CHAPTER III

METHODOLOGY

3. INTRODUCTION

Research is a scientific process of discovering new knowledge. Research aims at the discovery of the relationships that exist among the phenomena of the universe. It may further be described as the application of the principles and procedures of scientific inquiry to enhance the understanding related to the education of the young and the old and also to develop a sound and rational base for the practice of education.

McClure and Hersson (1991), refer that research is an inquiry process that has clearly defined parameters and has its aim as the discovery or creation of knowledge, or theory building, testing, confirmation, revision, refutation of knowledge and theory or investigation of a problem for local decision making. Kerlinger (1978) put the views that scientific research is a systematic, controlled, empirical, critical investigation of hypothetical propositions about the presumed relations among natural phenomena.

Any research studies whether educational or scientific needs carefully planned and systematic presentation. Step and procedures common to all types of method and research are selection, formulation and definition of problem, conceptual clarity, methodology, survey of related literature and documentation, collection of data, interpretation and presentation of data and report writing.

3.1 METHODOLOGY

The term methodology is often loosely used to refer to the techniques or procedures of data collection. In a sense, methodology is the entire research process thought out logically in which selection of study units, techniques to be used in direct or indirect observation, etc. are attendant important parts. “The machinery of methodology”, according to Barr (1960), “occupies a very important position in any of research. The research cannot perform its function without it, since it is the methodology which lays out the way that formal
research is to be carried out and outlines the detailed description of the research procedure.

The success of any research mainly depends upon the kind of methodology and procedure followed in the stepwise execution of the study. A well-organized and sound methodology directs the investigator to the desired target. According to Lokesh Koul, “Methodology of educational research describes the various steps of the plan of attach to be adopted in solving a research problem.” The selection of a method with a specific design depends upon the nature of the problem and upon the kind of data that the problem entails. However, the method selected should be in cohesion with specific principles and adequate enough to lead to a reliable generalization. However, in any specific study, it is a common practice to use one of the above methods, though two or more methods also can be applied effectively in combinations in certain research situation. A researcher must have a thorough understanding of all research methods with particular reference to their strengths, limitations, applicability and appropriateness. Research has proved to be an essential and powerful tool in leading towards progress. Research methodology is the procedure, which is designed and adopted in solving a research problem.

3.1.1 THE RESEARCH DESIGN OF THE STUDY

A research design is a plan, structure and strategy of investigation so conceived as to obtain answers to research questions or problems. The plan is the complete scheme or program of the research. It includes an outline of what the investigator will do from writing the hypotheses and their operational implications to the final analysis of data (Kerlinger 1986). A research design is a procedural plan that is adopted by the researcher to answer questions validly, objectively, accurately and economically (Kumar 2007).

The present Chapter describes the entire plan of the study that has been undertaken by the investigator. Present study is basically survey-cum-explorative type of research which is one part of the descriptive research.
3.1.2 DESCRIPTIVE METHOD

Descriptive research studies are designed to obtain pertinent and precise information the current of phenomenon and whenever possible, to draw valid general conclusions from the facts discovered. They are restricted not only to fact finding but many often in the formulation of important principles of knowledge and solution of significant problems concerning local, national and international. Descriptive studies are more than just a collection of data; they involve measurement, classification, analysis, comparison and interpretation. They collect and provide three types of information: (1) of what exists with respect to variables or conditions in a situation: (2) of what we want by identifying standards or norms with which to compare the present conditions or what experts consider to be desirable, and (3) of how to achieve goals by exploring possible ways and means on the basis of the experience of others or the opinions of experts.

Descriptive studies investigate phenomenon in their natural setting. Their purposes are both immediate and long range. They constitute a primitive type of research and do not aspire to develop an organized body of scientific laws. Such studies, however, provide information useful to the solution of local problems and at times provide data to form the basis of research of a more fundamental nature.

The descriptive research method has undoubtedly been the most popular and most widely used research method in education. It helps to explain educational phenomenon in terms of the conditions or relationships that exists, opinion that are held by the students, teachers, parents and expert, processes that are going on, effects that are evident or trends that are developing. Because of the apparent ease and directness of this method, a researcher can gather information in terms of the individual’s opinion about some issue by a simple questionnaire. At time, descriptive survey is the only means through which opinions, attitudes, suggestion for improvement of educational practices and instruction, and other data can be obtained.

Types of descriptive research:
For the sake of convenience descriptive studies may be classified in the following three categories:

1. Survey Studies
2. Interrelationship studies
3. Development studies

3.1.3 SURVEY STUDIES

Survey is the most commonly used descriptive method in educational research. Survey studies are conducted to collect detail descriptions of existing phenomenon with the intent of employing data to justify current conditions and practices or to make more intelligent plans for improving them. Their objective is not only to analyze, interpret and report the status of an institution, group or area in order to guide practice in the immediate future, but also to determine the adequacy of status by comparing it with established standards. Some surveys are confined to gather all three types of information: (1) data concerning existing status, (2) comparison of existing status with the established status and standards, and (3) means of improving the existing status, while others are limited to one or two these types.

The present study is basically survey type research. It is a survey type of research because, here the researcher has made a survey in order to know the existing financing of technical education in India since independence. It is an explorative type of research in the sense that here the researcher has made an in-depth explorative study in order to know the trends, criteria, utilization and problems of financing in technical education in India. Specifically, the study intends- 1) to study the trends of financing technical education India. 2) To study the criteria for financing the technical education. 3) To examine the utilization of funds in technical Institutes. 4) To make a comparative study of financing in Technical Education in last two five year plans. 5) To study the problems financing the technical education. 6) To make a comparative analysis of the financing of govt. & private technical Institutes in India. For meeting these objectives, Status Questionnaire, Personal Observation & discussion/interview with the key officials of the Institute were used by the researcher.
3.2 SOURCES OF DATA

The required data for the study were obtained from the sources classified as follow:

1. Exploration of the field
2. Exploration of the documents
3. Consultation with the experts

3.2.1 Exploration of the Field

The field of the study was explored through inter-communication with the Head of the Institute, Registrar/ CAOs of the institute. During this phase, it was observed that the data supplied by the officials, in many cases, were quite obsolete and due to such reason, in later phase, the researcher was under compulsion to explore the base-line data by the help of teachers from the different institutes.

3.2.2 Exploration of the Documents

To drive the study in its proper direction to reach the objectives, the following documents had been explored in addition to the research literatures, to acquire data:

6. Country Paper on Higher Education in India Presented by R. Chakravarty at Ninth Session of the Regional Committee Meeting for the Regional Convention on the Recognition of Studies, Diplomas and
Degrees in Higher Education in Asia and the Pacific in conjunction with the Regional Seminar on Regional Harmonization: Establishing a Common Higher Education Area, Seoul, Republic of Korea, May 2007.


14. National Profiles in Technical and Vocational Education in Asia and the Pacific - India (ACEID, 1995, )

Apart from this the Institute & Universities Vision Documents, Annual Reports & Web sites have been consulted extensively to gather data for the study purpose.

3.2.3 Consultation with the Experts

Essential data as well as information to carry out the study was creamed out by the way of formal consultation and taking opinion of experts in the field of technical education.

3.3 METHODOLOGICAL DIAGRAM OF THE STUDY

The detailed study has been summarized in the following table No.4.1.
<table>
<thead>
<tr>
<th>Objectives</th>
<th>Data-gathering, tools/techniques</th>
<th>Nature of the tools/techniques</th>
<th>Sources of data</th>
<th>Nature of the data</th>
</tr>
</thead>
<tbody>
<tr>
<td>To study the trends of financing technical education in India.</td>
<td>Documentary Survey</td>
<td>Self-developed and standardized</td>
<td>1. Encyclopedia, Handbook, Journals, Annual Reports and other Reference Sources</td>
<td>Qualitative as well as quantitative</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Website of the Institutes</td>
<td></td>
</tr>
<tr>
<td>To study the criteria for financing the technical education.</td>
<td>Documentary Survey Interview</td>
<td>Self-developed and standardized</td>
<td>1. Encyclopedia, Handbook, Journals, Annual Reports and other Reference Sources</td>
<td>Quantitative</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Website of the Institutes/MHRD/Planning Commission</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Key officials of the Institute /MHRD/Planning Commission Officials</td>
<td></td>
</tr>
<tr>
<td>To examine the utilization of funds in technical Institutes.</td>
<td>Status Questionnaire &amp; discussion/ interview with the key officials of the Institute</td>
<td>Self-developed and Standardized</td>
<td>1. The Degree offering Technical Institutes &amp; University Engineering Departments in India</td>
<td>Quantitative</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Website of the Institutes/MHRD/Planning Commission Officials</td>
<td></td>
</tr>
<tr>
<td>To make a comparative study of financing in Technical Education in last two five year plans.</td>
<td>Status Questionnaire &amp; discussion/ interview with the key officials of the Institute</td>
<td>Self-developed and Standardized</td>
<td>1. The Degree offering Technical Institutes &amp; University Engineering Departments in India</td>
<td>Qualitative</td>
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<tr>
<td>To study the problems financing the technical education.</td>
<td>Status Questionnaire</td>
<td>Self-developed and Standardized</td>
<td>1. The Degree offering Technical Institutes &amp; University Engineering Departments in India</td>
<td>Qualitative as well as quantitative</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>2. Website of the Institutes</td>
<td></td>
</tr>
<tr>
<td>To make a comparative analysis of the financing of govt. &amp; private technical Institutes in India.</td>
<td>Interview, Personal Observation &amp; discussion with the key officials of the Institute</td>
<td>Self-developed</td>
<td>The Degree offering Technical Institutes &amp; University Engineering Departments in India</td>
<td>Qualitative as well as quantitative</td>
</tr>
</tbody>
</table>
3.4 COLLECTION OF DATA

Data collection is an essential and important part of the research process. On the basis of the collected data, the researcher can identify as valid, verify as correct, or reject as untenable his/her tentatively framed inferences or generalizations. In order to collect the required data for a research problem, the researcher has to sample the population concerned, since it is not possible to encompass the entire population. The researcher may have to devise appropriate tools for measuring the attributes concerned and to administer them. In the present chapter, the researcher adopted the following steps:

1) Selection of Sample
2) Selection of tools
3) Administration of tools
4) Tabulation and organization of data.

3.4.1 Selection of Samples

Sampling is the process by which a relatively small number of individuals, objects or events is selected and analyzed to find out precise information about the whole. Sampling procedures provide generalizations or the basis of a relatively small proportion of the population. Most of the educational phenomena consist of a large number of units. It would be impracticable, if not impossible, to test interview or to observe each unit of the population under controlled conditions in order to arrive at generally valid principles. Some populations are so that their study would be expensive in terms of time, money, effort and manpower. In the words of W. G. Coachran-“The purpose of sampling theory is to make sampling more efficient. It attempts to develop methods of sampling selection and of estimation that provide at the lowest possible cost estimates that are precise enough for our purpose”.

A sample is a small proportion of a population selected for observation and analysis. It is a collection consisting of a part or subject of the objects or individuals of populations which is selected for the purpose of representing the population. By observing the characteristics of the sample; one can make certain inferences about the characteristics of the populations from which it is drawn.
It is accepted by the researchers, experts and educationists that it is not possible for an investigator to collect data’s from each every individual of the selected area of research. The term population refers to collection of any specified group of human beings or non-human entities such as objects, educational institutions, time units, geographical areas, individual, etc. The term “population” signifies the total number of aspects for which the information is collected and the investigations conducted. As it is impossible to collect information’s or data from the whole population, a sample is selected from the total population. The process of selecting the true representative is termed as “Sampling”.

In the present study the researcher has selected the following institutes as the sample.

<table>
<thead>
<tr>
<th>Institute</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian Institute of Technology: (IITs)</td>
<td>15</td>
</tr>
<tr>
<td>Indian Institute of Management: (IIMs)</td>
<td>13</td>
</tr>
<tr>
<td>Indian Institute of Science (IISc) Bangalore</td>
<td>1</td>
</tr>
<tr>
<td>Indian Institute of Science Education &amp; Research: (IISERs) Bhopal, Kolkata, Mohali, Pune, Thiruvananthapuram</td>
<td>5</td>
</tr>
<tr>
<td>National Institute of Technology : (NITs)</td>
<td>30</td>
</tr>
<tr>
<td>Indian Institute of Information Technology: (IIITs) Hyderabad, Allahabad, Bhubaneswar, New Delhi</td>
<td>4</td>
</tr>
<tr>
<td>National Institute of Technical Teachers’ Training &amp; Research: (NITTTRs) Chandigarh, Bhopal, Kolkata, Chennai</td>
<td>4</td>
</tr>
<tr>
<td>Others (SPA, ISMU, NERIST, SLIET, NITIE &amp; NIFFT, CIT)</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>81</td>
</tr>
</tbody>
</table>

3.4.2 Selection of Tools

A research design is the experimenter, what a blue print is to an architect (Van Dalen, 1962). But the success of design depends upon the tools, which are used to collect the data and verify the results. Tools of research refer to the devices by which relevant data are collected. Tools may be good in design but full success depends upon how they are operated i.e. technique of using the tools.

For any research study, the researcher has to collect data and on the basis of that data he draws conclusions and arrives at generalizations. These generalizations and conclusions will be correct and valid if the data are
methodically collected. For collecting reliable and valid data one needs and valid tools of data collection. Therefore, the researcher is to select the tools of data collection carefully and judiciously. An investigator requires many data gathering tools or techniques which vary in their complexity, design, administration and interpretation. Each tool is appropriate for collection of certain of evidence or information. The investigator selects from the available tools which will provide data verify the objectives. In some situations, the investigator may find the existing research tools inadequate to serve his purpose. In such cases, he may modify or construct his own tools.

Further, the selection of suitable tools for a particular study depends upon the objectives of the study as per the nature and objectives of the present study; the researcher developed and used the following tools:

1) Questionnaire
2) Observation
3) Interview

3.4.2.1 Questionnaire

A questionnaire is one of the most commonly used data gathering devices. A questionnaire is a device consisting of a series of questions dealing with different problems of an object/institute. The respondent is asked to supply answers to these questions in the space meant for this purpose in the questionnaire itself. According to Goode and Hall (1952) the word “questionnaire” refers to a device for securing answers to a series of questions by using a form which the respondent fills in himself. Similarly, Barr, Davis and Johnson defined questionnaire as a systematic compilation of questions that are administered to a sample of population from which in information is to be collected. Judd, Smith and Kidder (1991) stated that for eliciting information, the questionnaire is the most appropriate device. This is a popular device often used in behavioral necessities including education, where it usually takes the form of surveys. Broadly, there are two forms of questionnaire, viz. closed form and open form. In closed form questionnaire, the respondent merely selects suitable answer from multiple answers supplied with the question. It requires all the respondents to answer within the same framework, i.e. such questions have a restricted set of possible responses.
A Questionnaire is a device consisting of series dealing with topic(s) sent or given to an individual or a group of individuals, with the objective of obtaining data on some problems under investigation. Goode and Hall say that in general the word ‘Questionnaire’ refers to a device for securing answers to a series of questions by using a form, which the respondent fills in himself. Barret Al defines Questionnaire as a systematic compilation of questions that are administered to a sample of population from which information is desired. Questionnaire is popular means of collecting all kinds of data in research. It is widely used in educational research to obtain information about certain conditions and practices, and to inquire into opinions and attitudes of an individual of a group. A Questionnaire is either administered personally to a group of individuals or it is mailed to them to save a great deal of time and money in travel. In the former situation, the person administering the tools has an opportunity to establish rapport with the respondents, and to explain the meaning of questions to the respondents that may not be clear to them.

In the later situation the mailed Questionnaire is probably both the most and most abused data-gathering research tool. It is mostly used when the individuals from whom we desire information cannot always be contacted personally without the expenditure of great deal of time and money in travel.

In the present study, the researcher developed one sets of Questionnaire for the collection of data.

Before preparing the Questionnaires a number of books and journals were consulted to decide the type of questions to be incorporated to elicit responses on selected variables of both facilities and utilization of the school library. The investigator himself visited schools, interacted with authorities, students and library in charges and got sufficient insights regarding the library facilities and their utilization in schools.

After getting various information, the investigator had detail consultations with experts, particularly librarians, teachers, academicians and other individuals working in the field. On the basis of the discussions, the Questionnaires were prepared. Initially a pilot study was taken up and the Questionnaires were applied on a small. The situational contexts, language and format were thereafter finalized.
on the basis of the responses received. For the development of the questionnaires, the researcher has adopted the following steps:

Step-1: Collections of questions: The researcher collected 100 questions from the various sources. While collecting the questions/formulating the questions, the researcher kept in mind all those criteria which have been stated by Best & Khan in their book of Research In Education (1998, PP.233).

Step-II: Editing of the Questions: All these 100 questions got edited by two subject experts. Out of 100 questions the experts rejected 47 questions and in the preliminary draft of the questionnaire 53 questions remained for testing.

Step-III: Try Out: Though the researcher took every care during the time of preparation of the preliminary draft yet the questionnaire was tried out on a sample of 5 institutes and it was found that the questionnaire is quite convenient to the respondents in making out the answers of the questions. Since the draft of 35 questions was found satisfactory, therefore, it was used for identifying the financial status of technical institutes. The detail of the Questionnaire is given in Annexure: A.

3.4.2.2 Interview

The Interview is a process of communication or interaction in which the subject or interviewee gives the needed information verbally in a face-to-face situation. According to J W Best, the interview is in a sense an oral questionnaire. Instead of writing the response the subject or interviewee gives the needed information orally and face to face. It is a two-way method, which permits an exchange of ideas and information. For a skillful interviewer, the interview is certainly superior to any other data-gathering devices. After the interviewer gains rapport, or establishes a friendly relationship with the subject, certain types of confidential information may be obtained that an individual might be reluctant to put in writing. It is unique is that it involves the collection of data through direct verbal interaction between the interviewee and the interviewer. It requires the actual physical proximity of two or more persons and generally requires that all the normal channels of communication be open to them. As a research technique, the interview is a conversation carried out with the definite purpose of obtaining certain information by means for the spoken word.
The interviewer can explain the purpose of his investigation, and can explain more clearly just what information he wants. If the subject misinterprets the question, the interviewer may follow it with a clarifying question. At the same time, he may evaluate the sincerity and insight of the interviewee. It is also possible to seek the sample information in several ways, thus providing a check for the truthfulness of the responses.

According to Godde, the reliability of the data obtained through interview is affected by the following factors:
1. Many interviewees desire to make good impression, particularly in answer to questions concerning generally accepted standard of behaviour.
2. Many interviewees try to refrain from giving highly personal information, revelation of which might appear damaging to them.
3. The interviewer’s attitude of confidence in and sense of respect for the interviewee may dilute the information received.
4. Content and form of questions, procedures set for interview, physical setting, recording mode and casual distractions at the time of interviewing also affect the result.

This Interview technique, which is known to be important tool for gathering relevant information in a research project, was used in the present investigation to obtain adequate information during evaluation of the sample study. Interview was conducted mainly with the Head of the institution, of the universities / institutes and also the students/teacher whenever it was thought to be necessary to gather more information of the sample study.

So, side by side with the questionnaire, the interview was also used to have a clear conception of the actual need of the study. A checklist was also prepared to overcome the gap of the technique used.

3.4.2.3 Observation

As a data gathering device direct observation may make an important contribution to the descriptive research. Certain types of information can best be obtained through direct examination by the investigator. The investigator had visited a number of technical institutions in India and had observed the working of
those institutions in detail. He recorded his observations on the spot for analysis and interpretation.

### 3.4.3 ADMINISTRATION OF TOOLS

After having the completion of selection of sample and preparation of data gathering tools, the next step is to proceed for collecting data. The investigator as a first step of his research study established contacts with the registrar’s of the selected technical institutes in order to get effective co-operation and smooth conducting of the research study.

The Questionnaires were administered in the technical institutes and the investigator collected the necessary information from Head of the institutions. The investigator visited most of the mentioned institutions personally.

### 3.4.4 STATISTICAL TECHNIQUES USED

The collected data were sorted down and classified in the tabular form for simplicity in drawing conclusions. For analyzing and interpreting the data, percentage and graphical representation were applied.

### REFERENCES

Kumar, Ranjit (2007). Research Methodology, Dorling Kindersley, India.