Chapter-3
Plan and Procedure

3.1 INTRODUCTION

It is necessary to organize each phase of research before beginning the actual one, and it is even necessary to understand the meaning of research. The word research is used in the context of ‘Scientific Research’. J. W. writes, “research is the in depth and organized accumulation of scientific method of analysis.” Further West writes that, “a person can be scientific without even having done the actual research but, no person can do research without being scientific.” For this, it is necessary to understand the English word ‘research’.

The word ‘research’ has been derived from the French word ‘recherche’ which means “to look”, “to see”, “to investigate” etc. The word ‘research’ in English is made up of two words: re + search, which means ‘to find again’, ‘to search again’ or ‘to investigate about something’. The meaning of ‘research’ is frequently adjoined with ‘search / investigation’. That is why it is said that, “to research is to search again.” Many scientists have provided the definitions of scientific research.(82)

“Research is an orderly reflexive and pure technique in which special equipment, appliances and procedures are applied to find out the solution to some problem.” –Kafford(82)

“Research is an organized method which is used to find out new facts or to ensure the old facts and it is also used to study the correlations deciding these facts, sequences, reasonable explanations and natural laws.”

P. V. Jung
In all these chapters, the meaning of research is the same as stated earlier, that of searching out something again. A matter is already researched and a researcher again tries to find out something new from the same matter is called 'research'. Scientifically, research is an attempt to understand a phenomenon in a scientific and objective manner. The scope of research is very broad. After choosing the research area, the researcher tries to define the design of the research process to solve the problem of study, which means that a researcher prepares a conceptive framework, upon which the pattern of research is prepared and it controls the whole research. In the process of research, many matters are...
reciprocally effective to each other which rather than following any order mingles into each other and affects. These activities are interdependent. The first step of research, generally, decides the last step and the form of research. Thus, a researcher should initially decide what facts and information are to be collected to progress further. (82)

P. V. Jung calls it the primary need of any scientific research. So, it is necessary for a researcher to plan the research. In other words, research planning is a logical and composite tool to guide the whole research. (82)

As it is necessary for an engineer to organize the whole beginning to end planning of building the same is necessary for a researcher. A researcher organizes the research plan from the beginning. Research planning is the cornerstone of research so it necessary that the planning should be accurate. Before beginning any research for the proposed problems, it is necessary to plan it accordingly. If a research is begun without the panning it is liable to cause complexities and so one cannot reach to the final outcome of their proposed objective. While planning the research, it is necessary to think over each and every minor part of the research. The more a researcher is careful about planning the research, the more his/her research is trustworthy and appropriate. (82)

3.2 WHAT IS A ‘HYPOTHESIS’?

Before beginning the actual study, the researcher assumes some kind of outcomes of the research. Normally, this assuming is known as the ‘hypotheses’. For example, suppose that a researcher wants to study about the effect of the education level on the beliefs and superstitions of a person. Before the actual study/research, a researcher can assume that the superstitious beliefs found in the educated people are less than the people who are little educated. This assumed statement would be called the hypotheses. (83)
Different psychologists have given different kinds of definitions of the hypotheses. They are as follows:

(1) “A hypothesis is an assumed statement about the relationship between two or more variables.” (83)
- Karlinger (2000)

(2) “A hypothesis is an experimental statement about the possible relationship between two or more variables.” (83)
- Macguigan (1969)

(3) “A hypothesis is a kind of presumption which works as a temporary explanation. If we look from another perspective, then the hypothesis is a ‘question’; which is answered by the series of experiments and observations.”
- Chaplin (1975)

(4) “A hypothesis is a kind of statement, a proposal or a presumption which works to explain some truths temporarily.”
- Rebar (1987)

With the analysis of the above definitions of hypothesis, the following points can be concluded about the form of it:

(1) A hypothesis is an assumed proposal, assumption or a statement which is erected before the beginning of the actual study.

(2) A hypothesis is a kind of statement or a proposal in which the relationship between two or more variables is mentioned.

(3) Assumed statement or the proposal is based on the observation of routine life or on the studies conducted before.
(4) Assumed hypothetical statements are tested on the basis of empirical studies. A hypothesis is an unstable or a temporary statement which after the testing becomes stable or permanent.

(5) A hypothesis is accepted or rejected after the testing. When an assumed hypothetical statement proves to be untrue it is rejected.(83)

Hypotheses are of two types: Null Hypothesis and Alternative Hypothesis. With reference to the present research, the following Null Hypotheses were created:

1) There will not be any significant difference found in the mean score of emotional maturity and the student’s standard of education
2) There will not be any significant difference found in the mean score of emotional maturity and to the place of residence of the students,
3) There will not be any significant difference found in the mean score of emotional maturity and the sex of the students.
4) There exist no correlation found between the student’s standard of education and the place of residence and the score of emotional maturity.
5) There exist no correlation found between the student’s sex and the place of residence and the score of emotional maturity.
6) There exist no correlation found between the student’s sex and the standard of education and the score of emotional maturity.
7) There exist no correlation found between the student’s sex, the place of residence and the standard of education and the score of emotional maturity.
8) There will not be any significant difference found in the mean score of emotional maturity and age of the student.
9) There will not be any significant difference found in the mean score of emotional maturity and the type of family of the student.
10) There will not be any significant difference found in the mean score of emotional maturity and the stream of education of the student.
11) There will not be any significant difference found in the mean score of emotional maturity and the education of the student’s mother.

12) There will not be any significant difference found in the mean score of emotional maturity and the education of the student’s father.

13) There will not be any significant difference found in the mean score of emotional maturity and the occupation of student’s mother.

14) There will not be any significant difference found in the mean score of emotional maturity and the occupation of student’s father.

15) There will not be any significant difference found in the mean score of mental health and the student’s standard of education.

16) There will not be any significant difference found in the mean score of mental health and the student’s place of residence.

17) There will not be any significant difference found in the mean score of mental health and the student’s sex.

18) There exist no correlation found between student’s standard of education and the place of residence and the score of mental health.

19) There exist no correlation found between the student’s sex and the place of residence and the mean score of mental health.

20) There exist no correlation found between the student’s sex and the standard of education and the score of mental health.

21) There exist no correlation found between the student’s sex, the place of residence and the standard of education and the score of mental health.

22) There will not be any significant difference found in the score of mental health and the age of the student.

23) There will not be any significant difference found in the score of mental health and the family of the student.

24) There will not be any significant difference found in the score of mental health and the stream of education of the student.

25) There will not be any significant difference found in the score of mental health and the education of the student’s mother.

26) There will not be any significant difference found in the score of mental health and the education of the student’s father.
27) There will not be any significant difference found in the score of mental health and the occupation of student’s mother.
28) There will not be any significant difference found in the score of mental health and the occupation of student’s father.
29) There will not be any significant difference found in the score of adjustment and the student’s standard of education.
30) There will not be any significant difference found in the score of adjustment and the student’s place of residence.
31) There will not be any significant difference found in the score of adjustment and the student’s sex.
32) There exist no correlation found between the student’s standard of education and the place of residence and the score of adjustment.
33) There exist no correlation found between the student’s sex and the place of residence and the score of adjustment.
34) There exist no correlation found between the student’s sex and the standard of education and the score of adjustment.
35) There exist no correlation found between the student’s sex, the place of residence and the standard of education and the score of adjustment.
36) There will not be any significant difference found in the score of adjustment and the age of the student.
37) There will not be any significant difference found in the score of adjustment and the family of the student.
38) There will not be any significant difference found in the score of adjustment and the stream of education of the student.
39) There will not be any significant difference found in the score of adjustment and the education of the student’s mother.
40) There will not be any significant difference found in the score of mental health and the education of the student’s father.
41) There will not be any significant difference found in the score of adjustment and the occupation of student’s mother.
42) There will not be any significant difference found in the score of adjustment and the occupation of student’s father.
43) There will not be significant correlation found in between the score of emotional maturity and mental health.

44) There will not be significant correlation found in between the score of mental health and adjustment.

45) There will not be significant correlations found in between the score of emotional maturity and adjustment.

46) There will not be significant correlations found in between the score of student’s emotional maturity and mental health when the score of adjustment is static.

47) There will not be significant correlations found in between the score of student’s mental health and adjustment when the score of emotional maturity is static.

48) There will not be significant correlations found in between the score of student’s emotional maturity and adjustment when the score of mental health is static.

3.3 THE PLANNING OF RESEARCH

In the Sociological research, the planning of research is very important. As it is necessary to plan a blue print of a house before actually beginning to build it, it is necessary to orderly organize the research. The research planning is the cornerstone of the whole research. Before beginning a research it is required to accordingly plan the research process so that the objectives can be reached to its fulfillment and also it is advisable to think over the includable independent variables, the levels of the variables, the methods to be used to control the outer variables and also the objectives, samples, sample selection, variables, tools of ingathering the information, their authenticity, accuracy, and the selection of the statistical method etc. The more a researcher is careful about planning the research, the more his / her research is trustworthy and appropriate.(82)

The research design is very important in sociological research. In Psychology, the research planning is very important because Psychology is an experimental science. The final outcome of any research is always dependent on
the research design. If the design is faulty the outcome of the research is also inaccurate and inappropriate. (82)

The research design informs about the included independent variables, the levels of the variables, the methods used to control the outer variables, how the dependent variables are measured, what type of samples are selected, and how many targets are included in the selected samples. (82)

Moser (1961) writes in his book ‘Survey Methods in Social Investigation’, “Social Research is an organized inquiry or an investigation to get new knowledge about social problems or social happenings.”

The Encyclopedia of Social Science writes, “Social Research organizes the things, signs and objects skillfully. The motive of this is to test and develop the knowledge by generalization, without caring about its usefulness in art or practice.” (82)

According to Mrs. P. V. Yung, “Social Research is a scientific planning. The motive of this is to find out new facts and re-test the old matters and also to analyze the internal relations, logical clarifications, sequences and the natural rules governing them.” (82)

The question here is that can any problem or a matter be chosen as the subject of research? Any matter readies itself as the matter of research whenever a problem or a question does not reach to a conclusive answer and creates tension or when a research does not reach to the proposed outcome it becomes necessary to go for this scientific research. Research is not an easy but complex and organized process. (82)

The definitions of research design are as following:
“Research Design is the planning, strategy and structure of research objected
to find the answers to the research questions and control its dilation.”

Karlinger (2000)

“Research Design is a special and basic planning, structure and strategy of
research which includes in it the distribution of the objectives according to
the level of the independent variables and the process of the independent
variable’s use and the related planning of statistical analysis.”(82)

D. N. Shrivastva (2000)

The following matters are included in the Research Planning:

(1) One should be clear about the source of ingathering the information about
their research topic. One should be clear about the source, whether from the
documents or from the field, for the information.

(2) The object of study should be clearly stated in the research planning.

(3) There should be clear indication of the research being a personal investigation
or the statistical form.

(4) The framework of the study should be thought upon in relation to the social,
cultural and geographic factors.

(5) It should have cleared whether the ‘the whole’ is to be studied or ‘the part of
the whole’.

(6) The sample should be selected scientifically.

(7) One should be clear about the methods to be used to collect the information
the research.

Research design is given the metaphor of ‘A guide to the research’. Research
design is a basic and special planning, strategy and structure of
research.(82)

The object of the present research is to study the ‘emotional maturity’,
‘mental health’, and ‘adjustment’ of the students. For this study, around 800
students of the higher secondary schools and colleges, belonging to the village
and the city area of Surendranagar, were selected as the stratified samples
on the $2 \times 2 \times 2$ factorial design. The basis of their selection was their level of study, the place of their residence and sex. To get the information about their emotional maturity, mental health and adjustment ‘The Emotional Maturity Scale’ prepared by Dr. Mahesh Bhargav and Yashvir Shingh, ‘The Mental Health Inventory’ prepared by Dr. D. J. Bhatt and Gita R. Gida and ‘Revised Adjustment Inventory (RAI)’ prepared by Dr. Pramodkumar etc. were used. The research was divided into following parts based on the statistical calculation of the given information.(77)

PART 1:- The Study of the Emotional Maturity of the Students in relation to their Personal Social Variables:

In Part 1 the value of ‘F’ is found by using the $2 \times 2 \times 2$ factorial design to study the ‘emotional maturity’ of students in relation to the variables of their level of study, their place of residence and sex and their interaction. With the help of this value, the hypotheses 1 to 7 were tested.(77)

Table no. 3.2

The table showing the Independent Variables and their Levels of ‘F’ Test for the ‘Emotional Maturity’ of Students

<table>
<thead>
<tr>
<th>NO.</th>
<th>Independent Variables</th>
<th>The Levels of the Independent Variables</th>
<th>Dependent Variables</th>
</tr>
</thead>
</table>
| 1.  | The Level of Education | (i). The students of Higher Secondary Schools = A1  
                (ii). The Students of Colleges = A2 | The Scores of Emotional Maturity |
| 2.  | The Place of Residence | (i). Village = B1 |                     |
Moreover, to study the ‘emotional maturity’ of the students in relation to their age, the type of family, the stream of education, the education of mother, the education of the father, the occupation of the mother, the occupation of the father, the ‘t’ test was used and by that the hypotheses 8 to 14 were tested. (77)

Table no. 3.3

The Table Showing the Independent Variables and their Levels of ‘t’ Test for the Student’s Emotional Maturity (77).

<table>
<thead>
<tr>
<th>NO.</th>
<th>Independent Variable</th>
<th>The Levels of the Independent Variables</th>
<th>Dependent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Age Of Students</td>
<td>(i). 18 Years or less than that</td>
<td>The Scores of Emotional Maturity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii). 18 Years or Above</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Type of Family</td>
<td>(i). Joint</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii). Separate</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The Stream of Education</td>
<td>(i). General</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii). Science</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mother’s Education</td>
<td>(i). Till Std. 7\textsuperscript{th} or Less than that</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii). Std. 7\textsuperscript{th} or Above</td>
<td></td>
</tr>
</tbody>
</table>
5. Father’s Education
   (i). Till Std. 7th or Less than that
   (ii). Std. 7th or Above

6. Mother’s Occupation
   (i). Housewife
   (ii). Job

7. Father’s Occupation
   (i). Business
   (ii). Job

*PART 2:* The Study of the Mental Health of the Students in relation to their Personal Social Variables:

In Part 2 the value of ‘F’ is found by using the $2 \times 2 \times 2$ factorial design to study the ‘mental health’ of students in relation to the variables of their level of study, their place of residence and sex and their interaction. With the help of this ‘F’ value, the hypotheses 15 to 21 were tested.

*Table no. 3.4*

The table showing the Independent Variables and their Levels of ‘F’ Test for the ‘Mental Health’ of Students

<table>
<thead>
<tr>
<th>NO.</th>
<th>Independent Variables</th>
<th>The Levels of the Independent Variables</th>
<th>Dependent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The Level of Education</td>
<td>(i). The students of Higher Secondary Schools = A1 (ii). The Students of Colleges = A2</td>
<td>The Scores of Mental Health</td>
</tr>
</tbody>
</table>
Moreover, to study the ‘mental health’ of the students in relation to their age, the type of family, the stream of education, the education of mother, the education of the father, the occupation of the mother, the occupation of the father, the ‘t’ test was used and by that the hypotheses 22 to 28 were tested.

Table no. 3.5
The Table Showing the Independent Variables and their Levels of ‘t’ Test for the Student’s Mental Health

<table>
<thead>
<tr>
<th>NO.</th>
<th>Independent Variable</th>
<th>The Levels of the Independent Variables</th>
<th>Dependent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Age Of Students</td>
<td>(i). 18 Years or less than that (ii). 18 Years or Above</td>
<td>The Scores of Mental Health</td>
</tr>
<tr>
<td>2</td>
<td>Type of Family</td>
<td>(i). Joint (ii). Separate</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The Stream of Education</td>
<td>(i). General (ii). Science</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mother’s Education</td>
<td>(i). Till Std. 7th or Less than that (ii). Std. 7th or Above</td>
<td></td>
</tr>
</tbody>
</table>
PART 3:- The Study of the Adjustment of School and College Students in relation to their Personal Social Variables:

In Part 3 the value of ‘F’ is found by using the $2 \times 2 \times 2$ factorial design to study the ‘mental health’ of students in relation to the variables of their level of study, their place of residence and sex and their interaction. With the help of this ‘F’ value, the hypotheses 29 to 35 were tested.

*Table no. 3.6*

The table showing the Independent Variables and their Levels of ‘F’ Test for the ‘Adjustment’ of Students

<table>
<thead>
<tr>
<th>NO.</th>
<th>Independent Variables</th>
<th>The Levels of the Independent Variables</th>
<th>Dependent Variables</th>
</tr>
</thead>
</table>
| 1.  | The Level of Education | (i). The students of Higher Secondary Schools = A1  
       |                       | (ii). The Students of Colleges = A2      | The Scores of Adjustment |
| 2.  | The Place of Residence | (i). Village = B1                       |                     |
Moreover, to study the ‘adjustment’ of the students in relation to their age, the type of family, the stream of education, the education of mother, the education of the father, the occupation of the mother, the occupation of the father, the ‘t’ test was used and by that the hypotheses 36 to 42 were tested.

*Table no. 3.7*

The Table Showing the Independent Variables and their Levels of ‘t’ Test for the Student’s Adjustment

<table>
<thead>
<tr>
<th>NO.</th>
<th>Independent Variable</th>
<th>The Levels of the Independent Variables</th>
<th>Dependent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Age Of Students</td>
<td>(i). 18 Years or less than that</td>
<td>The Scores of Adjustment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii). 18 Years or Above</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Type of Family</td>
<td>(i). Joint</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii). Separate</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The Stream of Education</td>
<td>(i). General</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii). Science</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mother’s Education</td>
<td>(i). Till Std. 7th or Less than that</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii). Std. 7th or Above</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Father’s Education</td>
<td>(i). Till Std. 7th or Less than</td>
<td></td>
</tr>
</tbody>
</table>
PART 4: The Study of the Correlations of the Student’s Emotional Maturity, Mental Health and Adjustment:

Karl Pearson’s ‘r’ method was used to test the type of correlation between the student’s emotional maturity, mental health and adjustment. The hypotheses 43 to 45 were tested on this. The partial correlation between the student’s emotional maturity, mental health and adjustment were also measured. With this, the hypotheses 46 to 48 were tested. (77)

Table no. 3.8

The Table Showing the Correlation and Partial Correlation Counting between the Student’s Emotional Maturity, Mental Health and Adjustment (77)
3.4 THE POPULATION OF THE RESEARCH

In the field of Sociology, Psychology and Education, the information is selected mainly from two sources:

(1) The information related to the research is directly collected from the people.
(2) The information is collected by selecting a sample from the population people and the study over them.

There are two methods of study connected with these two sources of collecting the information:

(1) Parametric Method
(2) Sampling Method

‘Parametric’, is also called the total counting method of investigation. In this method all the units of the whole population are studied. It can be said about the ‘parametric method’ that, when the information is collected to know about the special characteristic of all the units of the whole population of a group, society or community is called the ‘parametric method’.

Mrs. P. V. Young defines the ‘population’ as, “The whole group from which a sample is selected is called the people, population or supply.”

There are mainly two types of the population:

(1) Limited Population:
   The ‘limited population’ is a kind of population whose members can be counted accordingly i.e. the students of secondary schools of Gujarat.
(2) Illimitable Population:

The ‘illimitable population’ is a kind of population whose members cannot be counted accordingly i.e. the number of fish in the river.

Moreover, the population is even divided into the following four parts:

(1) Homogenous Population:

When each unit or every people of the whole population are marked by some specific characteristic is called the ‘homogenous population’.

(2) Heterogeneous Population:

When each unit or every people of the whole population are not marked by some specific characteristic is called the ‘heterogeneous population’.

(2) Actual Population:

When each part and every unit of the whole population is actual and physical existence is called the ‘actual population’.

(3) Hypothetical Population:

When each part and every unit of the whole population is not physically present and only a hypothesis is made about its existence is called the ‘hypothetical population’.

The purpose of the present research is to study the ‘emotional maturity’, ‘mental health’ and adjustment in the students and so the population for the present research is all the students of the schools and colleges of Surendranagar.(82)
3.5 THE SAMPLE OF THE RESEARCH

The information is collected from a large group and then the information is divided and analyzed to find out the purposed outcome. When a researcher does not select the whole group but instead choses a part of the group to research and studies it is called the ‘sampling method’ of research. With this sampling method, the decisions about the whole groups are found out.

The Definition of the Sample:
The definitions of sample are as following:
(i) A sample, as the name suggests, is the small representative of the large group. Good and Hutt (1960)

(ii) A statistical sample is the very small illustration of the whole group. Jung (1966)

(iii) A sample is a part of the whole population and it represents the whole aggregate / population taken for the study. So, the decision based on the sample would be appropriately applicable to the whole group. English and English (1980)

According to the above definitions, a sample is “a small representative of a large group and accurate and appropriate decisions can be concluded for the whole population on the basis of it.” (82)

The Types of the Sample:
The samples used in behavioral research are divided into the following two types:

(i) Probability Sample:
When the probability of entering into the sample of each and every person of population / aggregate is decided is called ‘a probability sample.’
Types:
(a) Random Sample
(b) Stratified Sample
(c) Field Sample

(ii) Non – Probability Sample:

A non – probability sample is a planning of sampling in which the probability of the population / aggregate of entering into the sample is not equal.

Types:
(a) Quota Sample
(b) Accidental Sample
(c) Purposive Sample
(d) Methodological Sample
(e) Convenience Sample

Here, the 800 students were selected as a sample from Surendranagar District’s various schools and colleges, in which 400 students were from the Higher Secondary Schools and another 400 were the College students. In it, 200 students were selected from village area and another 200 were from the city area. In all of them, 100 were girl students and another 100 were boy students. The details of the sample are shown in the tables following:(82)

The division of the sample for the present study is as following:

Table no. 3.9

A table showing the student’s ‘sex’, ‘place of residence’ and ‘level of education’ according to $2 \times 2 \times 2$ factorial design (N = 800)

<table>
<thead>
<tr>
<th></th>
<th>The Students of Higher Secondary Schools</th>
<th>The Students of College</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Village</td>
<td>City</td>
<td>Village</td>
</tr>
</tbody>
</table>
For this $2 \times 2 \times 2$ Factorial Design will be chosen.

Sample Size: N = 800

1. Standard of education (A): Two Levels –
   
   A1 = The Students of Higher Secondary schools
   
   A2 = College Students

2. The Place of Residence (B): Two Levels –
   
   B1 = Village
   
   B2 = City

3. Sex (C): Two Levels –
   
   C1 = Boy Students
   
   C2 = Girl Students

\textit{Table No. 3.10}

The Table Showing the Explanation of Sample (N = 800)

<table>
<thead>
<tr>
<th></th>
<th>A1</th>
<th>A2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>B2</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>C1</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>C2</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Total</td>
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<td>200</td>
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</tr>
<tr>
<td></td>
<td>200</td>
<td>200</td>
<td>800</td>
</tr>
</tbody>
</table>
The Information about the sample will be quickly understood with the following ‘research design’.

**Research Design**

*Table No. 3.11 (77)*
3.6 MEASURING THE VARIABLES OF THE STUDY

Variables are known as variant. The literal meaning of variable is ‘to vary’. The important feature of variable is the variation of its quantity. Any person, place, thing, incident, characteristic or situation is considered to be a variable if it contains two traits: one is the possibility of quantitative variation and its measurement, another is it should be able to be effective itself and to affect others as well. Different Psychologists have given different definitions of ‘variables’ as following:

According to Matheson and his companions (1970), “a variable is a situation or a position in scientific research whose quantity or quality can vary.”

According to Postman and Egan (1966), “a variable is a feature or a characteristic which can have many types of values.”

According to D’Amato (1970), “any characteristic or feature of things, incidents or people, which can be measured, is a variable.”

According to Morgan and his companions (1996), “A variable is an incident or a situation which has different values. During the experiment this incident or situation can be measured and variations are possible in its quantity.”

The objective of the present research is to study the student’s ‘emotional maturity’, ‘mental health’ and ‘adjustment’ and also to examine the effect of personal social variables on the ‘emotional maturity’, ‘mental health’ and ‘adjustment’. For this, 800 students, on the basis of their ‘standard of education’, ‘place of residence’ and ‘sex’, were selected as stratified random sample according to $2\times 2\times 2$ factorial design, from various schools of Surendranagar district. To measure their emotional maturity, mental health and adjustment ‘The Emotional Maturity Scale’ prepared by Dr. Mahesh Bhargav and Yashwar
Shingh, ‘The Mental Health Inventory’ prepared by Dr. D. J. Bhatt and Gita R. Gida and ‘Revised Adjustment Inventory’ prepared by Dr. Pramodkumar etc. were used. The following variables were measured. (56)

3.6.1 Independent Variable:

An independent variable is selected by the experimenter directly or by selection process because it affects the phases of behavior. In other words, independent variable means a variable whose effect is to be examined.

In general, “an independent variable is any variable manipulated by ‘E’ either directly or through selection in order to determine its effects on behavioral measure.”

Table no. 3.12

A Table of the Independent Variables and their Levels

<table>
<thead>
<tr>
<th>No.</th>
<th>Independent Variable</th>
<th>The Level of Independent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standard of education</td>
<td>Higher Secondary School College</td>
</tr>
<tr>
<td>2</td>
<td>The Place of Residence</td>
<td>Village City</td>
</tr>
<tr>
<td>3</td>
<td>Sex</td>
<td>Boy Students Girl Students</td>
</tr>
<tr>
<td>4</td>
<td>Student’s Age</td>
<td>18 years or less 18 years or above</td>
</tr>
<tr>
<td>5</td>
<td>Type of Family</td>
<td>Joint</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td><strong>Stream of Education</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Separate</td>
<td></td>
</tr>
<tr>
<td><strong>7</strong></td>
<td><strong>Mother’s Education</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. 7\textsuperscript{th} or less</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. 7\textsuperscript{th} or above</td>
<td></td>
</tr>
<tr>
<td><strong>8</strong></td>
<td><strong>Father’s Education</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. 7\textsuperscript{th} or less</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std. 7\textsuperscript{th} or above</td>
<td></td>
</tr>
<tr>
<td><strong>9</strong></td>
<td><strong>Mother’s Occupation</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Housewife</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Job</td>
<td></td>
</tr>
<tr>
<td><strong>10</strong></td>
<td><strong>Father’s Occupation</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Job</td>
<td></td>
</tr>
</tbody>
</table>

### 3.6.2 Dependent Variable:

A dependent variable is an observant behavioral variable affected by the independent variable. In other words, a behavioral variable measured to know the effects of the independent variable is a dependent variable.

A dependent variable is any behavioral variable measured by ‘E’ to assess the effect of a manipulated variable.

The dependent variables of the present research are as following:

(i) The scores of ‘emotional maturity’

(ii) The scores of ‘mental health’

(iii) The scores of ‘adjustment’
3.6.3 Control Variable:

The variables, except the independent variables, which can directly or indirectly affect the dependent variables, are controlled by the examiner and so they are known as ‘control variable’.

During the experimentation, experimental mistake is likely to happen if these variables are less controlled. So it can be said with affirmation that the change in the dependent variable is due to the change in the independent variable only if the total control is laid upon while the experimentation to have the accurate and trustworthy result. Thus, the control over other variables is necessary while the experimentation. Controlling is the heart of experimentation.

The following variables were controlled in the present research:

(1) In the present research, the sample students were selected only from the various schools of Surendranagar district.
(2) Only regular students were selected.
(3) Only those students, able to speak and understand Gujarati language, were selected.
(4) Only the teachers aged 21 to 58 years were selected.

3.7 THE TOOLS OF RESEARCH

The motive of the present research is to study ‘emotional maturity, mental health and adjustment in students’ and for this purpose, the following tools were used:
3.7.1 Personal Information Register:

Here, the information regarding the personal matters was gathered to measure the emotional maturity, mental health and Adjustment of School and College Students. For this, a ‘personal information register’ was prepared in which the following points were included: the name of the student, the name of school – college, education level/standard, the place of residence, sex, age of the student, type of family, stream of education, mother’s education level, father’s education level, occupation of mother, occupation of father. (56)

3.7.2 Emotional Maturity Scale:

The emotional maturity scale is prepared by Dr. Mahesh Bhargav and Dr. Yashvir Singh.

In the emotional maturity scale total 48 groups are given. In every sentence there are five options given: “very much”, “much”, “uncertain”, “always” and “never”. The answer can be acquired by signing “✓” on any one of them. In this scale there are 48 statements asserting “too much” and for those 5 marks are given, the same way 5, 4, 3, 2, 1 mark is given for the option “much”. In this scale 48 is the lowest score and 240 is the highest score to be acquired. In this scale, if the scores of the responders are higher than it is believed that the level of their ‘emotional maturity’ is higher and the same way if the score of the responder is lower than their ‘emotional maturity’ is also believed to be at lower level.

Reliability: 0.84
Accuracy: 0.80
Minimum: 48
Maximum: 240
Time: 20 to 25 minutes (56)
3.7.3 Mental Health Inventory:

The mental health inventory was prepared by the HOD of the Psychology Department of Saurashtra University Dr. D. J. Bhatt and Ms. Gita Gida in 1992. In this scoring key there are total 40 statements in which mainly this five elements are included:

(a) The perception of reality
(b) Integrated Personality
(c) Positive self – assessment
(d) Group favoring attitude
(e) Domination over the environment

The above five elements are divided into 40 statements. This inventory is based on two point scales and so at the end of each statement there are two options: “agree”, “Do not agree”. The responder is to read the statement and mark the “✓” sign on the relevant option. On the basis of the inventory the score of mental health can be acquired by adding the total score (2) with the scores of each element column. By adding the 8 total columns the score of each element can be found. In this way, we can get different scores for each of the five elements.

For each right answer (1) mark is given in this inventory, while each wrong answer is given (0) marks. Moreover, the highest score can be 40 and the lowest score can be 0.

(1) The Perception of Reality:

Question no. : 1, 6, 11, 16, 21, 26, 31, 36
Answer: no, yes, yes, yes, no, yes, yes,

(2) Integrated Personality:

Question no. : 2, 7, 12, 17, 22, 27, 32, 37
Answer: yes, no, yes, yes, no, yes, no

(3) Positive self – assessment:
Question no. : 3, 8, 13, 18, 23, 28, 33, 38
Answer: no, yes, yes, yes, yes, no, no, no

(4) Group favoring attitude:
Question no. : 4, 9, 14, 19, 24, 29, 34, 39
Answer: yes, no, no, no, yes, yes, yes

(5) Domination over the environment:
Question no. : 5, 10, 15, 20, 25, 30, 35, 40
Answer: yes, yes, yes, no, no, yes, no, yes

Reliability:

In this ‘mental health inventory’, dual divisional reliability counting was done using the ‘Spearman Brown Formula’. The reliability of the present inventory is shown in the following table:

Table no. 3.13

The Table showing the reliability of Mental Health Inventory

<table>
<thead>
<tr>
<th>No.</th>
<th>Reliability Method</th>
<th>Strength</th>
<th>$ Value</th>
<th>Reliability Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Half Divisional Method (Spearman Brown Formula)</td>
<td>100</td>
<td>0.90 **</td>
<td>0.94</td>
</tr>
<tr>
<td>2</td>
<td>Test Re – Test Method</td>
<td>100</td>
<td>0.75 **</td>
<td>0.87</td>
</tr>
<tr>
<td>3</td>
<td>Logical Similarity Method</td>
<td>100</td>
<td>0.65 **</td>
<td>0.81</td>
</tr>
</tbody>
</table>

(* * $ - Value significant at 0.01 level)

Test Re –Test timing is 1 Month.

The reliability scores of the table suggest that the test is satisfactory with internal consistency.
Moreover, the reliability of the Test Re - Test was also found on the basis of the elements of the scoring key. The information is as following:

Table no. 3.14

The Table showing the Test Re – Test of the Elements of Mental Health Inventory

<table>
<thead>
<tr>
<th>No.</th>
<th>The Elements of the Test</th>
<th>Strength</th>
<th>$ Value</th>
<th>Reliability Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Perception of Reality</td>
<td>100</td>
<td>0.93 **</td>
<td>0.96</td>
</tr>
<tr>
<td>2</td>
<td>Integrated Personality</td>
<td>100</td>
<td>0.83 **</td>
<td>0.91</td>
</tr>
<tr>
<td>3</td>
<td>Positive self – assessment</td>
<td>100</td>
<td>0.64 **</td>
<td>0.80</td>
</tr>
<tr>
<td>4</td>
<td>Group Favoring Attitude</td>
<td>100</td>
<td>0.94 **</td>
<td>0.97</td>
</tr>
<tr>
<td>5</td>
<td>Domination over the Environment</td>
<td>100</td>
<td>0.76 **</td>
<td>0.87</td>
</tr>
</tbody>
</table>

Reliability (* * $ - Value significant at 0.01 level)

Test Re – Test timing is 1 Month.

Table no. 3.15

The Table Showing the Inter – Correlations between the elements of Mental Health Inventory

<table>
<thead>
<tr>
<th>No.</th>
<th>Elements</th>
<th>The Perception of Reality</th>
<th>Integrated Personality</th>
<th>Positive Self – Assessment</th>
<th>Group Favoring Attitude</th>
<th>Domination over the Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Perception of Reality</td>
<td>1.00</td>
<td>0.27</td>
<td>0.22</td>
<td>0.36</td>
<td>0.20</td>
</tr>
</tbody>
</table>
By observing the table, it can be said that the continuity of the inter-correlation between the elements of the inventory is 0.04 to 0.48. It suggests that the elements measure the mental health personally and individually.

Accuracy:

To decide the accuracy of the inventory, the following measures were taken. The accuracy of the inventory was found higher.

(1) Face Validity
(2) Factorial Validity
(3) Content Validity
(4) Con – Current Validity

To decide the Con- Current Validity a ‘Personality Scoring Key’ was used, which was prepared by Dr. D. J. Bhatt (1984). It includes 13 elements (13 P. F.). This inventory was given to 75 teachers. The information is in the table as following:

<table>
<thead>
<tr>
<th></th>
<th>Integrated Personality</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td>0.27</td>
<td>1.00</td>
<td>0.32</td>
<td>0.04</td>
</tr>
<tr>
<td>3</td>
<td>Positive Self Assessment</td>
<td>0.22</td>
<td>0.32</td>
<td>1.00</td>
<td>0.21</td>
</tr>
<tr>
<td>4</td>
<td>Group Favoring Attitude</td>
<td>0.36</td>
<td>0.04</td>
<td>0.21</td>
<td>1.00</td>
</tr>
<tr>
<td>5</td>
<td>Domination over the Environment</td>
<td>0.20</td>
<td>0.28</td>
<td>0.48</td>
<td>0.44</td>
</tr>
</tbody>
</table>
Table No. 3.16

A Table Showing the Con – Current Validity of the Mental Health Inventory

<table>
<thead>
<tr>
<th>No.</th>
<th>Details</th>
<th>Strength (N)</th>
<th>$ Value</th>
<th>Level of Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13 Personality Factors Scoring Key</td>
<td>75</td>
<td>0.63**</td>
<td>0.01</td>
</tr>
<tr>
<td>2</td>
<td>Mental Health Scoring Key</td>
<td>75</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The accuracy of ** r Value is at 0.01 level.(60)

According to the information gathered from the above table, it is clear that the value of ‘r’ - 0.63 is having higher accuracy at 0.01 levels, which means that the two scoring keys are correlational and so the new scoring key is satisfactorily accurate.

3.7.4 Revised Adjustment Inventory

The ‘revised adjustment inventory’ was prepared by Dr. Pramod Kumar in 1997 to know and observe the ill - adjustment of college students. In this questionnaire there are total 40 statements to be answered with ‘yes’ and ‘no’. These statements are taken from the first part of Woodworth and Seldbur’s self – dependent list and Asthan’s adjustment list.

The main purpose is to know a person’s adjustment. The last measurement of this questionnaire was done on the 229 technical students of ‘Indian Institute of Technology’ – Khadakpur and 286 students of Allahabad University. The reliability of male group was found 0.88 by half – divisional method. With the
help of re–examination the reliability of male group was found 0.81 in the period of one or two weeks and 0.77 of the female group in the period of two weeks. The accuracy of this questionnaire is correlated with the ‘Adjustment Scale’ of Asthma Hindustani. The correlational value of this newly developed scale was 0.71.

The ‘revised adjustment inventory’ is an automatic scoring key. The motive of the scoring key is honestly explained to the respondent.

The respondent is told that their answers will be kept secret and if they find any trouble regarding the interpretation of the statement then they should ask for an explanation before answering it. It was stressed that no statement is left unanswered.

According to the ‘A’ manual of this scoring key, every ‘no’ answer of the clauses should be given ‘1’ mark except the Clause V33, while the answer ‘yes’ of the Clause 33 should be given ‘1’ mark. The addition of the scores of all the Clauses shows the total score of the adjustment. In this inventory the high score suggests the higher adjustment and the lower scores suggest the ill–adjustment. In this scoring key the scoring level is between ‘0 – 40’. ‘0’ is the lowest score and ‘40’ is the highest score.(14)

Reliability: 0.88

Accuracy: 0.71

Minimum: 1

Maximum: 39

Time: 20 to 25 minutes
3.8 Statistical Methodologies

The following statistical methodologies were used in the present research:

3.8.1 ‘F’ Test (ANOVA):

Difference analysis method was first used by Fisher. Difference analysis is done to find out the difference between the means of two or more groups, it is also known as ‘F’ test. The difference between the scores of some special variable of different groups is known as ‘difference’.

In the present research, ‘F’ value was found on the basis of $2 \times 2 \times 2$ factorial design to find out the effects of the standard of education of student, the place of residence, and sex on the emotional maturity. With this value, the hypotheses 1 – 3 were tested. While the interaction between the students ‘standard of education, place of residence and sex was tested with the hypotheses 4 – 7.

The same way, ‘F’ value was found on the basis of $2 \times 2 \times 2$ factorial design to find out the effects of the standard of education of student, the place of residence, and sex on the mental health. With this value, the hypotheses 15 – 17 were tested. While the interaction between the students ‘standard of education, place of residence and sex was tested with the hypotheses 18 – 21.

The same way, ‘F’ value was found on the basis of $2 \times 2 \times 2$ factorial design to find out the effects of the standard of education of student, the place of residence, and sex on the adjustment. With this value, the hypotheses 29 – 31 were tested. While the interaction between the students ‘standard of education, place of residence and sex was tested with the hypotheses 32 – 35.
3.8.2 L. S. D. (Least of Significance Difference)

The L.S.D. is used to test the accuracy of the means of the variables which have same scores.

In the present research, L.S.D. is used to test the accuracy of the differences in the means of emotional maturity, mental health and adjustment of the following variables: the standard of education of student, place of residence and sex.

3.8.3 ‘t’ Test

‘t’ Test is a statistical method to decide whether the differences in between the two samples exist also in the whole population or not. With the help of this test one can find out the difference between two populations and also it is used to test the means between two averages, two standard deviations, and the difference between two percentages.

The two proponents of ‘t’ Test were Thorndike and Terman. The first letter of their names ‘t’ was used widely by Meklole to designate such scores.

Average is found in most of the researches. And so ‘t’ test is also used mostly to know the difference between the averages and to test the accuracy and inaccuracy of the differences of the averages.

In short, it can be said that it is assumed whether the difference is accurate or inaccurate and it is also decided whether to accept the former hypotheses or to reject them and the hesitancy of the test is also removed.
FORMULA: (78)

\[ t = \frac{M_1 - M_2}{SE_D} \]

The ‘t’ Test was used to find the effects on the student’s age, type of family, stream of education, mother’s education, father’s education, mother’s occupation, father’s occupation and also to find out the differences in it. With the help of the test the hypotheses 8 to 14, 22 to 28 and 36 to 42 were tested.

3.8.4 Correlation

In the correlation, the relation between two variables is studied. In the routine life, there is a kind of relationship seen in between the two variables. To study the correlation between the two variables it is necessary to find out the ‘correlational quotient’. Sir Frances Galton investigated this method and Pearson developed it afterwards.

3.8.4.1 The Meaning of Correlation

In the statistics, the relation between the two variables is known as ‘correlation’. The measurement accessed by the correlation is known as the ‘correlational quotient’.

3.8.4.2 Types of Correlation

There are two types of correlation:

(i). Positive Correlation and

(ii). Negative Correlation

The explanation with examples of these two types is as following:
(i). Positive Correlation:

When the value of a variable changes into the direction of the value of another variable then the relation between these two variables is known as ‘positive correlation’. Which means that if the value of a variable increases then the value of another variable also increases or if the value of a variable decreases then the value of another variable also decreases and so this is called the ‘positive correlation’ between two variables. For example, intellectual quotient, academic achievement, eligibility and business skills, marks of mathematics and statistics are the examples of positive correlation.

(ii). Negative Correlation

When the value of a variable changes against the value of another variable then the relation between these two variables is known as ‘negative correlation’, which means that if the value of a variable increases then the value of another variable decreases or if the value of a variable decreases then the value of another variable increases and so this is called the negative correlation between two variables. For example, attempts and mistakes, absenteeism, marks are the examples of ‘negative correlation’.

In statistics, correlation is shown as ‘r’. The measurement acquired by the correlation is called the ‘correlational quotient’. In the correlation, the values are always in between -1 and +1. If r = 1 then it shows the complete correlation, if r = -1 then it shows the complete negative correlation and if r = 0 then it shows the absence of correlation.
3.8.4.3 Interpretation of the Correlation

The interpretation of correlation is done as following:

- Less than 0.20 – less or scant correlation
- 0.20 to 0.40 – less correlation
- 0.40 to 0.70 – normal correlation
- 0.70 to 0.90 – notable correlation
- 0.90 to 1.0 – high correlation

If the value of correlation is negative than the interpretation of the values are done as above.

In the present research, Karlpearson’s ‘r’ was used to find out the correlation between emotional maturity, mental health and adjustment. With the help of this, the hypotheses 43 to 45 were tested.

3.8.5 Partial Correlation

Sometimes, it is necessary to expand the counting of the simple correlation. The information of the simple correlation shows the statistical relation between the acquired scores of two groups but if one wants to predict on the basis of correlation then one needs to note the effects of other variables. For example, when one is searching the correlation between the height and weight of a person then the variable of age is hidden beneath it because, normally as the age of a person increases the weight of a person also increases. So while finding out the correlation between height and weight, one must control the age. This controlling can be done in two ways:

(i). Experimentally

(ii). Statistically
In the experimental controlling, it is necessary to find out the experimental candidates with special characteristics. But the same is not necessary in statistical controlling. For statistical controlling, partial and multi-variable method can be used for analysis. So, if the effect of age is made static then the correlation between height and weight can be counted easily. In partial correlation, correlation quotient is found on the basis of testing the combined effects of two independent variables upon one dependent variable, while in multi-variable method, other variables are kept static and then the relationship in between the variables is decided. Because of this, it is easier to understand the statistical relationship between the complex variables like education, intelligence and personality. Generally, this kind of correlation is found between three or four variables. If there are two variables, then it is possible to count them with the help of computer in the present time.

In the present research, this method was used to measure the partial correlation between Emotional maturities, Mental health Adjustment of School and College Students. (78)

3.9 STACKING THE INFORMATION

The purpose of the present research was to study the ‘Emotional maturity, Mental health and Adjustment of School and College Students and so the students from the whole Surendranagar district’s various village and city schools and colleges were selected on the basis of their standard of education, place of residence and sex. There were total 800 students selected as stratified random sample on the basis of $2 \times 2 \times 2$ factorial design.

This information was ingathered from various higher secondary schools and colleges of Surendranagar district. The Principals of school and colleges were approached to seek the permission personally. Timings and shifts of the students
were taken into consideration to meet them personally. Each school and colleges were sent letter of thanks for their cooperation in my work.

The research student introduced herself to the students and told them about the purpose of the tests. They were told that the information sought from them would be used only for academic purpose and not shared with anyone in any form. After securing their consent and assurance of cooperation, they were told how to take the test.

In the free time of the students, the personal information booklet, ‘The Emotional maturity scale’ by Dr. Mahesh Bhargav and Yashvir Singh, ‘Mental health inventory’ by Dr. Gita R. Gida and Dr. D. J. Bhatt and ‘Revised Adjustment inventory’ by Dr. Pramodkumar were used to gather information from them. The students were even informed that the information given by them will be kept secret and will be used for the purpose of research only. It will not be misused. From the entire answered questionnaires, the mechanically answered questionnaires were removed. Total 800 questionnaires were filled up by the students. This way, the information was ingathered.

While researching, the information was ingathered between the dates 01/01/2015 to 15/12/2015. Then all the questionnaires were checked and given marks. After completing the detailed information the datasheet was prepared.

To analyze the correlation of the ingathered information in the present research, factorial method ‘F test (ANOVA)’, ‘t test’ and ‘correlation r’ were used. To check the accuracy of the differences between the means, L.S.D. value was found. The hypotheses were tested on the basis of this and the outcomes were derived. (78)