Patna University
B.A Part 3
Topic: Stages of Research

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- Science can be defined as a methodological and systematic approach to the acquisition of new knowledge. Scientists attempt to gain new knowledge by making careful observations and using systematic, controlled, and methodological approaches. Research is a very general term for an activity that involves finding out, in a more or less systematic way. It is about acquiring knowledge and developing understanding, collecting facts and interpreting them to build up a picture of the world around us. Research comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organizing and evaluating data; making deductions and reaching conclusions; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis.

Stages of Research

1. Formulating the research problem- Formulating a research problem is the first and most important step in the research process. Before conducting research, it is important to design and decide what to study. Researchers choose the topics that they study in a variety of ways, and their decisions are necessarily influenced by several factors. The formulation of a general topic into a specific research problem, constitutes the first step in a scientific enquiry. Essentially two steps are involved in formulating the research problem- understanding the problem thoroughly, and rephrasing the same into meaningful terms from an analytical point of view. Researchers typically choose research topics that are of interest to them. Some research ideas may also stem from a researcher's motivation to solve a particular problem.

2. **Literature Review-** Once a researcher has chosen a specific topic, the next step in the planning phase of a research study is reviewing the existing literature in that topic area. For this purpose, the abstracting and indexing journals and published or unpublished bibliographies are the first things to study. Academic journals, conference proceedings, government reports, books etc., must be collected depending on the nature of the problem. The primary purpose of a literature review is to help researchers become familiar with the work that has already been conducted in their selected topic areas. Literature reviews are absolutely indispensable when planning a research study because they can help guide the researcher in an appropriate direction by answering several questions related to the topic area.

3. Development of Hypothesis- After identification of a question or an issue to investigate and extensive literature survey, the researcher must formulate a hypothesis that can be tested empirically. Formally, a hypothesis is a tentative statement that describes the relationship between two or more variables. As such the manner in which research hypotheses are developed is particularly important since they provide the focal point for research. They also affect the manner in which tests must be conducted in the analysis of data and indirectly the quality of data which is required for the analysis. hypotheses are the researcher's attempt to explain the phenomenon being studied, and that explanation should involve a prediction about the variables being studied. These predictions are then tested by gathering and analyzing data, and the hypotheses can either be supported or refused. Hypotheses can take various forms, depending on the question being asked and the type of study being conducted.

4. Preparing the research design: This step involves deciding which research method to use for collecting data. There are two basic types of designs used in research—descriptive and experimental. Descriptive research includes research strategies for observing and describing behavior, including identifying the factors that seem to be associated with a particular phenomenon. Experimental research is used to show that one variable causes change in a second variable. In an experiment, the researcher deliberately varies one factor, then measures the changes produced in a second factor. Each research approach answers different kinds of questions and provides different kinds of evidence. The function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money. A flexible research design which provides opportunity for considering many different aspects of a problem is considered appropriate if the purpose of the research study is that of exploration.

5. Sampling- The basic notion of sampling is that a relatively small number of units, if selected in a manner that they genuinely represent the study population, can provide – with a sufficiently high degree of probability – a fairly true reflection of the sampling population that is being studied. The objective of any sampling design is to minimize, within the limitation of cost, the gap between the values obtained from your sample and those prevalent in the study population. There are two key aims of sampling- the avoidance of bias in the selection of a sample, and the attainment of maximum precision for a given outlay of resources. There are three categories of sampling design- random/probability sampling designs, non-random/non-probability sampling designs and 'mixed' sampling design.

6. Collecting the data: There are two major approaches to gathering information about a situation, person, problem or phenomenon. In most situations, we need to collect the required information, however, sometimes the information required is already available and need only be extracted. Based upon these broad approaches to information gathering, data can be categorized as: primary data and secondary data. The research tool must be scientific in nature. There are several ways of collecting the appropriate data which differ considerably in context of money costs, time and other resources at the disposal of the researcher. Data can be gathered through testing, Interviews, questionnaires, Surveys, observation, tests, biographies and case studies and experiments.

7. Analysis of the data: Researchers use the methods statistics to analyze, summarize, and draw conclusions about the data they have collected. They also use statistics to determine whether their findings are statistically significant. The analysis of data requires a number of closely related operations such as establishment of categories, the application of these categories to raw data through coding, tabulation and then drawing statistical inferences. The criteria for deciding which forms of data analysis to undertake are governed both by fitness for purpose and legitimacy – the form of data analysis must be appropriate for the kinds of data gathered.

8. Writing a research report- Writing the report is the last and, for many, the most difficult step of the research process. This report informs the world what we have done, what we have discovered and what conclusions we have drawn from your findings. Reports should be written in an academic style and be divided into different chapters and/or sections based upon the main themes of your study. In the report, the advantages and limitations of the research work are also being discussed. Also, the future research work frame can be traced in the research report.