CHAPTER : 5

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CHAPTER – 5
RESEARCH DESIGN AND APPLICATION

5.0 INTRODUCTION

Research design is a strategy on paper like an architect's plan. The purpose of research design is to impose controlled restrictions on observations of natural phenomena. It suggest the investigator what not to do.

The product of research depends upon the quality of its design. A good research work cannot be done without purposeful efforts. If the design has faults than the final results will have faults. Certain fundamental step of research design must be given due importance when proposed to be used. The operation of the design, that is planning must be carried out with patience and accuracy.

The first phase of the study i.e. the construction and process of standardization of Attitude Scale have been describing in the foregoing chapter. This chapter deals with the research design for the second phase of the study i.e. the study of the attitude of students in Gujarat towards distance education. The research design and its application is described in this chapter.

5.1 BASIC ELEMENTS OF RESEARCH METHOD

Every researcher should know the process of research. The process can be viewed as the overall scheme of scientific activities in which scientific engage in order to produce knowledge, it is the paradigm of scientific inquiry.

As illustrated in figure 5.1 the research process consists of seven principal stage: Problem, hypothesis, research design, measurement, data collection, data analysis and generalization. Each of these stages is interrelated with theory in the sense that it is affected by it as well as affects it.
The most characteristic feature of the research process is its cyclic nature. It usually starts with a problem and ends in a tentative empirical generalization. The generalization ending one cycle is the beginning of the next cycle. This cyclic process continues indefinitely, reflecting the process of scientific discipline.

The success of the researcher depends upon the research process. The research process must be sound and scientific. The sound and scientific research process gives the best result. For better result the researcher should determine the research objectives. Once the research objectives have been determined, the hypotheses explicated, and the variables defined, the researcher confronts the problem of constructing a research design that will make possible the testing of hypotheses. A research design is the program that guides the investigator in the process of collecting, analyzing and interpreting observations. It is a logical model of proof that allows the researcher to draw inferences concerning casual relations among the variables under investigation. The research design also
defines the domain of generalizability that is, whether the obtained interpretations can be generalized to a larger population or to different situations.

According to Claire Selltiz et al¹, "A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure".

This definition emphasizes fulfillment of research purpose within the limited economy. However, this definition does not make the structure of research design very clear. F.N. Kerlinger² has given best definition of research design which specifies the process and structure of research. According to him, "Research design is the plan, structure and strategy of investigation conceived so as to obtain answer to research question and to control variance."

This study is of descriptive type hence; this study involved the descriptive survey method of research. The descriptive survey method of research describes what is describing, recording, analyzing and interpreting conditions that exist. It involves some type of comparison or contrast and attempts to discover relationship between existing non-manipulated variables. Descriptive research includes surveys and fact – finding inquiries of different kinds.

The major purpose of descriptive research is description of the state of affairs as it exists at present. Education is a social science. In social science research the term Ex Post Facto Research is quite often used for descriptive research. The main characteristic of this method is that the researcher has no control over the variables, he has to report what has happened or what is happening. The methods of research are survey methods. And hence this method of research is known as descriptive survey method of research.
The basic elements of descriptive survey method of research are variables, hypotheses, research tools and the selection of the sample. Each of the four elements has been described in detail hereafter.

5.1.1 VARIABLES

Research problems are conveyed with a set of concepts that are obstructions representing empirical phenomena. In order to move from the conceptual to the empirical level, concepts are converted into variables. It is as variables that over concepts will eventually appear in hypotheses and be tested.

Concepts are converted into variables by mapping them into a set of values. For example assigning numbers [one type of values] to objects is a mapping of a set of objects into a set of numbers. A variable is an empirical property can change in value or kind, it can be regarded as a variable. For example, sex is a variable because it can be differentiated by at least two distinct values male and female. Similarly, area is a variable because it can be also assigned at least two values Urban and Rural. When a variable has only two value, it is termed a dichotomous variable.

For purpose of research it is important to make an analytic distinction among dependent, independent and control variables and between continuous and discrete variables. The variable that the researcher wishes to explain is regarded as the dependent variable. The variable is the explanatory variable, it is presumed cause of change in the values of the dependent variable, the dependent variable is the expected outcome of the independent variable. Dependent variables are also termed criterion variables and independent variables, predictor variables.

It should be stressed that the distinction between dependent and independent variables is analytic and relates only to the research purpose. In the empirical world, variables are neither dependent nor independent, the researcher decides how to view them and his or her decision is based on the research objectives. An independent variable in one investigation may
be a dependent variable in another and the same researcher in different projects may classify the same variables in different ways.

Most of the phenomena investigated by social scientists call for the assessment of the effects of several independent variables on one or more dependent variables. This happens because one independent variable usually explains only a certain amount of the variation in the dependent variable, and more independent variables have to be introduced in order to explain more variation.

In this study the students are studied as a dependent variable (sex, area, course) and distance education is studied as a dependent variable.

The various variables and their levels at which they operate in this study are given in the table 5.1

**TABLE 5.1**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Variable</th>
<th>Nature of Variable</th>
<th>No. of levels</th>
<th>Name of Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sex</td>
<td>Independent</td>
<td>2</td>
<td>1. Boys 2. Girls</td>
</tr>
<tr>
<td>2.</td>
<td>Area</td>
<td>Independent</td>
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<td>1. Urban 2. Rural</td>
</tr>
<tr>
<td>3.</td>
<td>Course (A) According to Faculty (B) According to Degree</td>
<td>Independent</td>
<td>2</td>
<td>1. Art Graduate 2. Commerce Graduate</td>
</tr>
<tr>
<td>4.</td>
<td>Distance Education</td>
<td>Independent</td>
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<td>-</td>
</tr>
</tbody>
</table>

In this study one variable is studied as independent variable and three variables are studied as dependent variable.

The above-described variable led the investigator to build some hypotheses.
5.1.2. HYPOTHESES

Hypotheses are tentative answer to research problems. They are expressed in the form of a relation between independent and dependent variables. Hypotheses are tentative conjectures because their velocity can be evaluated only after they have been tested empirically. When a researcher suggests a hypothesis, he or she has no assurance that it will be verified. A hypothesis is constructed and if it is rejected another one is put forward, if it is accepted it is incorporated into the scientific body of knowledge.

Hypotheses can be derived deductively from theories, directly from observations, intuitively or form a combination of these. The sources from which researchers derive their hypotheses are of little significance in comparison with the way in which they reject or fail to reject them.

It is common to formulate the hypothesis in a form known as the null hypothesis. In this form the hypothesis states that no difference is expected. Null hypothesis would state the two groups would not differ. The null hypothesis relates to a statistical method of interpreting conclusions about population characteristics that are inferred from the variable relationships observed in samples. The null hypothesis asserts that observed differences or relationships merely result from chance errors inherent in the sampling process.

The following null hypotheses were formulated for investigation. The null hypotheses are of general nature related to the effect of interaction between amounts in various independent variables.

H01 : There will be no significant mean difference between the score of Attitude of boys and girls towards distance education.

H02 : There will be no significant mean difference between the score of Attitude of urban and rural students towards distance education.

H03 : There will be no significant mean difference between the score of Attitude of urban boys and girls towards distance education.
H04 : There will be no significant mean difference between the score of Attitude of rural boys and girls towards distance education.

H05 : There will be no significant mean difference between the score of Attitude of urban boys and rural boys towards distance education.

H06 : There will be no significant mean difference between the score of Attitude of urban girls and rural girls towards distance education.

H07 : There will be no significant mean difference between the score of Attitude of urban boys and rural girls towards distance education.

H08 : There will be no significant mean difference between the score of Attitude of urban girls and rural boys about distance education.

H09 : There will be no significant mean difference between the score of Attitude of CIC students and CFN students towards distance education.

H010 : There will be no significant mean difference between the score of Attitude of CIC boys and girls towards distance education.

H011 : There will be no significant mean difference between the score of Attitude of CFN boys and girls towards distance education.

H012 : There will be no significant mean difference between the score of Attitude of DCA students and DDE students towards distance education.

H013 : There will be no significant mean difference between the score of Attitude of DCA boys and girls towards distance education.

H014 : There will be no significant mean difference between the score of Attitude of DDE boys and girls towards distance education.

H015 : There will be no significant mean difference between the score of Attitude of B.A. students and B.Com. students towards distance education.

H016 : There will be no significant mean difference between the score of Attitude of B.A. boys and girls towards distance education.

H017 : There will be no significant mean difference between the score of Attitude of B. Com. boys and girls towards distance education.
H018 : There will be no significant mean difference between the score of Attitude of MCA students and MBA students towards distance education.

H019 : There will be no significant mean difference between the score of Attitude of MCA boys and girls towards distance education.

H020 : There will be no significant mean difference between the score of Attitude of MBA boys and girls towards distance education.

H021 : There will be no significant mean difference between the score of Attitude of CIC boys and CFN boys towards distance education.

H022 : There will be no significant mean difference between the score of Attitude of CIC girls and CFN girls towards distance education.

H023 : There will be no significant mean difference between the score of Attitude of CIC boys and CFN girls towards distance education.

H024 : There will be no significant mean difference between the score of Attitude of CIC girls and CFN boys towards distance education.

H025 : There will be no significant mean difference between the score of Attitude of B.A. boys and B. Com. boys towards distance education.

H026 : There will be no significant mean difference between the score of Attitude of B.A. girls and B. Com. girls towards distance education.

H027 : There will be no significant mean difference between the score of Attitude of B.A. boys and B. Com. girls towards distance education.

H028 : There will be no significant mean difference between the score of Attitude of B.A. girls and B. Com. boys towards distance education.

H029 : There will be no significant mean difference between the score of Attitude of DCA boys and DDE boys towards distance education.

H030 : There will be no significant mean difference between the score of Attitude of DCA girls and DDE girls towards distance education.

H031 : There will be no significant mean difference between the score of Attitude of DCA boys and DDE girls towards distance education.
H032: There will be no significant mean difference between the score of Attitude of DCA girls and DDE boys towards distance education.

H033: There will be no significant mean difference between the score of Attitude of MCA boys and MBA boys towards distance education.

H034: There will be no significant mean difference between the score of Attitude of MCA girls and MBA girls towards distance education.

H035: There will be no significant mean difference between the score of Attitude of MCA boys and MBA girls towards distance education.

H036: There will be no significant mean difference between the score of Attitude of MCA girls and MBA boys towards distance education.

H037: There will be no significant mean difference between the score of Attitude of IGNOU student and BAOU student towards distance education.

5.1.3 TOOLS USED

The selection of an appropriate tool or instrument for measuring variables is one of the most critical components of the research process. The following tools was used in this study.

* Attitude Scale: Developed by the investigator.

The detail of the tool is given hereafter.

Attitude Scale:-

This scale is developed by the investigator to measure the attitude of students. It is in Gujarati as well as in English. It has eleven components and thirty-nine statements. The preparation and administration of the attitude scale has been described in detail in the previous chapter and is appended in Appendix.
### TABLE : 5.2

#### 1.4 POPULATION:

**IGNOU = INDIRA GANDHI NATIONAL OPEN UNIVERSITY**

<table>
<thead>
<tr>
<th>Study centre</th>
<th>CIC</th>
<th>CFN</th>
<th>DCA</th>
<th>DDE</th>
<th>BA</th>
<th>B. Com.</th>
<th>MCA</th>
<th>MBA</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
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<td>200</td>
<td>100</td>
<td>100</td>
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<td></td>
</tr>
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<td>1350</td>
<td></td>
</tr>
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<td>100</td>
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<td>100</td>
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<td>50</td>
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<td>100</td>
<td>100</td>
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<td>100</td>
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<td>10. Valsad</td>
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<td>50</td>
<td>50</td>
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<td>500</td>
<td></td>
</tr>
</tbody>
</table>

**BAOU = Dr. BABASAHEB AMBEDKAR OPEN UNIVERSITY**

<table>
<thead>
<tr>
<th>Study Centre</th>
<th>CIC</th>
<th>CFN</th>
<th>DCA</th>
<th>DDE</th>
<th>BA</th>
<th>B. Com.</th>
<th>MCA</th>
<th>MBA</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
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<td>300</td>
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<td>-</td>
<td>-</td>
<td>950</td>
</tr>
<tr>
<td>2. Baroda</td>
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<td>50</td>
<td>200</td>
<td>-</td>
<td>300</td>
<td>200</td>
<td>-</td>
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<td>100</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>450</td>
</tr>
<tr>
<td>6. Dahod</td>
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<td>100</td>
<td>-</td>
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</table>

|          | 2100| 1000| 2900| 1450| 2600| 2450| 1400| 1350| 15250 |

Out of 10 study centres of IGNOU and 8 study centres of BAOU, 4 study centres of each have been selected randomly. 1528 students from different study centres of IGNOU and BAOU of Gujarat (which includes working in Govt. Private Offices, Schools, Colleges, Urban and Rural students, non-working students boys and girls) were served the scale. All
respondents took a great interest in the study and timely sent their responses.

5.1.4. SAMPLE SELECTION

The selection of the sample is an important part in the research study. A sample is said to be representative of a population or universe. When it has approximately the characteristics of the population relevant to the research in equalities. A sample is a subject of the population. The real worth at the sample lies in its accuracy and representativeness.

The sample should be the representative of a population. According to Johnson\(^3\), "A representative sample is defined as one, with which the measurement made on it units are equivalent to those which would be obtained by measuring all the elements of the population."

Travers\(^4\) defines sampling as: "A representative sampling is one in which the characteristics of the sample are similar in important respect to characteristics of the population sampled."

Hence, representative sampling should be carefully determined. There are different methods of sampling. According to Rumell\(^5\), they are:

(i) Random Sampling
(ii) Stratified sampling
(iii) Area Sampling
(iv) Systematic Sampling
(v) Purposive Sampling and
(vi) Quota Sampling.

Garrett\(^6\) suggests the following methods of sampling:

(i) Random Sampling
(ii) Stratified Sampling
(iii) Incidental Sampling and
(iv) Purposive Sampling
The investigator selected the stratified cluster sampling method, because that enabled him to take the special advantage in connection with the nature of research data. A deep study also needs an adequate familiarity with the environment. This can be really obtained if the area is geographically limited. So it was realised that the intensiveness of the study and the validity of data would be adversely affected if the sample chosen was spread all over Gujarat. Under the circumstances it appeared that stratified cluster sampling could be used with advantage.

The next problem was to select a cluster and to draw the required sample. In Gujarat, there are 25 districts but investigator has selected four districts, i.e. Ahmedabad, Kheda, Anand and Baroda as a cluster would not have geographically unmanageable. The basic principle underlying stratified cluster chosen be studied entirely. From the districts, eight study centres of two Open University i.e. Indira Gandhi National Open University and Dr. Babasaheb Ambedkar Open University were chosen as a cluster. The scale was administered to 1528 students of two open universities of their study centres of different courses of Gujarat.

Our of 10 study centres of IGNOU and 8 study centres of BAOU, 4 study centres of each have been selected randomly. 1528 students from different study centres of IGNOU and BAOU of Gujarat (which includes working in Govt. Private Offices Schools, Colleges, Urban and Rural students, non-working students) were served scale. All respondents took a great interest in the study and finally sent their responses. The detail of the sample is represented in the following table.

Table: 5.3

5.2 HYPOTHESIS TESTING

The process of statistical inference enables the investigator to evaluate the accuracy of their estimates. The use of inferential statistics is the assessment of the probability of specific sample results under assumed population conditions. This type of inferential statistics is called hypothesis testing.
Table 5.3

Sample

<table>
<thead>
<tr>
<th>IGNOU Study Centre</th>
<th>CIC</th>
<th>CFN</th>
<th>DCA</th>
<th>DDE</th>
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<th>B.Com</th>
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</thead>
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</table>
5.2.1 STRATEGY OF HYPOTHESIS TESTING

The first step in testing a hypothesis is to formulate it in statistical term. It is already discussed in the previous para how to draw a hypothesis from a theory or how to formulate a research problem as a hypothesis. However, in order to test the hypothesis, one must formulate it in terms that can be analyzed with statistical technique. The statistical hypothesis is formulated in terms of descriptive statistics (such as a correlation are mean) as well as a set of specifying conditions about these statistics (such as a positive correlation or a difference between the means.)

The statistical hypothesis always applies to the population of interest. In this study no inference would be necessary if the population could be directly tested, then any difference between the means would support the hypothesis. However, sample results are subject to sampling fluctuations, which would account for the difference between the means. Thus a result in line with the hypothesis is true or false, with the results being due to chance factors.

For testing the hypothesis a research design is needed. In the descriptive survey method, the investigator manipulates and controls one or more dependent variables and observes the independent variables for corresponding changes.

5.2.2. CHOICE OF RESEARCH DESIGN

In deciding choice of research design the investigator has to take into consideration several factor like available setting nature of objectives and time.

Two separate and dimensions can help the investigator in the choice of approach. Fox had suggested the following table.
TABLE 5.4
Interaction of time and intent dimensions of Research Design

<table>
<thead>
<tr>
<th>Dimension I Intent of RD</th>
<th>Dimension II Time in which interest lies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Description</td>
<td>Past Historical Sample Historical</td>
</tr>
<tr>
<td></td>
<td>Present survey simple survey case study</td>
</tr>
<tr>
<td></td>
<td>Future Experimental Experimental</td>
</tr>
<tr>
<td>Comparison</td>
<td>Parallel Historical</td>
</tr>
<tr>
<td></td>
<td>Multiple Group Correlation Survey</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Historical and Criterion</td>
</tr>
<tr>
<td></td>
<td>Single Group Survey and Multiple Group survey Criterion measure</td>
</tr>
<tr>
<td></td>
<td>Single Group Experiment with criterion measure</td>
</tr>
</tbody>
</table>

In the present study table 5.2 leads the investigator to the choice of research design looking to the dependent variables the investigator has selected the descriptive survey method to test the hypothesis.

5.2.3 Statistical technique

This study is under taken to measure the attitude of students in relation to area, sex and courses.

The investigator had used the t-test and coefficient of correlation as the statistical techniques in this study.

The next chapter deals with the analysis of data.
REFERENCES:


