Chapter: 3

Foundation of the Research and Research Design

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3.1 Introduction:

Before starting any work, its planning is thought about. As an engineer prepares a detailed plan on a paper before construction of a building, a blueprint is required to be prepared before conducting a research. The success of a work depends on its planning. The planning becomes helpful in the appropriate use of an investigator's energy, time, tools and money. Before conducting a research, an investigator has to plan according to his/her own abilities, facilities and limitations.

This chapter presents a detailed presentation on the research design and process prepared by the researcher, and the points are as given below:

- Scope
- Research Design
- Sample of the research
- Tools of the research
- Measurement of the variables under the study
- Data Collection
- Statistical Techniques

3.2 Scope / Population:

"Scope means the basic community of subjects, things or events selected as a sample for experiment from the scope."

The aim of this study is to know the opinions towards personality and education of the school going students.
In this research the male and female students of granted and self-financed higher secondary schools of the state of Gujarat have been selected as the scope of study.

Frank S. Freeman explains the meaning of scope and says, “The data obtained in any investigation represent a sample drawn from the total group, that in statistical terms is called population or the universe.”

3.3 Sample:

A representative sub-group selected from a vast community or the whole class is called sample.

According to Gutt and Hutt, “As the name suggests, sample is a small sub-group which represents the whole.

According to Shri Pradyuman Joshi, “Sample is the study drawn from the whole field by studying about the small group selected from the whole workfield.”

A test can evaluate proportionately the whole scope in a true form when the sample is equally proportional and unbiased in its representation of the scope.

According to B. W. Teckman,

“A sample that corresponds to or matches the population of which it is a sample with respect to characteristics important for the purposes under investigation. In an achievement test of normal sample such significant aspects
might be the proportion of cases for various types of school in different geographical areas and so on.”

Thus, a sample is a part of the whole.

### 3.3.1 Two characteristics of a good sample:

A good sample has two characteristics:

1. **Representation of the whole:** A sample is called representative sample which covers all the characteristic of the whole (population).

2. **Adequate size:** A sample should be adequate in size. Its size should adequately bring about reliable result.

### 3.3.2 Five advantages of sample examination:

When the distribution of traits is known by acquiring data from each unit of a sample or when all the units of a sample are ignored, it is called sample examination. Thus, sample examination means study of each unit of a sample. There are five advantages of the sample examinations: Speed, Savings, Precision, Assurance of truth and Duration for more research.

### 3.3.3 Methods for sample selection:

The selection of an unbiased sample is a difficult task. A sample is selected by different methods according to various purposes of the research.

For the selection of sample, Garett says, “Various techniques have been devised for obtaining a sample which will be the representative of its population.”
When a sample is big and uniformity is to be brought in the variables under the study, a sample should be selected through an appropriate method for precise results.

The knowledge of the principles of a sample is essential for any research. Sampling means a process of sample selection. The modern principle of Sampling is divided into two categories: (1) Probable Sampling, (2) Non-probable Sampling

3.3.3.1 **Probable Sampling**:

Probable sampling means a probability is determined as to what is the probability of every unit to enter into a sample.

Advantages of probable sampling:

Isidor chain gives three advantages of probable sampling –

(1) A sampling design can be possible which is only the representative of probable sample.

(2) An estimate can be drawn as to how the results of a sample differ from the results of the whole (population).

(3) In probable sampling, the size of a sample can be pre-determined.

Types of probable sampling:

The three types of samples drawn by the probable sampling which are as given below:

1) Simple random sample:

Random sample does not mean a sample as wished. It means specific. Random sample is the one in which:
Every unit of the whole has equal opportunity for selection.
No other unit should be neglected while selecting an unit.
The selection of units should be incidental or accidental.

According to Isido Chain, in a random sample every unit not only gets equal opportunity to enter but every arrangement of the possible expected units also get equal opportunity.

2) Stratified random sample:
In a sample, units are randomly selected from various levels or groups of the whole. When the units are not uniform but are varying, a stratified random is selected.

In stratified random sample, firstly the whole is divided into two categories. For example, two categories in terms of caste (gender):
(1) Females and (2) Males.

Sometimes, the categories are determined by more than one criterion. For e.g., Study stream of a school and caste. Thus, categories can be determined by two criteria.
1. Girl-students of granted school (Females)
2. Girl-students of self-finance school (Females)
3. Boy-students of granted school (Males)
4. Boy-students of self-finance school (Males)

Here, the units in every level should be uniform.

After forming categories in a stratified random sample a simple random sample is taken as determined in every unit.
Isidor Chain notes that standard stratified sample is not necessary. When a sample is taken in equal proportion from different levels, time is saved in computation.

3) Cluster Sample:

It is a type of sample in which groups and not the individual are selected as units. When the whole is larger or is distributed in vast areas, it becomes difficult to make a complete list of all units of a whole. In such situation cluster sample becomes useful.

3.3.3.2 Non-probable sampling:

When the probability of every unit's entry cannot be determined, it is called Non-probable sampling. In this type of sampling, there is no method to estimate the probability of entering the units in a sample.

Two advantages of Probable sampling: (1) Facility, (2) Economy

Types of Non-probable sampling:

The three types of samples drawn by the method of Non-probable sampling have been discussed as shown below:

1) Intermediate sample:

When the immediate units of the whole (population) are selected for study they are called immediate or incidental sample. Here there is only one criterion for sampling and that is, to select those subjects which are easily available.
In the incidental sample, the easily available units of the whole are studied till a certain size of a sample is not fulfilled. When this sample is taken the data is analysed through statistical method.

2) Quota sample:

It is a type of sample in which all the groups of the whole (population) get a place in accordance to their strength.

In this type of sample the quota of every level and the quota of every interviewing official is predetermined, and therefore it is called quota sample. Isidor Chain says, "The main aim of quota sample is to select a sample so that the sample becomes a replica of the whole.

3) International sample:

It becomes difficult in terms of time, energy and money when a research is conducted by covering all the units of the whole (population). Thus, a representative sample is taken for study. In this study, the sample has been selected keeping in mind certain specific matters.

Firstly, schools of the state of Gujarat have been selected and among these, those granted and self-financed schools have been selected which have their respective streams. Boys and Girls studying in these schools were selected by the random sampling method. From these students, only those students were given the questionnaire who showed readiness to fill up the questionnaire. The castes (gender)
and streams were specifically considered during sampling process.

Primarily, total number of 1600 questionnaires were given to collect data. After scrutiny, those questionnaires were cancelled which were found to be half-filled or not properly given responses. Thus, the remaining 1400 students were selected in the sample. But the statistical method of variance analysis was to be used, therefore 60 students were inducted in each group. The final sample consisted of 1280 students.

Thus, a stratified random sampling method was used for the study. In stratified random sampling method the advantages of both, categorization and incidenceality are obtained.

Certain important aspects of stratified random sampling method are given below:

- Representation of population
- Results can be applied to the population
- Equal opportunity of selection to every subject
- Representation in accordance with size and area
- Less expensive
- Purposeful method of a sample
- Being practical, have more usage value
- statistical use of the data can be done
3.5 Research Tools:

A researcher makes use of various tools for collections of necessary data in his/her study. A researcher uses appropriate tools to test the hypotheses and achieve the objectives of the research. In a research questionnaires, interview, observation or case-study methods as well as various test, comparisons and other lists are used as research tools. One or more tools suitable to the problem of the study can be used for data collection.

Keeping in mind the objectives of this research, the following tools have been used:

3.5.1 Individual Datasheet:

The individual data sheets of the subjects involved in the sample of a research becomes very useful for a researcher. Here, the investigator had prepared individual data sheet to acquire information about individual social variables of the students.

3.5.2 Isenck's Modsley personality inventory:

3.5.2.1 Purpose:

Dr. H. J. Isenck had prepared a Modsley personality inventory to measure personality dimensions such as neuroticism, emotional stability and extroversion Introversio. This inventory is brief and a standardized tool and can be easily administered. It is suitable for normal and abnormal adolescents and adults. It can be used individually
or in group. It can be given to people of the age of 15-16 or more years. Dr. Isenck's "Modsley personality inventory was translated into Gujarati language by Dr. D. J. Bhatt (1998). The personality traits of students can be measured through this translated inventory. There are 48 statements in this inventory which mainly measures the two personality traits. (i) Extroversion (2) Neuroticism.

3.5.2.2 Administration of the Modsley Personality Inventory:

Dr. Isenck's Modsley Personality Inventory is brief and standardized and which can be easily administered and computed. This inventory measure personality traits like extroversion-introversion and neuroticism and emotional stability.

During its administration, the subjects were informed that there was nothing 'right' or 'wrong' and 'good' or 'bad' in the test. So the subjects were asked to show their views honestly and were ensured that their answers would be kept confidential, and the answers will be solely used for the research. Thus, a cordial relationship was established with the students and the inventory was given to be filled up in group.

There is not time-limit for filling-up the inventory but 15-20 minutes time was given to the students.
3.5.2.3 **Rating:**

The inventory was divided into two parts: (i) Short comparison and long comparison in which the previous one had 12 statements whereas the latter one had 48 items / statements in which 24 statements were related to “extroversion-introversion” and 24 statements were related to neuroticism-emotional stability.

Every statement in the inventory has three options, viz ‘Yes’, ‘?’ and ‘No’. The respondent has to give answer on any one of the options. On the basis of the rating key, the scoring values of each statement are 0, 1 and 2 which shows extroversion and neuroticism from lower to higher level.

The scoring area of the longer test for extroversion is 0 to 48 whereas that of the short test is 0 to 12. Similarly, the scoring area of the longer test for neuroticism is 0 to 18 whereas that of the short one is 0 to 12.

Every question of this test has three options/alternatives like ‘Yes’, ‘?’ and ‘No’. If the responses of the subject for questions numbering 14, 16, 18, 22, 24, 30, 36 and 40 are ‘No’, ‘?’ ‘Yes’, then the subject will be given the score of ‘2’, ‘1’ and ‘0’ accordingly. Apart from these 8 statements, the process for remaining 40 statement is reverse, that is, if the subject’s responses are ‘Yes’, ‘?’ and ‘No’, the scores given will be 2, 1 and 0 accordingly. Thus, the scores obtained after giving response to the 48 statements will be considered as raw scores from which standardized scores will be obtained. The sum total of the scores on statement
numbering 2, 3, 6, 7, 10, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45 and 47 will be the score for neuroticism. On case of neuroticism the least score can be 0 and the highest score can be 48. Whereas the sum total of the scores on remaining statements will be the score on extroversion. The least score on extroversion can be '0' and highest score could be 48.

For example:

- Do you like to meet people? ‘Yes’ ‘?’ ‘No’

If the subject draws a circle, the 8 statements numbering 14, 16, 18, 22, 24, 30, 36 and 40 are computed. But the computation of these eight statement is reverse than the 40 statements.

Thus, the scoring of each statement is done on the basis of rating key. Then, Dr. Bhatt (1998) has provided tables to convert raw score into ‘t’ score. On the basis of it the raw scores were converted into t scores. After summing up the scores obtained by the subject on 24 statements related to extroversion-introversion. The raw scores on extroversion-introversion were obtained which were converted into ‘t’ scores. Similarly, after summing up the scores obtained by the subject on 24 statements related to neuroticism-stability, the raw score on neuroticism-stability was obtained which was converted into ‘t’ score.
The high scores on neuroticism-stability suggest neuroticism whereas the low scores suggest stability. Similarly, the high scores on extroversion-introversion scale suggest extroversion whereas the low score suggest introversion.

3.5.2.4 **Standardization**:

In this research, Dr. Iseuck's Modsley Personality Inventory has been used which has been designed to measure the personality traits of adults. The reliability and validity of this inventory was derived on different samples.

3.5.2.5 **Reliability and Validity**:

For long comparison a sample of 150 (75 males and 75 females) was taken from the students of higher secondary level. The common mean and standard deviation for neuroticism were found to be 23.20 and 10.00 respectively, whereas the common means and standard deviation for extroversion were found to be 27.80 and 6.20 respectively. But, on the basis of English sample, the mean and standard deviation for neuroticism were 1.90 and 11.00 respectively. Similarly, the mean and standard variation for extroversion were 24.90 and 9.7 respectively. There was not significant difference between the personality traits on the sample of males and females, and in comparison to English group, the Indian group was found to have more neuroticism and extroversion.
For the comparison, the coefficient of correlation between 'N' and 'E' was 0.223 which was found to be better agreed with the English standard. The coefficient of correlation of split-half reliability was found to be $N = +0.567$ and $E = +0.358$ whereas for the absolute test, it was found to be $N = +0.71$ and $E = +0.42$. These reliability norms were lower than those of the English sample. The reliability of extroversion comparison was between 0.75 to 0.85 whereas the reliability of neuroticism comparison was between 0.85 to 0.90.

In the study conducted by Isenck the test-retest reliability of extroversion comparison was found to be 0.81 and the test-retest reliability for neuroticism comparison was found to be 0.83.

On a sample of mill technicians and employees of 'Atira', a study showed that the test-retest reliabilities on extroversion comparison and neuroticism comparison were found to 0.68 and 0.83 respectively. The test-retest reliability of an inventory translated into Oriya language was found to be 0.76 and the test-retest reliabilities for the inventory translated into Gujarati for extroversion comparison and neuroticism comparison were found to be 0.76 and 0.74 respectively.

To determine the validity of personality inventory two groups suffering from mental disease were selected. The scores on neuroticism and introversion of dispinic neurotics suffering from anxiety, disorders, fear and psycho-attitudes were found to be higher, whereas the scores on neuroticism
and extroversion of the patients of psychoperasis and hysteria were found to be higher, which show the validity of this inventory.

The split-half reliability and rational equivalence reliability of Dr. Bhatt’s personality inventory are found to be 0.73 and 0.93 respectively, whereas the reliability scores on a sample of 340 suggest 0.85 and 0.96 respectively on neuroticism scale. The reliability score of split half reliability on extroversion-introversion was found to be 0.86 whereas the ration equivalence reliability score was found to be 0.94. The validity of Dr. Bhatt’s MPI suggests that in comparison between English and Indian sample, the means of Gujarati sample were found to be significantly higher.

3.5.3 **Opinionnaire (self-made) about Education :**

As a part of the research this tool was developed and standardized and its process was followed as shown in chapter-4. This standardized tool was printed and its required copies were obtained.

3.6 **Measurement of variables under the study :**

In this study, the measurement level of the variables is as shown below:

3.6.1 Type of school: Schools were divided into two categories:
(i) Granted schools and (ii) Self-finance schools.

3.6.2 Caste (Gender): Two categories were derived according to the castes of the students.
(i) Female students and (ii) Male students
3.6.3 Stream: This study includes two streams.
(i) General stream (which includes Arts and Commerce)
(ii) Science stream

3.6.4 Region: This study includes 4 regions of Gujarat state showing schools at 10+2 level.
(1) Central Gujarat (2) South Gujarat
(3) North Gujarat (4) Saurashtra

3.6.5 Area of residence: The areas of residence of the students are divided into two parts: (i) Rural area (ii) Urban area

3.6.6 Type of family: The families of students are divided into two categories:
(i) Undivided family and (ii) Divided family

3.6.7 Personality: The personality of students are classified into two categories:
(i) Extroversion-Introversion
(ii) Neuroticism-Emotional stability

3.6.8 Opinions towards education have been divided into two categories: (i) Positive and (2) Negative

3.7 Data collection:

In this research, the type of college, caste, stream and personality of the students and their opinions towards education were to be obtained, so an educational opinionnaire (self-made) was constructed. The subjects of the sample required 50 to 55 minutes to fill-up the required data. They required 4 to 5 minutes time for individual data sheet, 20 minutes for Isenck's personality inventory and 25 to 30 minutes for attempting the education opinionnaire. The subjects were required to give their responses by putting tick (✓) marks in
Isenck's personality inventory and the education opinionnaire. The time of 15 minutes was required to establish cordial relations with students and for distribution and collection of the materials given to the students. A prior permission was taken from the principal to allow to go into the classroom for one hour.

The area of scope is very wide in this research. It was not possible for a person to go to all schools and administer the opinionnaire because the opinionnaire was to be administered in a prescribed time period. To avoid this problem, teachers of the schools and friends were engaged for the administration of the opinionnaire. For this, the telephonic permission were acquired from the principals of respective schools and at some places letters asking for permission were send to each of the other schools, in which request to allocate one hour's time for Std. XI and XII was made to the principals of the schools.

The researcher and the administrators of the opinionnaire had gone into the classrooms to explain the purpose of data collection and importance of the responses to the students and had ensured the students to keep the data confidential and that the data would solely be used for the research.

The subjects of the sample were asked to read every statement carefully. There was nothing like true or false as well as good or bad. Moreover it was not an intelligence test. The subjects were told to show their views and answer each statement accordingly. In case of any confusion or difficulty the subjects were told to consult the researcher or the administrators of the opinionnaire.

Thus, the data were collected from the subjects of the sample. Later on, the students and the principals were thanked by the researcher. The principals, teachers and students of all schools were found to be very cooperative in the administration of the opinionnaire.
3.8 **Rating of responses and type of data:**

The responses given by 1280 subjects of the sample in Isenck's Modsley Personality Inventory and Education Opinionnaire were subjected to rating and were later on taken for use in the research.

For every question in Isenck's Modsley Personality Inventory, the scores were given according to rating scheme and all the subjects were classified into two groups viz Extroversion-Comparison and neuroticism-Comparison.

The education opinionnaire was in the form of Five-point scale standardized through likert method, in which the response was to be done by marking a tick (✓) mark in one of the five boxes namely completely agree, agree, neutral, disagree and completely disagree. Thus, responses were to be given on 46 statements. For the responses from 'completely agree' to 'completely disagree', the scores of 4, 3, 2, 1, 0 were to be given accordingly for positive statements and for the responses from 'completely agree' to 'completely disagree', the scores of 0, 1, 2, 3, 4 were to be given accordingly for negative statements. On the basis of responses to 48 statements, rating key was used for rating the statements. Then, the ratings were summed up and the score obtained was considered as the score of opinions about education given by the students.

3.9 **Data Analysis:**

- Statistical techniques were used for analysis and interpretation of the data collected in the research.
In any matter, the quantitative data is found to be more effective than the qualitative data. Therefore, statistical techniques are used in those studies where qualitative data are converted into quantitative data. Fischer notes that the aim of statistical techniques is to remove irrelevant data from the whole data and keep the required data.

Thus, keeping in mind the above matters, the following statistical methods were used for data analysis for this study.

3.9.1 Technique of ‘r’ correlation:

This method was initiated by Sir Francis Galton and was developed by pearson. Like the mean and the standard deviation, the co-efficient of correlation is a figure which gives complete idea of relationship between two things of or variables.

In this study, the method of coefficient of correlation was used to find out relationships among extroversion, neuroticism and opinions towards education, and with the help of it, the hypotheses no.1 to 3 were tested.

3.9.2 Bartlett’s Test of Homogeneity of Variance:

Among the basic assumptions of variance analysis (F ratio), one assumption is that the differences in variables should not differ. Therefore, the homogeneity of variable should be tested before conducting the variance analysis. Here, Bartlett’s Homogeneity test was used before F-ratio.
3.9.3 Variance Analysis (ANOVA):

The variance analysis method was given by Fisher. It is used to test the significance of difference between two groups on the basis of variance and to test the hypothesis whether all the groups belong to the population. Thus, this method is economical in terms of time, and it helps in obtaining deviations in and between the groups and the total deviation.

In this study, with the help of the use of variance analysis the hypotheses were tested through $2 \times 2 \times 4$ factor analysis. The hypothesis 4 to 15 were tested in this way.

3.9.4 t-ratio method (Critical Ratio Method):

When the measurement of standard deviation of population is not known and when computation is to be done on the basis of standard deviation of the sample, the t-ratio method is used with the help of 't' ratio method, the difference between only two means can be known at a time, on the basis of which it can be determined whether or not the difference exists in the population.

In this research the individual social variables like the residential area of student and type of family etc. The 't' ratio method was used to find out the effect on extroversion, neuroticism and the opinions toward education, and through it the hypothesis from 16 to 21 were tested.

The process of construction and standardization of opinionnaire involved in this research can be seen in the next, Chapter-4.
References:


4) Pradhyuman Joshi, "Sampling Techniques" Saurashtra University, Rajkot; 1985, p.143.
