
MODULE 1

RESEARCH: CONCEPT, TYPES & STEPS

INTRODUCTION

The progress of any Nation to a great extent depends on the Research and Development. The explosion of information is due to the researches in different areas. The technological development is also due to Research. In nutshell the Research is the backbone of any country progress and development. Thus, research is conducted in all disciplines. But it is observed that the society gets maximum benefit from researches conducted in different areas of Science, Medicine and Technology. The findings of researches in Social Sciences are not as useful as those of Science, Medicine and Technology. Further, in India Research Methods are not taught in many disciplines although people do research. Now people are becoming conscious about the importance of Research Method. In this chapter information is given related to Concept of Research, types and steps to be followed in conducting research in any discipline. After reading this article, you will be able to:

- Define Research
- List characteristics of Research
- Differentiate between Research, Discovery, and Invention
- Differentiate between different types of Research
- List the steps to be followed in conducting research

RESEARCH

It is a known fact that necessity is the mother of invention. The necessity comes in the form of a Problem. The Problem is the base of Research. There is a Problem and its' Solution also exists but the people may not be fully satisfied with the existing Solution of the Problem. It is this **dissatisfaction** that motivates people to find another Solution of the same Problem. It is also a fact that there is no absolute Solution of the Problem. Each Solution of the Problem leads to a new Problem. Take the case of mobile. People wanted to be in contact during their travel. It was the need. The research gave mobile as the Solution but there are many Problems associated with it. The researches have indicated that there are many health hazards which

were not before the invention of mobile. Thus, research gives both the Solution and new Problem.

It is a fact that there are many solutions of the same problem both in Sciences and Social Sciences. Due to this, it is not appropriate to say that the outcome of the research, that is, the Solution is correct or incorrect. The Solution of the Problem has to be accepted as it comes. For getting the Solution, some Activities have to be carried out. Any Activity can be carried out unsystematically or systematically. An activity is said to be carried out systematically when the probability of success is maximum. On the other hand, whenever the probability of success is not maximum, the activity is said to be done unsystematically. So in Research Activities have to be carried out systematically. The word Systematic reflects that there are well defined steps arranged in predefined order/sequence. Whenever there are steps, it must be a Process. On the basis of above explanation, the research can be defined as:

Research refers to a **Process** wherein **Activities** are carried out **Systematically** to find **Solution** of the **Problem**.

This is the general definition of Research. From this the definition of research in different disciplines can be coined. A few are given below:

Research in Physics refers to a **Process** wherein **Activities** are carried out **Systematically** to find **Solution** of the **Problem related to some aspect of Physics**.

Research in Hindi refers to a **Process** wherein **Activities** are carried out **Systematically** to find **Solution** of the **Problem related to some aspect of Hindi**.

Research in Education refers to a **Process** wherein **Activities** are carried out **Systematically** to find **Solution** of the **Problem related to some aspect of Education**.

Research in Management refers to a **Process** wherein **Activities** are carried out **Systematically** to find **Solution** of the **Problem related to some aspect of Management**.

CHARACTERISTICS OF RESEARCH

The following are the characteristics of any research.

- It is Systematic in nature.
 - It is Problem oriented.
 - It refers to a Process.
-

-
- It involves Activities.
 - It leads to Solution.

DIFFERENCE among DISCOVERY, INVENTION and RESEARCH

Let us take the example of X – Ray. X – Ray was discovered incidentally in 1895 by German Scientist Wilhelm Roentgen. India was also discovered incidentally by Vasco da Gama in 1497. No Systematic efforts were made. Thus, Discovery is not the outcome of activities carried out systematically. It is due to this that people cannot be trained for Discovery. Thus, Discovery is unsystematic.

The steam engine was invented by James Watt. Let us understand the process of inventing Steam Engine. James Watt saw that the steam coming out of the boiling water was able to lift the lid put over the vessel. It reflected that the steam has energy to push the lid upward. James Watt thought of using this idea and the Steam Engine was invented through activities carried out systematically. Thus, Steam Engine was the outcome of activities carried out systematically. Inventions are Applied Researches. So, the Invention may take place while someone is doing Research. Research as pointed out earlier is Systematic in nature. So, Invention is systematic in nature and it may happen during conducting Research. Thus, it is easy to differentiate among Discovery, Invention & Research.

TYPES OF RESEARCH

There are different Types of Research. The Type of Research depends on its base. The types of Researches along with their bases are given below:

Qualitative Research & Quantitative Research

The data / information can be Qualitative or Quantitative. In Languages, Philosophy, History, etc. mostly the Qualitative data exist. The Qualitative data can be converted into Quantitative data but it should not be converted into Quantitative data because there is a loss of information or data. To understand this let us take one example. Suppose there is a 10 marks question while checking the answer of this question, the teacher reads the answer which is in Qualitative form and assigns say 6 marks out of 10 which is the maximum score for this question. So the Qualitative data/information has been converted into Quantitative data. Now from this Quantitative data can one get back the Original Qualitative data? The answer is no. It means there is a loss of information in transforming Qualitative data into Quantitative data.

So while analyzing the Qualitative data one should not convert it into Quantitative data. It should be used as Qualitative data only. Thus, the basis for **Qualitative Research & Quantitative Research** is Types of data / information.

Philosophical Research, Historical Research, Survey Research, Experimental Research & Case Study Research

For conducting Research, the researcher has to follow some steps. So there is a Method or Procedure to be followed in conducting a Research. The Method / Procedure to be followed are different for different researches. Thus, on the basis of Method / Procedure followed, the types of Research are: Philosophical Research, Historical Research, Survey Research, Experimental Research, & Case Study Research. **Thus the basis of classifying researches into Philosophical Research, Historical Research, Survey Research, Experimental Research, & Case Study Research** is Method / Procedure followed.

Basic / Fundamental / Theoretical Research, Applied / Experimental Research, and Action Research

The outcome of a Research is in the form of Solutions of the Problem. It is also called findings. It is observed that sometime the findings of Research are not usable. That is, society cannot benefit from the findings of all Researches. Such researches are not required as the society cannot benefit from them. It is a well-known fact that the Theory developed by a person is not only used by the people of his country but the whole World can benefit from the Theory. Thus, the Basic/Fundamental/Theoretical Research has Utility or Applicability for all people of the world.

Fan, TV, Mobile, etc. are the outcomes of Applied/Experimental Research. Fan which is used in India requires 220 Volts but the Fan in Canada requires 110 Volts. It means that the Indian Fan will not work in Canada and similarly Canada Fan will not work in India. Mobile requires SIM card which differs from country to country. Thus Applied/ Experimental Researches have limited Utility/ Applicability. So the Degree of Utility or Applicability reduces.

Finally, you must have noticed that two people having fever may not get the same medicine. There are large numbers of medicine for fever. Whatever medicine suits to a person, the same medicine may not suit to another person. Similarly, if the students of College A go on strike and the College Authority negotiate with the students and find the solution of the problem.

The students go back to their classes. Suppose after some time another College B students go on strike. The reason of going on strike by students of College A may or may not be the same as that of College B. So, the solution of College A will not apply to College B. Separate solution has to be worked out. So, the Degree of Utility or Applicability is too limited.

Thus, the base of **Basic / Fundamental/ Theoretical Research; Applied/ Experimental Research and Action Research is the Degree of Utility or Applicability.**

STEPS OF RESEARCH

The Research refers to a Process which is Scientific or Systematic in nature. So its steps are also derived from the Scientific Process. These are as follows:

- **Identification of Problem**
- **Formulation of Hypothesis**
- **Data Collection**
- **Data Analysis**
- **Conclusion**

The details of each step are given below:

Identification of Problem is the first step. Let us understand why the first step of research is Identification of Problem but not Selection of Problem? Identification word is to be used when the situation is heterogeneous and in homogeneous situation Selection word is to be used. Take an example. Whenever one goes to the market to buy vegetable, one first find out which all types of vegetables are available. Naturally, there are different types of vegetables in the market. So it is heterogeneous situation. Suppose one decides to purchase potatoes. From potatoes one will select potatoes of nearly the same size. Here the word selection is used because one is taking potatoes from heap of potatoes which is homogeneous because all are potatoes. Thus, Selection word is used whenever the situation is homogeneous and in heterogeneous situation Identification word is to be used. This is because it is easy to select when the situation is homogeneous.

To understand the difference between Identification and Selection, let us take another example. There are subjects like, Economics, Political Science, Hindi, English, Management, Education, Psychology, Social works, Physics, Mathematics, Chemistry, etc. It is a heterogeneous situation. Suppose one wants to do research in Management. So the researcher has identified the subject in which he/she want to do research. There are different areas in Management, like, Marketing, Finance, Advertising, Human Resource, etc. From these the

researcher decides to do research related to Marketing. There are different Marketing strategies. Among these one may decide to conduct research related to e-marketing. This is Selection because the researcher started narrowing Management to Marketing than to e-marketing.

Now let us understand the word Problem. You have normal body temperature but it is not a Problem. It becomes Problem whenever body temperature changes. Suppose you want to buy Car. As there are varieties of cars, it may not be easy to choose one car. The decision about the car is not easy. Thus, more alternatives lead to Problem as it delays the decision-making process. A characteristic that has a tendency to change is called Variable. Thus, another name of Problem is Variable. In this step the researcher has to finally select the Variable.

In this step, the researcher is supposed to select the Variable. After this, the title has to be written. The title should neither be too broad nor too specific. It should be narrow. The title should give information about the Variable(s) to be studied. The Population of the study should also be reflected in the title. After reading the title the reader should also know the Nature or Type of Research. Thus, an appropriate research title should give:

- Information about the Variable(s),
- Population, and
- Type of Research.

Any title that does not give all these information is not complete. Further the Title cannot start with the word “To” because the Title is not pinpointed. Also, the Title cannot indicate the direction. The Objectives have to start with the word “To” because Objectives are pinpointed and indicates the direction. After writing the Title of Research, the researcher should write the Objectives. The Objectives are research questions whose answer the researcher tries to get through the research. The Objectives can be written in Statement form or in Question form. In one research, both Objectives as well as Research Questions should not be written.

Formulation of Hypotheses is the second step. Hypothesis is the tentative solution of the Problem. Another definition is that Hypothesis is the Intelligent Guess about the solution of the Problem. Conjectural statement about the relationship between Variables is another definition of Hypothesis. From these definitions it is evident that Hypothesis is not the final Solution of the Problem. To get the final Solution, it has to be tested. The Testing of

Hypothesis is to be done with the help of Statistical Technique. The Statistical Technique requires quantitative data. It means whenever in a research quantitative data are not collected, the Hypothesis cannot be tested. Hence Hypothesis should not be formulated in a research where Qualitative data are collected. Thus, Formulation of Hypothesis step may not be there in some researches. Thus, it is an optional step.

The researcher must understand:

- How the Hypothesis is to be worded?
- Should “Significant” word be used or not in the Statement of Hypothesis?
- What difference will it make if significant word is not used in the Statement of Hypothesis?
- What is the base or rational of stating the Hypothesis?
- When should one state Null Hypothesis or Directional Hypothesis?
- When to use One Tailed Test or Two Tailed Test?
- What is the relationship between level of Significance and Type of Error?

Data Collection is the third step of research. To start with, the researcher should know from where the data are to be collected. That is, the Population should be known in case of Survey and Experimental Type of Researches and Source of Data should be known in case of Philosophical and Historical Type of Researches. It may happen that the researcher is not able to collect information or data from each and every member of the Population. Under such circumstances, the Sample has to be taken from the Population. **The process of selecting Sample from the Population is called Sampling.** The Sample is the small representative portion of the Population. The representation has to be with respect to the correlates of the variable under study. It is not possible to have truly representative Sample of the Population but efforts must be made to select Sample that can represent the Population to the maximum extent. There are different Sampling Techniques. The Sampling Techniques have been classified into two categories:

- Non-Probability Sampling and
- Probability Sampling.

The researcher must know which type of Sampling Technique is to be used in the current research or research in hand. This information is known from the Objectives of Research. It is only the wording of the Objective that can guide researcher in deciding which Sampling

Technique is to be used. Further, the researcher must know what Sample Size should be appropriate for the research. The Sampling Error must be known to the researcher.

After selecting the Sample, the researcher should decide the Tool or Instrument to be used for Collecting Data. The Tools are of various types, such as, Test, Scale, Inventory, Observation Schedule, Interview Schedule, and Questionnaire. Tools are Standardized and Unstandardized. Tests, Scales and Inventories can be standardized but Interview Schedule and Questionnaire cannot be standardized. On the other hand, Observation Schedule cannot be standardized but inter observer reliability can be established. The researcher must know that tools have characteristics. The characteristics are Reliability, Validity, Objectivity, Sensitivity, and Usability. The characteristics of the tool will be imbibed in the data. That is, if the tool is Reliability and Valid, then data will also be Reliable and Valid. Consequently, the finding will also be Reliable. Thus, the researcher has to select tools carefully.

After selecting the Tools/Instruments, the researcher must decide the Method of Research to be followed in conducting research. The different Methods of Research are: Philosophical Method, Historical Method, Survey Method, Experimental Method, and Case Study Method. Each Method of Research has well defined steps. The researcher has to follow the steps meant for the Method of Research which he/she is using.

Data Analysis is the fourth step of research. The data can be Qualitative or Quantitative. For analyzing the Qualitative data, the techniques available are: Content Analysis, Meta-Analysis and SWOT Analysis. Statistical Techniques are available for analyzing the Quantitative data. The researcher must know the Scale of Measurement underlying the data and accordingly select the appropriate Statistical Technique. The Statistical Techniques have been classified into Parametric Statistics and Non-parametric Statistics. The choice of statistic is guided by the wording of the Objective. It is due to this that the wording of Objectives should be pinpointed.

Conclusion is the last step of research. Conclusions are nothing but Findings of the Research undertaken by the Researcher. It must be consistent with the Objectives of research. Sometime researcher writes Conclusion in four to five pages and even more. From these pages, it is difficult to know the Conclusion. Sometime researcher writes Findings. There should be a linkage between Objectives and Findings. If there is no Objective corresponding to the finding, there cannot be a finding.

