3.0 STATEMENT OF THE PROBLEM

In 2012, The Asian Age Daily Dated Feb 25, 2012 reported that only 17% of the engineering students graduating were employable. This was based on feedback collected from 55,000 students by a Training and Assessment company Aspiring Minds. The Ministry of HRD, Government of India also stressed on the gap between academia and industry based on the report and said by 2022 India need to have 5million employable graduates to meet the then industry requirements.

With 60-70% being first generation graduates and majority of the jobs being generated in service sectors, communication skill, leadership skills and stress management have become key determinants in recruitment process. Most of the engineering colleges do not prepare these students to become employable.

Its need has arisen as students have no clear directions, with only a hand full of colleges offering placement and the huge number of engineers graduating every year has only created a cut-throat competition. Students need for repaying their financial assistance within stipulated time and the possible branding that happens to them when they miss out on campus recruitment opportunities has made student's life more stressful. Hence the need to understand the efficacy of training programmes offered to the before campus recruitment has become essential.

3.1 HYPOTHESES OF THE STUDY

Based on the literature available in the field of communication skills, leadership styles, and Symptoms of Stress among the engineering students, the investigator has formulated the following Null and Alternate Hypotheses and they are:

1. There is a significant association among the variables of Communication Skills, Leadership Skills and Symptoms of Stress.

2. The Personal Variables of students namely:

   a) Male and female do not differ on the variables of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

   b) Different disciplines of students do not differ on the variables of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

   c) Different religious groups of students do not differ on the variables of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

   d) Different communities of students do not differ on the variables of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

   e) Different nativities of students do not differ on the variables of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

   f) Fathers belonging to different educational status do not differ on the variables of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

   g) Mothers belonging to different educational status do not differ on the variables of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

   h) Fathers belonging to different occupational status do not differ on the variables of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

   i) Mothers belonging to different occupational status do not differ on the variables of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

   j) Students attended no of training programmes do not differ on the variables of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

k) Students of Joint and nuclear Family do not differ on the variables of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

l) Students of Tamil and English medium in school (12th std.) do not differ on the variables of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress

3. Significant effect could be noted on the personal variable of the student on (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

4. The personal variables of the student would be a function of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

5. The personal variables of the students significantly contribute to (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

6. There is no significant difference among the students of Experimental and Control group before the training programme on the measures of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

7. There is a significant difference among the students of experimental group Before and After the training programme on the measures of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

8. There is no significant difference among the students of control group Before and After training programme on the measures of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

9. There is a significant difference among the students of Experiment and Control group after the training programme on the measures of (i) Communication Skills, (ii) Leadership Skills and (iii) Symptoms of Stress.

3.2 RESEARCH DESIGN

Research design help the researcher develop a mental image of the structure for gathering the dataand the analysis that will follow as observed by Asika,(2006). It is the framework for the study used as a guide in collecting and analyzing data,

For the present investigation, the investigator has chosen the Quasi-Experimental Research design. By this method, the students who score low in Communication skills & Leadership skills and high score on Stress symptoms test were being exposed to well-designed Training Programme. Hence, this research design befits into the present study. Our main motive over here is to provide the overall process of Research Methodology.

It is the prime objective of research design to encompass the methodology along with procedure overview which is going to be employed for conducting the scientific analysis. This research chapter is going to deal with the research study of "onion" model which was elaborated and suggested by renowned researchers named Saunders, Lewis and Thornhill (2003). It will cover the complete analysis of methodology, paths and steps to move ahead in research etc. Over all it will be covering the problems or difficulties which come across while moving ahead. Saunders *et al.* (2007, p.83) believed that the fig below mentioned could explain the insight of whole process just by the image representation itself. According to the sources it has been believed that there are approximately around five layers in the whole research design.
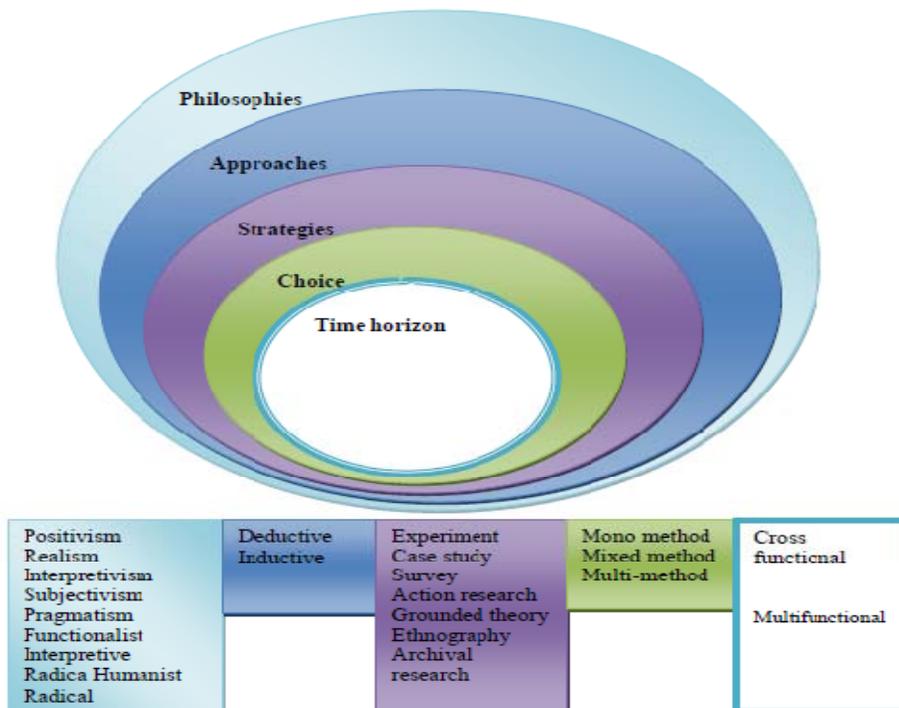

Figure: Research Onion Model

Research Philosophy

To achieve congruent data collection, one needs to incorporate research philosophy in the Research Methodology framework. It is based on different patterns of assumptions, concepts and practices. Many scholars and writers have put forward their views on the paradigm of the philosophy which has shaped the knowledge of development over the years (Alzheimer, 2009). In another manner, it could be described as how do the researchers thinking moves towards the knowledge development. Easterby-Smith, Thorpe and Lowe (2002, p.27) wanted to describe why there is a need of researches to understand the underlying philosophy. For the same he came forward to explain the three reasons. Firstly, they emphasized that the researcher will be able to plan the whole strategy and the overall study criteria. In our daily-life there are many factors which influence the decision of the individual. So before moving forward it's important for researchers to have a clear idea how to proceed further. Secondly, it will help the researcher to analyze on the research methods and will try not to get indulged in any unnecessary work. So, it has been strictly recommended that the individual researcher should be clear about his motive of research. Lastly, the method of research will decide the actual capability of the researcher. As it will analyze whether the researcher is innovative and creative.

According to Saunders *et al*. (2003). There are three major schools of thought which determine the research philosophy. They can be mentioned as under: -

1. Positivism – The position of the positivist is derived from natural science and is characterized through testing the hypothesis which is formulated from the existing theory. Positivism relies upon the truth and validity of the information that are collected through direct observation and experience and evaluates via quantitative methods.
2. Interpretivism – In the social world it is debated the groups and individuals make sense of the situation depends on their individual memories, experience and expectations. This paradigm assists to understand feelings and thinking of individualsand collects data through qualitative analysis

3. Realism- Realist takes aspect of both interpretivist and positivist. Realism understands that social and natural sciences are different with interpretivist position. Similarly, realist is in line with positivist by considering science to be empherical based.

3.3 SAMPLE OF THE STUDY

3.3.1 Population of the Study

The population of the study is a census of all items are subject that possesses the characteristics or that have a knowledge of the phenomenon being studied Asika(2006). Hence, the population of the study comprises of students belonging to a Deemed university in and around the city of Chennai. There are about 2400 candidates who are studying in final year engineering disciplines of IT/ CSE / ECE/ EEE/ Mech.

3.3.2 Sample Selection

a.Determination of Sample Size

A Sample is a part of the population. It is a sub-group of observations from a large population to make inferences about the characteristics of population (Walpole, 1974)

Out of 2400 candidates, approximately 10 % of the population namely 240 candidates had been selected for the sample of the study. Those who score low in communication skills, low in leadership skills and score high on symptoms of stress, were subjected to Experiment and Control group.

In this classification, 160 students fall under Experiment – Control group. A total of 80 students are considered as **"Experimental group"** and the remaining 80 students were considered as **"Control group"**. The experimental groups of students are subjected to the training programme on Communication skill, Leadership skills development and managing their personal and academic Stress.

To make the training progress a successful one, the investigator has given the training programme in a small group namely 20-25 students covering all the 80 students in Experimental group during the leisure hours and also during the weekend / holidays.

Response Rate

A set of questionnaires was distributed to 300 final year engineering students in a deemed university located in Chennai. The below table shows that out of 300 questionnaires distributed only 240 responded for the study and the response rate obtained was 80%

Table-1

Shows the Return rate of the questionnaire

S. No	Description	N(%)
1	Questionnaire handed over in person	300
2	Returned Questionnaire with incomplete	60
3	Completely filled Questionnaire and further taken for the study	240
4	Response rate	80%

Sample Size n $= (ZS/E)^2$

Where,
Z = Standard value corresponding to a confidence level of 95% = 1.96
S = Sample SD from pilot study of 60 samples = 0.39
E = Acceptable Error = 5% = 0.05

Hence, Sample Size n $= (ZS/E)^2$
$= (1.96*0.40/0.05)^2$
$= 233.72$

The minimum sample size based on a 95% confidence interval (z value =1.96) was found to be 233.72. However, Sample size of 240 was taken for the study.

3.3.3. Delphi method

In the present study, the investigator has used Delphi method. According to Simon (2006), the Delphi method is used to structure the group communication so that a panel of expert can deal with a complex problem using a future-oriented view. In the present study, a panel of five experts belonging to academic field was consulted on the objectives of the study and the development of suitable questionnaire. The view from the experts is highly helpful to conduct the pilot study

3.4 PILOT STUDY

A pilot study can be used as a "small scale version or trial run in preparation for a major study" (Polit, Beck &Hungler, 2001, p.467). Baker (1994) noted that "a pilot study is often used to pre-test or try out (pp.182-183) a research instrument. Baker found that a sample size of 10-20% of the sample for the actual study is reasonable number of participants to consider enrolling in a pilot.According to Saunders et al.(2007) the pilot study will be performed at the end of the exploratory phase and the questionnaire must be subjected to pilot study ahead of the data collection to the population, and this is done to make sure if there exist any disparities for the respondent to answer the questionnaire.

The pilot study was conducted among 25% (N=60) of the total sample (N=240) in the study. The students were administered with a)Communication Skills, b)Leadership Skill questionnaire and Symptoms of Stress Check-List during the pilot study.

3.5TOOLS USED

3.5.1 Personal Data Sheet

For the purpose of the study, the investigator has prepared the personal data sheet. It consists of personal information of the students namely: Name, Gender, Age, Discipline/Branch, Year of Study, Religion, Community, Nativity, parental Education, Type of family, No. of training programmes attended, and Medium of study in 12th std.

Questionnaires Used

The set of questionnaires is used to measure are a) Communication Skills b) Leadership Skills and c) Symptoms of Stress and the details of the questionnaire: are given below.

3.5.2 Communications Skills Questionnaire: Description

Communication Skills Questionnaire is emerged out of exhaustive survey of literature and opinions sought from specialists namely: Academicians, Educators, trainers and Consultants. It is an 18-items Questionnaire with 5- point Likert's rating scale from the response of "Strongly Agree to "Strongly Disagree". The raw score of 5 to 1 was given accordingly

Reliability and Validity

In the initial stage of research and during the pilot study, the reliability of communication skill questionnaire was done by using Cronbach's Alpha and the reliability was found to be 0.79 which was significantly high. Hence, the questionnaire is highly suitable for the study.

Both Face and Content validity were established. Face validity was done by the investigator himself with the consultation of the supervisor and content validity was done by expert in the field of investigation.

3.5.3.Leadership Skills Questionnaire: Description:

35 items of leadership skill Questionnaire are emerged out of an exhaustive survey of literature, analyzing the other questionnaire and opinion sought from specialist namely: Academicians, Educators, trainers and Consultants. The response type of questionnaire is 'Yes' or 'No'. The raw score of '1' and '0' were given in the screening system.

Reliability and Validity

Using Cornbach's Alpha, the reliability was fond to be 0.81which was significantly high. Hence, the questionnaire is highly suitable to proceed to main study. Both Face and Content validity were established.

Face validity was done by the investigator himself with the consultation of the supervisor and content validity was done by expert in the field of investigation.

3.5.4 Symptoms of Stress Check List: Description:

The 40-items of Stress Symptoms Check-list was originally developed by Rajendran (2005) and it contains both physical symptoms (29-items) and psychological symptoms (11-items). It is a 5point Likert's rating scale starts from the response of "not at all" to "Always". The raw score of"0" to "4" was given accordingly.

Reliability and Validity

The original Check-list was given to the sample during the pilot study and using the Cornbach's Alpha, the reliability was found to be 0.83which is significantly high and useful in the main study.Both Face and Content validity were established.

Face validity was done by the investigator himself with the consultation of the supervisor and Content validity was done by expert in the field of investigation.

3.6 MAIN STUDY

The main study was conducted soon after the result of the pilot study was obtained. The necessary modifications were done in the questionnaires. Further, the investigator approached a deemed university in Chennai. There are about 2400 candidates studying final year IT / CSE/ ECE /EEE / EEE & Mechanical engineering. Out of 2400 candidates, approximately 10 % of the population namely 240 candidates have been selected for the sample of the study. Those who score low in communication skills, low in leadership skills and score high on symptoms of stress, were subjected to **"Experiment" and "Control group"**.

In this classification, 160 students fall under Experiment – Control group. A total of 80 students are considered as **"Experimental group"** and the remaining 80 students were considered as **"Control group"**. The Experimental groups of students were given well designed training programme based on their needs, identified in their questionnaires and check list.

Details of the Training Programmes:

a) **Communication Skills:**

i) Lecture on the identification of Need for Communication Skills to Students.

ii) Group Activity on Verbal and Non-Verbal Communication.

iii) Exercise on: One-way Communication, Two-Way Communication, Distorted Communication, Sign Language, Body Language etc.,

iv) Role play on personality types and communication styles.

b) **Leadership Skills:**

i) Lecture on Need for leadership Skills to Students.

ii) Lecture on Characteristics of good Leaders, personality of leaders

iii) Group Discussion

iv) Group Exercise on Team Building

c) **Managing Stress:**

i) Lecture on Signs and Symptoms of Stress

ii) Lecture on Body reactions during stress

iii) Group Discussions

iv) Group Exercise

v) Training in "Relaxation Therapy" by experts

3.7 STATISTICAL ANALYSIS

The collected data from the study sample (N=240) were subjected to the following Statistical Analysis.

S. No	Statistical Analysis	Description
1	**Mean and S.D**	Used to categorize as low and high on Communication Skill, Leadership Skills and Symptoms of Stress.
2	**Percentage Analysis**	Used to categorize the number of samples fall in different responses (item wise)
3	**Correlation Co-efficient**	Used to find out the association of Communication Skills, Leadership Skill and Symptoms of Stress.
4	**'t' – test**	Used to find out the significance of mean difference among personal variables on independent variable
5.	**One way ANOVA**	Used to find out the significance of mean difference among personal variables with independent variables.
6.	**Multivariate Analysis**	Used to find out the significant effect of independent variables on the personal variables.
	(a) Multiple Regression	Used to find out the contribution of independent variables.
	(b)Stepwise Multiple regression	Used to find out the selection of certain personal variables that explains the greatest amount of variations in the independent variables.

3.8 DESCRIPTION OF STATISTICAL ANALYSIS

1. Mean

Mean also known as arithmetic average, is the most common measure of central tendency and defined as the value, which we get by dividing the total of the values of various given items in a series by the total number of items. It can be worked out as follows,

$$\bar{X} = \frac{\sum X_i}{n} \qquad = \frac{X1 + X2 + \ldots\ldots + Xn}{n}$$

Where (X) = the symbol used for mean

$\sum$ = symbol of summation

Xi = value of the item, I = 1,2………, n

N = total number of items.

2. Percentage Analysis

Percentage method refers to a specified kind which is used in making comparison between two or more series of data. Percentages are based on descriptive relationship. It compares the relative items. Since the percentage reduces everything to a common base and thereby allow meaning comparison.

$$\text{Percentage} = \frac{\text{Number of respondents x 100}}{\text{Total no of respondents}}$$

3. Correlation Co-efficient

The correlation between X and Y is expressed by the correlation coefficient r which can be calculated with the following equation:

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \cdot \sum (y_i - \bar{y})^2}}$$

where x_i = data X $\qquad$; x = mean of data X

y_i = data Y $\qquad$; y = mean of data Y

It can be shown that r can vary from 1 to -1:

r = 1 perfect positive linear correlation

r = 0 no linear correlation (maybe other correlation)

r = -1 perfect negative linear correlation

4. t – test

The t- test assesses whether the means of two groups are statistically different. An inferential statistic is used to evaluate the reliability of a difference between two means. Versions exist for between – subjects and within – subjects design and for evaluating a difference between a sample mean and a population mean from each other. When comparing two sets of data, equation is written as:

$$t_{cal} = \frac{\left| \bar{x}_1 - \bar{x}_2 \right|}{s_p} \cdot \sqrt{\frac{n_1 n_2}{n_1 + n_2}}$$

Where $\bar{x}_1$ = mean of data set 1

$\bar{x}_2$ = mean of data set 2

s_p = "pooled" standard deviation of the sets

n_1 = number of data in set 1

n_2 = number of data in set 2.

5. Analysis of Variance (ANOVA)

The ANOVA test can be evaluated the significance of the difference between the means of more than two categories. But when the comparison among three or more categories or more categories or samples has to be made simultaneously, the use of t- test is not only tedious, but also increases the probability of making type I error. To overcome this difficulty, a method known as the Analysis of variance (ANOVA) has been developed. The ANOVA is designed to test whether a significant difference exists among three or more sample means. In this analysis, the total variance in a set of data is divided into variation within groups, and variation between – groups. The ANOVA technique is based on the concept of sum of squared deviations from a mean. Corresponding to the total variance and its two components, we have the total sum of squares (SST), between – groups sum of squares (SSb), and within groups sum of squares (SSw).

The within groups of squares (SSw) is obtained by combining the sum of squares (i.e. the square deviation of every raw score from its sample mean). The formula used is:

$Sw = Ed21 + Ed22 + Ed24 + \ldots Ed2n \ldots \ldots$

Where d = a deviation of every raw score of a category from its sample mean. The between – group sum of squares (SSb) is obtained as under: calculate the difference between each sample mean and the total mean square. This difference is multiplied by the sample size in the concerned category, and adds this quantity. The formula is:

$SSb = E[x - x1) 2xn;$ where x = any sample mean

The degree of freedom is obtained by:

Dfb   =   k-1;

Dfw   =   nt-k

Where K   =   the number of samples

Nt   =   the total number of scores in all sample combined.

The F ratio: the analysis of variance yields a F ratio, which is a ratio between groups variation, and within group variation. The F ratio indicates the size of the difference between groups relative to the size of the variation within each group. Having obtained the F ratio, we must now determine whether it is larger enough to reject the null hypothesis. If the calculated F ratio is larger than the corresponding table value, the null hypothesis is rejected and the research hypothesis is accepted. If the calculated F ratio is less than the table value, the null hypothesis is accepted.

6(a). Multiple Regression Analysis

Multiple Regression Analysis is a powerful technique used for predicting the unknown value of a variable from the known value of two or more variables- also called the predictors. It helps to predict the value of Y for given values of X_1, X_2, ..., X_k.

The variable whose value is to be predicted is known as the dependent variable and the ones whose known values are used for prediction are known as independent (exploratory) variables. In general, the multiple regression equation of Y on X_1, X_2, ..., X_k is given by:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + \dots\dots\dots\dots\dots + b_k X_k$$

b_0 is the intercept and b_1, b_2, b_3, ..., b_k are analogous to the slope in linear regression equation and are also called regression coefficients. They can be interpreted the same way as slope

6(b) Stepwise Multiple Regression Analysis

Stepwise regression includes regression models in which the choice of predictive variables is carried out by an automatic procedure. It is used when there is a need to predict the value of a variable based on the value of two or more other variables. The variable that we want to predict is called the dependent variable (or sometimes the outcome, target or criterion variable)