

# **THE NATURE AND SCOPE OF RESEARCH**

# What research is?

- Research is an organized and systematic way of finding answers to questions
- A systematic process of *collecting and analyzing information* (data) in order to increase our understanding of the phenomenon about which we are concerned or interested
- A systematized effort to gain new knowledge
  - Search for (new) knowledge/facts through objective, systematic and scientific method of finding solution to a problem
- The three major goals of research are *defining the prevailing situation, analyzing information, and reaching new conclusions*
- The three main acts of doing research are *searching for, reviewing, and evaluating information*

# What Research is not?

- Research isn't information gathering:
  - Gathering information from books, journal articles, conference papers and/or the Internet isn't research.
    - Information gathering has no contribution to new knowledge.
- Research isn't the transportation of facts:
  - Merely transporting facts from one source to another doesn't constitute research.
    - Missed the essence of research: the interpretation of data.
    - No contribution to new knowledge although this might make existing knowledge more accessible.
- Not synonymous with commonsense
  - but research is systematic, reproducible and objective (purposeful)

# Objectives of research

- The purpose of research is to discover answers to questions through the application of scientific procedures.
  - to find out the truth which is hidden and which has not been discovered as yet.
- Though each research study has its own specific purpose, we may think of research objectives as falling into a number of following broad groupings:
  - 1) To gain familiarity with a phenomenon or to achieve new insights into it (**Exploratory or formulative** research studies)
  - 2) To describe accurately the characteristics of a particular individual, situation or a group (**Descriptive** research studies)
  - 3) To determine the frequency with which something occurs or with which it is associated with something else (**Diagnostic** research studies)
  - 4) To test a hypothesis of a causal relationship between variables (**Hypothesis-testing** research studies).

# Motivation in Research

What makes people to undertake research?

- The possible motives for doing research may be either one or more of the following:
  1. Desire to get a research degree along with its consequential benefits;
  2. Desire to face the challenge in solving the unsolved problems, i.e., concern over practical problems initiates research;
  3. Desire to get intellectual joy of doing some creative work;
  4. Desire to be of service to society;
  5. Desire to get respectability.
- Many more factors such as directives of government, employment conditions, curiosity about new things, desire to understand causal relationships, social thinking and awakening, and the like may as well motivate

# Scientific Research

- *How is it different from non-scientific research?*
  - Focuses on solving problems and follows a step-by-step logical, organized, and rigorous method. i.e. identify the problems, collect data, analyze and draw valid conclusions
- Non-scientific research- based on experience and intuition
- Any scientific research is *systematic*- follows a clear procedure so that the experiment can be replicated and the results verified.
- All scientific research has a goal, repeated and refined experimentation gradually reaching an answer.
- Scientific research is *impartial, objective, empirical and logical*
- Scientific research leads to the development of generalizations, principles or theories, resulting in to some extent in prediction and control of events.

# Qualities of Good Research(Scientific Research)

Good Research is:

- ***Empirical***: this means that any conclusions drawn are based upon hard evidence gathered from information collected from real life experiences or observations.
- ***Systematic***: research is structured with specified steps to be taken in a specified sequence in accordance with the well defined set of rules.
  - Systematic characteristic of the research does not rule out creative thinking but it certainly does reject the use of guessing and intuition in arriving at conclusions.
- ***Objective***: Scientific knowledge is objective. Objectivity simply means the ability to see and accept facts as they are, not as one might wish them to be.
  - Objectivity demands that one must set aside all sorts of the subjective considerations and biases

Good Research is:

- ***Replicable***: produce the same results if repeated exactly. So replicability will help to verify and confirm the study
- ***Logical***: research is guided by rules of logical reasoning & logical process of induction & deduction
  - logical reasoning makes research more meaningful in the context of decision making.
- ***Controlled***: Variables are identified & controlled, wherever possible The researcher must in some way isolate, or control, those factors that are central to the research problem.
  - Control is important for replication: An experiment should be repeated under the identical conditions and in the identical way in which it was first carried out.



# Types of Research

- There are different ways of classifying research.
- It should also be noted that there is no clear dividing line between one method and the other.
- However, Research can be classified in terms of the following:
  - **Goal of research:** *Applied vs. Basic*
  - **Specific objective of research:** *Descriptive, Explanatory, and Exploratory*
  - **Approaches of research:** *Quantitative vs. Qualitative*
  - **Design:** *Experimental vs. Non Experimental*
  - **The type of data used in the research:** *Primary vs. Secondary*
  - **Field of study:** *Natural , social, educational, behavioral, health science etc.*

# Basic research

## Basic vs. Applied Research

***Basic research*** (usually refers to fundamental research, or pure research)

- It is concerned with generalizations & formulation of theory
- Gathering knowledge for knowledge's sake
- The researcher is testing theory and ideas without necessarily applying the results to practical problems
- The main motivation is to expand man's knowledge, not to create or invent something.

Objective:

- Advancement of knowledge(formulating or expanding theory)
- Understanding of theoretical relationship between variables
- Exploratory in nature (discovery of knowledge)

Example.     How did the universe begin?

How does the human memory work?

How do children acquire new languages?

Is computer important in everyday life?

# Applied research

*Applied research* is also called field research, evaluation research, or action research

- Applied research aims at finding a solution for an immediate problem facing a society or an industrial/business organization.
- The central aim of applied research is to discover a solution for some pressing practical problem
- Designed to solve practical problems of the modern world, rather than to acquire knowledge for knowledge's sake.
- Solve specific, practical questions
- For example, applied researchers may investigate ways to:
  - improve agricultural crop production
  - treat or cure a specific disease
  - improve the energy efficiency of homes, offices, or modes of transportation
    - What is the most efficient and effective vaccine against Malaria?
    - An investigation to determine the side effects of alcohol consumption.
    - How can cyber security be improved to prevent election fraud?

# Quantitative vs. Qualitative

## *Quantitative research*

- Quantitative research is based on the measurement of quantity or amount
- It is applicable to phenomena that can be expressed in terms of quantity
- Involves looking at amounts, or *quantities*, of one or more variables of interest.
- Purpose:
  - ➔ To explain and predict
  - ➔ To confirm and validate
  - ➔ To test theory

## *Qualitative research*

- Qualitative research, on the other hand, is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind.
- involves looking at characteristics, or qualities, that cannot be entirely reduced to numerical values.
- Purpose:
  - ➔ To describe and explain
  - ➔ To explore and interpret
  - ➔ To build theory

# Research Characteristics

- Originates with a question or problem in a specific area.
- Requires clear articulation of a goal or objective.
- Follows a specific plan or procedure (framework or model or architecture).
- Often divides main problem into sub-problems to ease the study.
- Guided by specific problem, question, or hypothesis.
- Accepts certain critical and significant assumptions and theory during the research work.
- Requires preparation of datasets, running experiments, analysis and interpretation of results.

# RESEARCH PROPOSAL

# What is the research proposal?

What is a research proposal?

- ✓ It is a detailed plan of your study.
- ✓ It is a document which sets out your ideas in an easily accessible way.
- ✓ A structured presentation of what you plan to do in research and how you plan to do it.
- ✓ The objective is to describe what you will do, why it should be done, how you will do it, and what you expect will result.

Research Proposal: is what the researcher *plans to do in the future*. ...

- lays out the problem for research,
- describes exactly how the research will be conducted, and
- outlines in precise detail the resources the researcher will use to achieve the desired results

# What is the research proposal?

- What a proposal should contain? It is based on your clear research question
  - What do you want to do? – research question
  - Why do you want to do it? – Any information gap
  - Why is it important? – any practical importance or knowledge advancement
  - Who has done similar work? - background
  - How are you going to do it? -methodology
  - How long will it take? – plan of work



# Components of a Research proposal

Research proposals are a roadmap documents that describe the intended research including:

- *Title/research topic*
- *Summary/Abstract*
- *Introduction/background*
- *The Problem statement*
- *Objective of the study*
- *Scope of the study*
- *Methodology of the study*
- *Significance of the study*
- *Time Schedule/ Work Plan*
- *Budget Schedule*
- *References*

- **Title of the Research:** After identifying a research problem a suitable title of the research should be given.
  - The research title should be specific, direct, concise, meaningful and easily understandable;
  - must accurately represent the objective and indicate the purpose of the study.
- **Summary/Abstract** – a one page brief summary of the research proposal.
  - It should include the research question, the rationale for the study, the hypothesis (if any), the method and the main findings.
  - Descriptions of the method may include the design, procedures, the sample and any instruments that will be
  - Do not put any information not stated in the main text.
  - Never contain references, figures and tables.
  - It comes first but written last.

- **Introduction/Background** – background information of the research proposal.
  - The main purpose of the introduction is to provide the necessary background or context for your research problem
  - The introduction typically begins with a general statement of the problem area, with a focus on a specific research problem, to be followed by the rationale or justification for the proposed study
  - State the research problem, which is often referred to as the purpose of the study
  - Present the justification of your proposed study and clearly indicate why it is worth doing
  - Set the delimitation or boundaries of your proposed research in order to provide a clear focus

*Statement of the problem* – the issue that leads to a need for the study.

- It must be very clearly defined to explain the nature of the problem and why it is significant.
  - It answer the question ‘*Why does this research be conducted?*’
  - The foundation for everything to follow in the proposal
  - Indication of the unexplored character of the issue or knowledge gap or research question
  - Reasons for undertaking the study
- **Formulation of Hypothesis:** Hypothesis is an assumption regarding the value or relationship of variables that needs to be tested.

## Objective of the study

- The objectives of a research summarize *what is to be achieved* by the study.
  - These objectives closely related to the research problem.
- The *general objective* of a study states what researchers expect to achieve by the study in general terms.
- It is possible (and advisable) to break down a general objective into smaller, logically connected parts; called *specific objectives*
  - Specific objectives should systematically address the various research questions.
  - They should specify what you will do in your study, where and for what purpose.
  - It is precise and supports only one interpretation.
  - Should be clear, specific, achievable and measurable
  - If there is more than one objective the objectives can be presented in the appropriate order of importance

## Scope of the study

- Scope of the study states a general outline or coverage of the study. The scope of research is the areas covered in the research.
  - In this part, you will tell exactly *what will be done & where the information used in the study specifically came from.*
- The scope identifies the boundaries of the study in term of subjects, objectives, facilities, area, time frame, and the issues to which the research is focused.
  - Sample phrases that help express the scope of the study:
    - The coverage of this study..... OR, The study covers the ...
    - The study consists of ..... OR, This study focus on...

***Delimitations of the study:*** describes the work that will not be undertaken

- Delimitation is used to make the study better & more feasible
- For example, the scope may be gathering information from children between the ages of five years to 18 years.
  - The delimitations of this study would include the decision not to gather information from below five and above 18 years

## **Significance of the study**

- The significance of the study should discuss the importance of the proposed research and its relevance.
  - The investigator should explain why it is important for the study to be undertaken and
  - indicate the likelihood of its contribution to the advancement of knowledge.
  - Practical application of the study output
- Without this justification, it will prove difficult to convince others that the problem in question is worth study.
- The significance of the study answers:
  - Why is your study important?
  - To whom is it important?
  - What benefits will occur if your study is done?

## Research Methodology

- Methodology is a science of studying how research is done scientifically
  - A way to systematically solve the research problem by logically adopting various steps
  - a detail description of the activities and the methodological steps you will take achieve your objectives.
- This section should aim at addressing four broad questions:
  - *Where we want to collect the data, how will we select our sample, and how many subjects will be included in the study?* (This refers to the coverage, target population, sample design)
  - *What information do we need to collect to answer the research questions implied in our research objectives?* (This refers to the variables we are interested in)
  - *What approach will we follow to collect this information?* (This refers to the research design we want to employ)
  - *What techniques and tools we will use to collect them.* (This refers to the data collection techniques and tools, such as questionnaire, observation check-list)



**Time Schedule/ Work Plan:** This section needs to include the time needed to complete the study and breakup of the entire time period.

- The tasks to be performed;
- When and where the tasks will be performed;
  - Including the beginning and end of each activity.
- Who will perform the tasks and the time each person will spend on them;
- The plan specifies how each project activity is to be measured in terms of completion, the time line for its completion

**Budget Schedule:** Resources needed to conduct the research

- Materials, equipment, and supplies,
- Travel,
- Miscellaneous expenses...
- Money required for each activity

Some questions:

- Is the budget total within specified limits?
- Is the budget sufficiently detailed?
- Is each item in the budget adequately justified?
- Are some budget items excessive in relation to their justification?
- Is the equipment really necessary?

**References:** lists only the literature that you actually used or cited in your proposal.

- The style of writing list of references varies from one discipline to another

# **Formulation Of Research Problem**

# What is Research Problem

- **A research problem** is a statement about an *area of concern*, a *condition to be improved*, a *difficulty to be eliminated*, or a *troubling question* that exists in scholarly literature, in theory, or in practice that points to the need for meaningful understanding and deliberate investigation.
- Sources of research problems:
  - Observation.
  - Literature reviews.
  - Professional conferences.
  - Experts.
    - People who has experience and knowledge in a certain research area can be good source of research topic.

# Components of a Research Problem

Components of a research Problem :

- There must be an individual or a group which has some difficulty or the problem.
- There must be some objective(s) to be attained
  - If one wants nothing, one cannot have a problem.
- There must be alternative means (or the courses of action) for obtaining the objective(s) one wishes to attain.
  - This means that there must be at least two means available to a researcher for if he has no choice of means, he cannot have a problem.
- There must remain some doubt in the mind of a researcher with regard to the selection of alternatives.
  - This means that research must answer the question concerning the relative efficiency of the possible alternatives.
- There must be some environment(s) to which the difficulty pertains.

# Selecting the Research Problem

- The research problem undertaken for study must be carefully selected
- When selecting a research problem or a subject for research:
  - ✓ Subject which is overdone should not be normally chosen, for it will be a difficult task to throw any new light in such a case.
  - ✓ Controversial subject should not become the choice of an average researcher
  - ✓ Too narrow or too vague problems should be avoided
  - ✓ The subject selected for research should be familiar and feasible so that the related research material or sources of research are within one's reach
  - ✓ The selection of a problem must be preceded by a preliminary study.
  - ✓ The importance of the subject, the qualifications and the training of a researcher, the costs involved, the time factor are few other criteria that must also be considered in selecting a problem.

- Defining the research problem is the first step and one of the most difficult in research undertaking.
- Each problem that is proposed for research has to be judged according to ***certain guidelines or criteria.***
- The following are some of the criteria's for selecting a research problem/idea:
  - Relevance/Significance
  - Avoidance of duplication (should be new)
  - Urgency of data needed (timeliness)
  - Feasibility of study (feasibility of the idea)
  - Interest to the researcher
  - Ethical acceptability

# Necessity of defining the problem

*“Problem clearly stated is a problem half solved”*

- The problem to be investigated must be defined unambiguously for that will help to discriminate relevant data from the irrelevant ones.
- A proper definition of research problem will enable the researcher to be *on the track* whereas an ill-defined problem may create obstacles.
- Well defined research problem answers:
  - What data are to be collected?
  - What characteristics of data are relevant and need to be studied?
  - What relations are to be explored?
  - What techniques are to be used for the purpose? ...
- Defining a research problem properly is a prerequisite for any study and is a step of the highest importance
- Formulation of a problem is often more essential than its solution



# Technique involved in defining a problem

- The research problem should be defined in a systematic manner
- The technique for the purpose involves the undertaking of the following steps generally one after the other:
  1. *Statement of the problem in a general way*: problem should be stated in a broad general way, keeping in view either some practical concern or some scientific or intellectual interest.
  2. *Understanding the nature of the problem*: understand its origin and nature clearly.
    - The best way of understanding the problem is to discuss it with those who first raised it
    - discussion with those who have a good knowledge of the problem concerned or similar other problems.
  3. *Surveying the available literature*: All available literature concerning the problem at hand must necessarily be surveyed and examined before a definition of the research problem is given.
    - give sufficient time in reviewing of research already undertaken on related problems.

4. *Developing the ideas through discussions*: discuss the problem with colleagues and others who have enough experience in the same area or in working on similar problems.
5. *Rephrasing the research problem into a working proposition*: rephrase the research problem into a working proposition/hypotheses.

# Research Questions

- A *research question* is the question a research study sets to answer.
  - a research study can have more than one research question.
  - should specifically state the purpose of your study in terms of the question you aim to answer.
  - Its purpose is to guide and center your research study.
  - should be as specific as possible
- Research Question poses a question that is then to be solved or answered through the research paper.
- The research methodologies, tools used to collect data, etc. all depend on the research question.
- Research Question can be used in both quantitative and qualitative studies
  - e.g.      What is the effect of personal technology on today's youth?
  - Is there a relationship between a person's age and learning?

# Hypotheses

- A hypothesis is a statement rather than a question
- Hypotheses are tentative, intelligent guesses as to the solution of the problem
  - It is the statement that suggests or predicts the outcome of the research.
  - It is a clear statement of what is intended to be investigated.
  - It is the statement we submit to testing
  - It is the statement the research study sets out to prove or disprove.
- Hypotheses should be clearly and precisely stated in simple terms, they should be testable, limited in scope and should state relationship between variables
- The task of research is to test and establish such hypotheses
- Hypotheses can direct later research activities since they can help determine the nature of the research and methods applied
- Hypothesis mainly used in quantitative research

# Research Process

# Research process

- **Research Process:** a process consists of series of actions or steps necessary to effectively carry out research
- Each step is interlinked with other steps.
- Research involves the following Process:
  1. *Selecting a broad area of study*
  2. *Problem definition*
  3. *Literature review*
  4. *Developing objectives and hypothesis/research question formulation*
  5. *Design of Research/Research Methodology*
  6. *Execution of the project*
  7. *Reporting/Writing research findings in report form*

# Selecting a research area/topic

- Look for a subject that interests you and will maintain your interest throughout the various stages of research that will help you to obtain the maximum self-development from the research.
  - It should be related with your career.
- Some preliminary reading will help to determine the extent of your interest.
- Keep in mind the time allotted to you and the expected length of the research paper.
- Commonly begin with fairly general topic and then refine it into a more specific one.
- Try to narrow your topic/idea by focusing on a particular aspect of a particular approach.

# Cont.

- Be original as much as you can, avoid duplicate work on a specific topic/idea by review literatures.
- The eventual successful completion of a research study is dependent on the selection of an appropriate topic.
- Before beginning the research, make sure you understand the amount and depth of research required, & the type of paper expected.



# Formulating the Research Problem

- A problem might be defined as the issue that exists in the literature, theory, or practice that leads to a need for the study.
- The prospective researcher should think on what caused the need to do the research (problem identification).
- The question that he/she should ask him/herself is:
  - *Are there questions about this problem to which answers have not been found up to the present?*

- Formulating your research problem enables you to make a purpose of your study clear to yourself and target readers.
- The task of formulating, or defining a research problem is a step of greatest importance in the entire research process. *Because:*
  - It determines the data to be collected
  - It determines the characteristic of the data which are relevant
  - It determines the type of techniques to be used
  - It determines the form of the final report

- Some general principles in problem formulation
  - Be sure the problem really exists.
  - Learn as much as possible about the problem to be solved.
  - Consider alternative formulations in case one is not feasible.
  - Be aware that the problem formulation may influence the phenomena being studied.
- The best way of formulating the research problem is:
  - To discuss it with colleagues.
  - To discuss it with those that have some experience with the issue.

- Evaluation of a research problem (some questions to be asked):
  - Is the problem in line with my goals or expectations and the expectation of others?
  - Will the solution of the problem advance knowledge?
  - What is the value of potential outcome? (who are the beneficiaries?)
  - Do I possess or can I acquire the necessary skills, abilities and background knowledge to study the problem? (Researcher's capability and interest).
  - Will the data be accessible?
  - Do I have access to the necessary resources (time, money, tools, equipment's, laboratory, subjects, etc.) to conduct the investigation?

# Literature Review

- The researcher should examine all available literatures to get himself familiar with the selected problem.
  - It is important in defining problems and hypotheses formulation as well as selection of methods.
  - May continue from beginning to end.
- Extensive review is required to know:
  - ✓ What others have done in the area?
  - ✓ How did they do it?
  - ✓ What were the research variables?
  - ✓ How were the variables measured?
  - ✓ What were the constraints?
  - ✓ What could possibly be modified?

- The Researcher may review two types of literature
  - ✓ Conceptual literature
    - Concerning the *concepts* and *theories*.
  - ✓ Empirical literature
    - Consisting of studies made earlier which are similar to the one proposed.
- Literature survey and problem formulation are inter-related, because the problem can only be specifically defined if extensive literature survey is done.
  - ✓ Journals, Books, Conference proceedings, published or unpublished bibliographies, Government Reports can be used.
- Remember – One Source may leads to another.

# Developing objectives and Working Hypothesis

## Objectives:

- Statements that indicate what a researcher intends to accomplish in a more specific term.

## Hypothesis:

- An assertion about the relationship between two or more concepts.
- Important bridges between empirical inquiry and theory.

## Some guidelines in developing objectives:

- Objectives must be specific, *concrete* and *achievable* statements.
- The objectives should clearly fit to the statement of the problem.
- The objectives must propose to do things as per the capability of the design of the study.
- Objectives should be in their approximate order of importance.

# Hypothesis

- After you have identified a problem, you may formulate certain answers in the form of hypotheses.
- Hypotheses are the propositions about the relationships between variables.
- Importance:
  - Hypotheses are particularly necessary in studies where the cause-and-effect relationships are to be discovered.
- A good hypothesis has several basic characteristics:
  - *Providing direction*: Hypotheses provide direction to research and prevent review of irrelevant literature and collection of useless or excessive data.
  - *Hypothesis should be testable*: The researcher should not state any hypothesis that she/he does not have reason to believe that it can be tested or evaluated by some objective means.
  - *Hypothesis should be brief and clear*: Hypothesis should be stated clearly and briefly.
    - It makes problems easier for the reader to understand and also for the researcher to test.



- Developing research hypotheses is important since they provide the main point of the research.
  - Hypothesis indirectly determine the quality of data which is required for the analysis.
  - The role of the hypothesis is to guide the researcher and keep him on the right track.
- Working hypotheses arise as a result of prior thinking about the subject.

# Design of the Research

- Once the research problem is formulated and working hypothesis developed, the researcher will be required to prepare a research Design/methodology.
- Research design refers to the arrangement of the conditions for collection and analysis of data in a manner that will satisfy or achieve the objectives of a research undertaking.
  - It is intended to enable the researcher to answer questions as **validly, objectively, accurately** and **economically** as much as possible
- The function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money.

- The research design tells us:
  - What observations to make?
  - What variables to measure?
  - How to make them/measure them?
  - How to analyze the data?
  - Data collection tools/techniques
  - It also suggests how many observations to make.
  - The type of statistical analysis to be used...

- The research design tells us:
  - What will be the sample design?
  - What techniques of data collection will be used?
  - Where can the required data be found?
  - What variables to measure?
  - How to make them/measure them?
  - How to analyze the data?
  - In what style will the report be prepared?

- The research design preparation should consider:
  - The time available for research.
  - The finance available for the purpose.
  - The availability and skills of the researcher and his/her staff (if any).
  - Identifying the study variables.
  - Identifying study subjects /experimental units,
  - The means of obtaining the information and reasoning leading to selection.

# Execution of the Research

- It is a very important step in the research process.
- If the execution of the research proceeds on correct lines, the data to be collected would be adequate and reliable.
- Under this phase the following tasks will be done:
  - Data Collection
  - Data Analysis
  - Generalizations and Interpretation of the results

## Data collection

- Data can be collected by any one or more of the data collection techniques/tools ways. It may involve:
  - ✓ Interview, Questionnaire, Laboratory, Observation, Document Analysis, Field survey /experiments, etc.
- The researcher should select one/more of these methods of collecting data by taking into consideration *the nature of investigation, objective and scope of the inquiry, financial resources, available time* and the *desired degree of accuracy*.
- In collecting the data, the researcher must decide:
  1. Which data to collect
  2. How to collect the data
  3. Who will collect the data
  4. When to collect the data

## Data Analysis

- After the data have been collected, the researcher turns to the task of analyzing them.
- Data analysis is a technique that typically involves multiple activities such as cleaning and organizing the data.
- Before analyzing the data the following operation are processed on collected data.
  - *Coding*: categories of data are transformed into symbols that may be tabulated and counted
  - *Editing*: is the procedure that improves the quality of the data for coding
  - *Tabulation*: is a part of the technical procedure wherein the classified data are put in the form of tables.
- Quantitative data analysis– quantitative figures
- Qualitative data analysis– analytical thinking
- Hypothesis testing



## ■ Generalizations and Interpretation of the results

- If a hypothesis is tested and upheld several times, it may be possible for the researcher to arrive at generalization, i.e., to *build a theory*.
  - As a matter of fact, the real value of research lies in its ability to arrive at certain *generalizations*.
  - Generalization is an act of reasoning that involves drawing broad inferences from particular observations.
- If the researcher had no hypothesis to start with, he might seek to explain his findings on the basis of some theory. It is known as *interpretation*.
  - Interpretation refers to the task of drawing inferences from the collected facts after an analytical and/or experimental study.
  - The process of interpretation may quite often generate new questions which in turn may lead to further researches.

# Reporting/Writing Research Reports

- Finally, the researcher has to prepare the report of what has been done.
- The result should be communicated to others.
  - ✓ Peers
  - ✓ Policy makers/Developers
  - ✓ Extension workers
  - ✓ General public
- Report should be written in a concise and objective style in simple language avoiding vague expressions such as ‘it seems,’ ‘there may be’, and the like.
- The style and content varies depending on to whom the research is written to.
  - ✓ The mode of presentation depends on the target audience.

# Cont.

- Some principal guidelines for writing reports of scholarly journals are:
  - Avoid using first person pronouns: I, Me, My, We and so on.
  - Be stylistically consistent with regard to tables, charts, graphs, section headings, and so forth.
    - Tables, for example, should follow the same format and should be numbered consecutively.
  - Clearly label all displays with meaningful title
    - Each table, graph, chart, or figure caption should accurately describe the material presented and its contribution to the report.
  - Use simple language (i.e. avoiding vague expressions)
    - Express findings clearly, simply, and accurately.