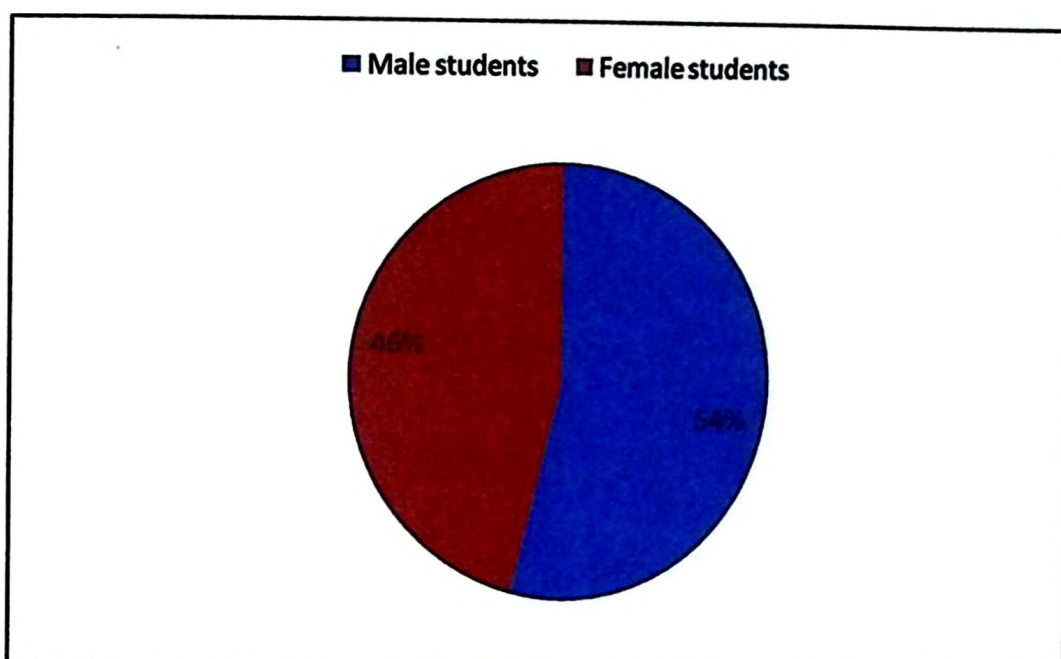
*Figure 3.3:* **Distribution of the sample according to gender**

### 3.8 Tool Used

In research, data gathering tools are called research tools. The advantage and importance of research are totally dependent on the relevance of the tools used to extract the information from the sample population. The tool should be relevant, reliable and valid.

As the study deals with self-efficacy in relation to academic achievement of secondary school students. The tool for the present research was-

1. **Self-efficacy scale (SES-SANS)** developed by Singh and Narain (2014). This scale is a scale of 20 items divided into 4 dimensions.

2. **Academic Achievement** is taken as final marks obtained by the students studying in class X in the previous class,i.e class IX in the session 2021-2022.

**Self-Efficacy scale (SES-SANS)**

This scale has been designed for use with 12 years and above the age of individuals. This scale consists of four dimensions which are as follows-

• **Self-confidence** - The faith in oneself and in one's ab free 55ilities to perform a certain work efficiently or arrive at a particular result.

• **Efficacy Expectation** - Believe that the person can successfully produce the behavior needed to generate a certain result. This shows how people will arrive and how long it will take to arrive at a result.

- **Positive Attitude** - A set of ideas and thoughts that is set for good results, focuses on overcoming the problem, and finding the solution to the problem.

- **Outcome expectation** - A person's belief that the particular behavior will direct towards a particular outcome.

The self-efficacy scale consists of 20 items. The scoring of positive items of the self-efficacy scale was done by assigning scores of 5, 4, 3, 2 and 1 for strongly agree, agree, neutral, disagree and strongly disagree. Negative items were scored as 1, 2, 3, 4 and 5 respectively. The details of scoring were given below -

**Table 3.4**

*Number of Positive and Negative Items in the Self-Efficacy Scale*

| Positive Items | Item No. 1, 2, 3, 5, 6, 7, 8, 9, 11, 13, 14, 15, 16, 17, 19 and 20 |
|---|---|
| Negative Items | Item No. 4, 10, 12, 18 |

### 3.8.1 Reliability

The test re-test reliability was calculated and was found to be 0.82 and the split-half reliability was found to be 0.74. All reliability coefficients were significant at the 0.01 level of significance.

### 3.8.2 Validity

SE scale was validated against the General Perceived Self-Efficacy Scale developed originally in German by Jerusalem and Schwarzer and adapted by Sud in Hindi (1981) as cited in Singh and Narain (2014). The concurrent validity was 0.92 which was significant.

### 3.9 Data Collection Procedure

Data were collected from secondary school students using the self-efficacy scale. The investigator collected all the data individually via google forms. Samples were requested to answer each statement freely without hesitation and ensured confidentiality of their responses. Before data collection, information was shared to all the samples about the study and its purpose of it. The respondents were requested to give honest responses. The respondents were also assured that the data provided by them will be kept entirely confidential and will be used for research purposes only. The investigator tried her level best to make the process of data collection easy,

convenient, and stress-free for secondary school students. The scales were filled by the students themselves. The data of academic achievement were the marks obtained by the students in grade 9.

## 3.10 Analysis of Data

After administering the data, the next stride was to analyze the information so obtained from the samples. For the analyzing part, quantitative data in accordance with the nature of the variables were put into work in the study. The data were analyzed with the help of Pearson product moment correlation and Independent sample t-test. A brief description of the statistical techniques is as follows-

## 3.10.1 Inferential Statistics

Inferential statistics are used to describe and make inferences about the population. Inferential statistics is employed when generalizations from samples to populations are made (Sekaran, 2003; Huck, 2004). It includes testing of the hypotheses by using suitable statistical tests. A brief description of the inferential statistical techniques:

## 3.10.2 Pearson Product Moment Correlation

The investigator used Pearson product moment correlation to analyze the relationship between the variables in the present study as all the variables involved in the present study were continuous and measured on an interval scale. The formula for calculating the coefficient of correlation from obtained scores of variables is as follows -

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

Where,

n = Number of scores

$\sum x$ = Sum of x scores

$\sum y$ = Sum of y scores

$\sum xy$ = Sum of the product of x and y scores

$\sum x^2$ = Sum of squared x scores

$\sum y^2$ = Sum of squared y scores                                    (Garrett, 2009)

### 3.10.3 Independent Sample t-test

The investigator used Independent Sample t-test to analyze mean comparison of two independent groups. The value of t is calculated by the formula given by-

$$t = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\left(\frac{(N_1 - 1)s_1^2 + (N_2 - 1)s_2^2}{N_1 + N_2 - 2}\right)\left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$$

Where,

$\overline{X}_1$=Mean of first sample

$\overline{X}_2$=Mean of second sample

$N_1$=Size of first sample

$N_2$=Size of second sample

$s_1^2$=Standard deviation of first sample

$s_2^2$=Standard deviation of second sample

### 3.11 Effect Size

Effect size refers to the standardized and objective measure which denotes the strength of a relationship between the variables. In other words, it is the standardized quantitative measure of the magnitude of the observed effect (Field, 2009).

### 3.11.1 Effect Size for the Pearson Product Moment Correlation

The effect size for correlation between variables was mentioned to estimate the magnitude or size of the correlation. Cohen's effect size measure was used in the context of Pearson's product moment correlation, table 3.4 shows descriptors for magnitudes by Cohen (1988).

Table 3.5

*Level of Effect Size for r*

| Sr. No. | Effect Size | r |
|---|---|---|
| 1 | Small | 0.10 |
| 2 | Medium | 0.30 |
| 3 | Large | 0.50 |

### 3.12 Computation of Data

A comprehensive data sheet was prepared along with proper coding of the variables including demographic variables also. The data was fed in the SPSS worksheet with the utmost care and cross-verified. SPSS 21 was used to do the analysis of the research. All the necessary commands and inputs were given for calculations.