

Classification of Research

By PURPOSE

1. Basic Research :

Develop and Refine Theory.

2. Applied Research :

Problem Solution method.

3. Action Research :

Practitioners attempt to study their problems .

Basic Research

(Fundamental / Pure Research)

This is conducted to contribute to our understanding and generate new knowledge to refine/ reject existing theories as opposed to solving problems

Characteristic :

- Educational theories and principles.-
- Use wide range of methods.-
- Highly specific hypothesis are developed.-
- Careful attention + error is reduced.-
- Complex analysis of data.-
- Generalization remain confined to books and research report.-

Applied Research

(Functional Research)

- Conducted for the purposes of solving problems by improving present practice
- Provides data to support theory or suggest the development of new theories.

Who used : Teachers, educational planners, administrators, curriculum specialists.

Action Research

The process by which practitioners attempt to study their problems scientifically in order to guide, correct and evaluate their decisions and action.

- It is a small scale intervention in the functioning of real world and close examination of the effects of those interventions
- It is often situational and aims at solving a specific, immediate and concrete problem in a local setting
- Not concern with generalization of results to other settings
- Useful in providing answers to problems that cannot wait for theoretical solutions

By STRATEGIES :

1. Quantitative Method.
2. Qualitative Method.

Quantitative Methods

Quantitative Methods depends on numerical data, such as statistics and measurements, to investigate specific questions, like who, what, where or when. The results are usually presented in tables or graphs.

Objective of Quantitative methods:

The objective of quantitative research is to develop and employ mathematical models, theories and hypotheses pertaining to natural phenomena.

Example :

Quantitative Method Can instruction & Emotional Support in the first Grade make a difference for children at risk of school failure ?

Qualitative Methods

Qualitative Methods involves non-numerical data, such as opinions and literature. It uses descriptions to obtain the meanings and feelings involved in a situation.

Objective of Qualitative methods :

It focuses on studying a single person and gathering data through the collection of stories that are used to construct a narrative about the individual's experience and the meaning he / she attributes to them.

Example :

Qualitative Method Adequate schools and inadequate Education : the life history of a Sneaky Kids.

QUANTITATIVE RESEARCH VERSUS QUALITATIVE RESEARCH

Quantitative Research uses statistics	Qualitative Research uses descriptions and observations
Data can be measured accurately	Data can be observed and not measured
Considered to be objective	Considered to be subjective
Uncovers measurable data to formulate theories and facts and uncover patterns	Helps to understand the underlying reasons, opinions, and motivations
Mainly uses hypotheses	Uses either hypotheses or research questions
Data collection methods are highly structured	Data collection methods are semi-structured or unstructured
The sample population is large	The sample population is small

Principles of Researches

Let us first know, what are scientific researches?

Scientific research: Scientific research is a process used by scientists to study various phenomenon . It involves evaluating hypotheses using systematic methods of collecting, analyzing, and interpreting data.

Until the past decade, scientists, research institutions, and government agencies relied solely on a system of self-regulation researches accepted research practices to ensure integrity in the research process, which advocated for many non-standard views on the nature of research. Among the very basic principles that guide scientists, as well as many other scholars, are those expressed as respect for the integrity of knowledge, Interaction, honesty, objectivity, and openness. These principles are at work in the fundamental elements of the scientific methods, such as formulating a hypothesis, designing an experiment to test the hypothesis, and collecting and interpreting data.

We will discuss different research methods, designing research and shaping ideas and scientific arguments. You will learn, hopefully, the formulation of a problem is often more essential than it's solution.

What are scientific Principles?

Principles are ideas based on scientific rules and laws that are generally accepted by scientists. They are fundamental truths that are the foundation for other studies. Principles are qualitative. They are more like guiding ideas that scientists use to make predictions and develop new law.

What are the basic scientific principles?

Basic Principle: Principles from which other truths can be derived:

SCIENTIFIC PRINCIPLE 1 :

Pose significant questions that can be investigated empirically.

This principle has two parts. The first part concerns the nature of the questions posed; The second part concerns how these questions are posed: they must be posed in such a way that it is based on accumulated experience from previous work, especially practical type of experience.

SCIENTIFIC PRINCIPLE 2 :

Link Research to Relevant Theory

Scientific theories are, in essence, conceptual models that explain some phenomenon. We endeavor to make the mesh ever finer and finer. Indeed, much of science is fundamentally concerned with developing and testing theories, hypotheses, models, conjectures, or conceptual frameworks that can explain aspects of the physical and social world. Examples of well-known scientific theories include evolution, quantum theory, and the theory of relativity.

SCIENTIFIC PRINCIPLE 3:

Use methods that permit direct investigation of the question

The design for collecting data and the measurement and analysis of variables in the design—should be selected in light of a research question, and should address it directly. Methods linked directly to problems permit the development of a logical chain of reasoning.

SCIENTIFIC PRINCIPLE 4 :

The extent to which the inferences that are made in the course of scientific work are warranted depends on rigorous reasoning. What is required in research work is the development of a logical “chain of reasoning” that moves from evidence to theory. This chain of reasoning must be coherent, explicit (one that another researcher could replicate), and persuasive to a skeptical reader (so that, for example, counter hypotheses are addressed).

What are the 5 principles of ethics?

The **five** main principles of ethics are usually considered to be:

- Truthfulness and confidentiality.
- Autonomy and informed consent.
- Beneficence.
- Non-maleficence.
- Justice.

Scientific Methods

Scientific methods in research

Scientific methods are defined as controlled, systematic investigations that are rooted in objective reality and that aim to develop general knowledge about natural phenomena.

Purpose of Scientific methods

The basic purposes of scientific methods are **description**, **exploration**, **prediction**, **control**, **prescription**, & **identification of relationship of the facts**.

The Scientific Method involves 8 steps:

- ✓ Observation
- ✓ Problem or Question
- ✓ Research
- ✓ Hypothesis
- ✓ Experiment
- ✓ Results
- ✓ Conclusion
- ✓ Report

1. Observation :

- ✓ You observe something using your senses.
- ✓ What you see makes
- ✓ You ask a question or state a problem.
- ✓ Make observations and research your topic of interest.

2.Question :

Problem or (Question) You ask a question or state the problem that you observed

3. Research (make a background) :

you should conduct back ground research on your topic to learn as much as you can about it. This can occur both before and after you state an objective and form a hypothesis. In fact, you may find yourself researching the topic throughout the entire process.

4.Hypothesis :

You predict what you think the answer to your question might be.
Based on your observation a Hypothesis is formed that tries to explain your observation or answer your question
(IF-----THEN)

✓ **Example: If soil temperatures rise, then plant growth will increase.**

5. Experiment :

You figure out a way to test whether the hypothesis is correct.
The outcome must be measurable. Record and analyze data.
To make sure that any resulting data will be accurate, the experiment should be repeated several times, taking variables into account.

6. Results :

You do the experiment using the method you came up with record the results.

You repeat the experiment to confirm your results by retesting.

7. Conclusion :

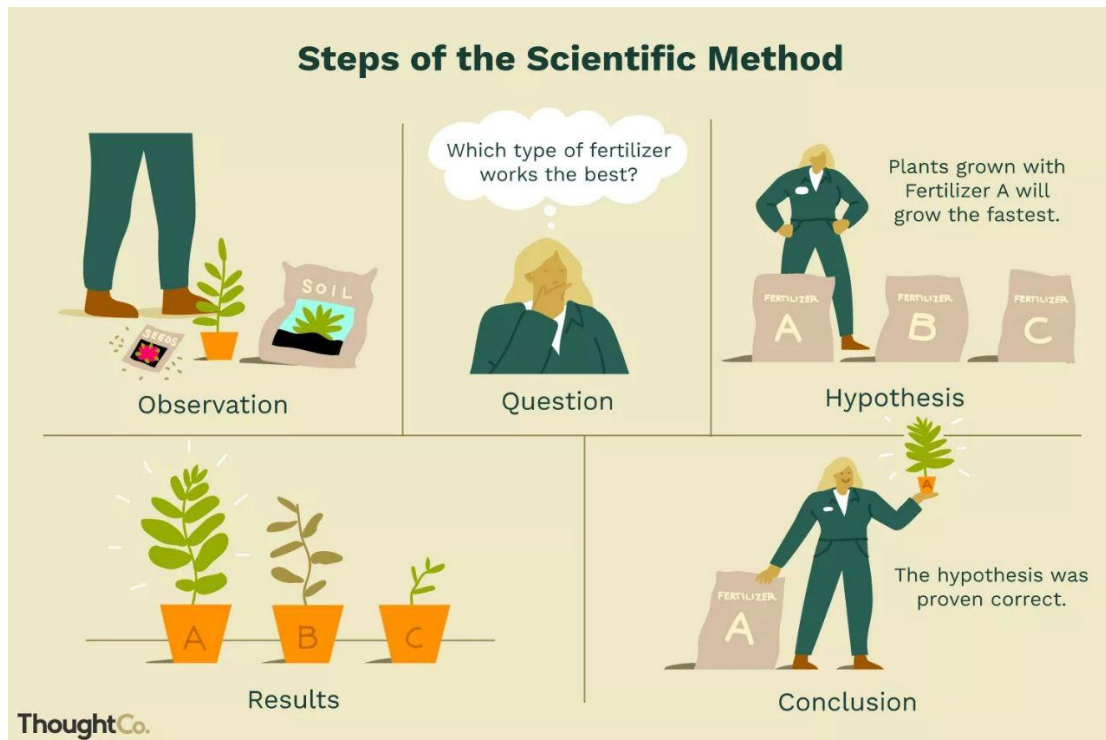
You state whether your prediction was confirmed or not and try to explain your results.
Make recommendations for further study and possible improvements to the Procedure.

8. Report : Share your results .

Scientific Method steps



Example for scientific method



Steps of Scientific methods in details:

- 1 Selecting the topic & identifying the research problem .
- 2 Defining the objectives of the study.
- 3 Reviewing the literature from theory & other related studies.
- 4 Defining concepts & variables to be studied.
- 5 Stating hypothesis about expected observations or phenomenon to be studied.
- 6 Identifying assumptions & implications.
- 7 Describing the research design & methods for data collection.
- 8 Defining study population & sample .
- 9 Planning the data analysis & discussion.
- 10 Collecting data from subjects, and Analyzing data

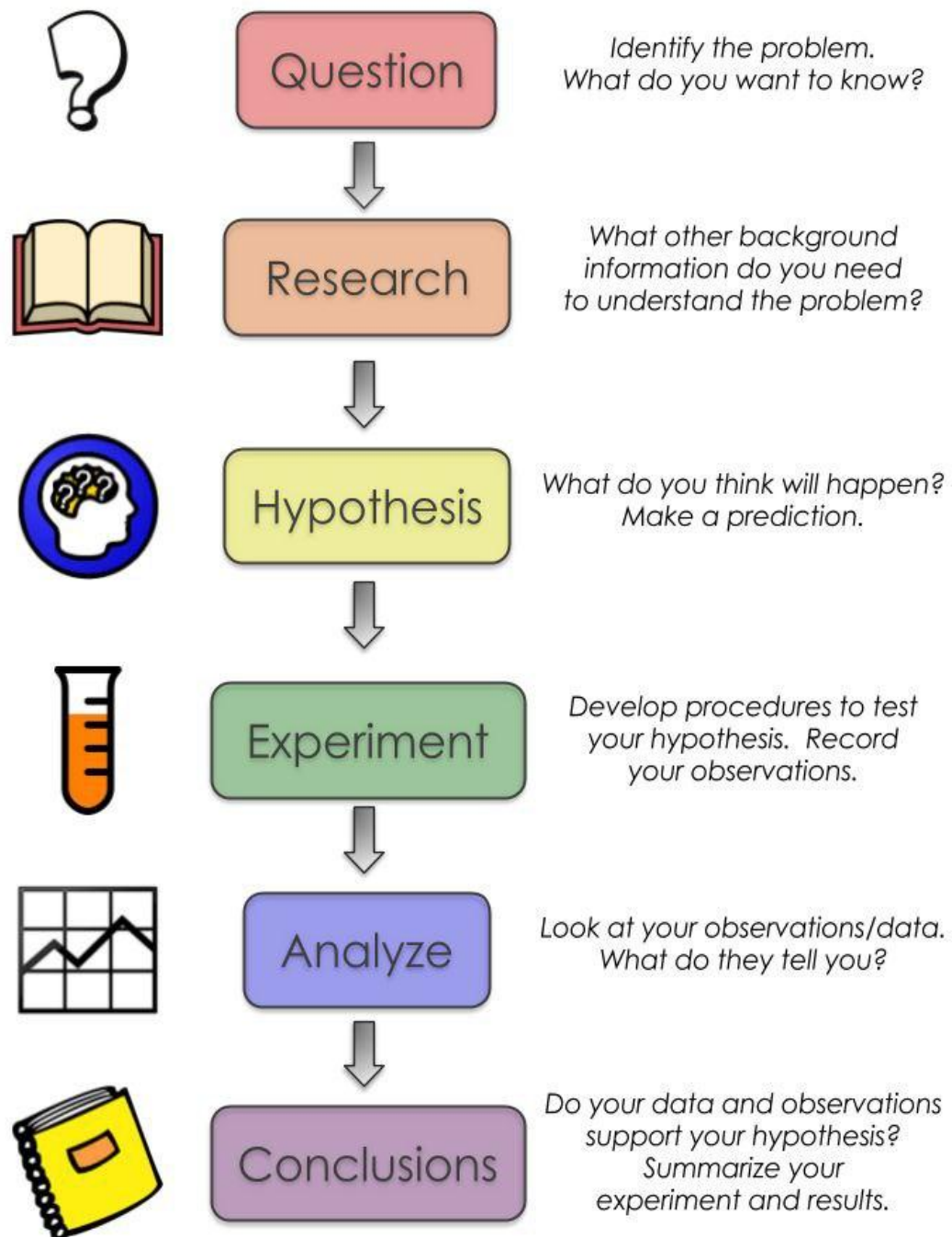
Characteristics of scientific method :

- 1 It is systematic or ordered.
- 2 Used to solve problems.
- 3 Helps in obtaining accurate classification of facts.
- 4 Helps in discovery of scientific laws.
- 5 Relies on evidence.
- 6 Results can be observed and measured.

Why scientific method is important in research ?

It provides an objective, standardized approach to conducting experiments and, in doing so, improves their results . by using a standardized approach in their investigations, scientists can feel confident, that they will stick to the facts and limit the influence of personal .

The Scientific Method



Designing the Research Plan

(Part 1)

Research Plan is a short document, which sets out initial thoughts on a research project in a logical and concise manner.

It May be Constructed in The Following Format :

- (1)** The research question .
- (2)** The hypotheses .
- (3)** Aims and objectives .
- (4)** Research design .

Identifying the Problem :

- 1-** The first and foremost task in the entire process of scientific research is identify a research problem.
- 2-** But the core question is: whether all problems require research.
- 3-** Researcher need to identify both :

A. Non-research Problem.

B. Research Problem .

Non- Research Problem :

is one that does not require any research to arrive at a solution . intuitively, a non-researchable problem consists of vague details and cannot be resolved through research. It is a managerial or built-in problem that may be solved at the management level .

Research Problem :

In contrast to a non-research problem, a research problem is of primary concern to a researcher .

Why is a research plan important ?

1. A research plan is useful to state the goals of the proposed research.
2. It summarizes a methodology, outcomes, and framework the author or research team will be using.

Formulating a Research Plan :

Whenever you need to come up with a research plan the following are Required :

1. An outline of what you're going to do and what the entire research process.
2. summarize the most important aspects of starting full-research.
3. Clarify what you'll be doing.

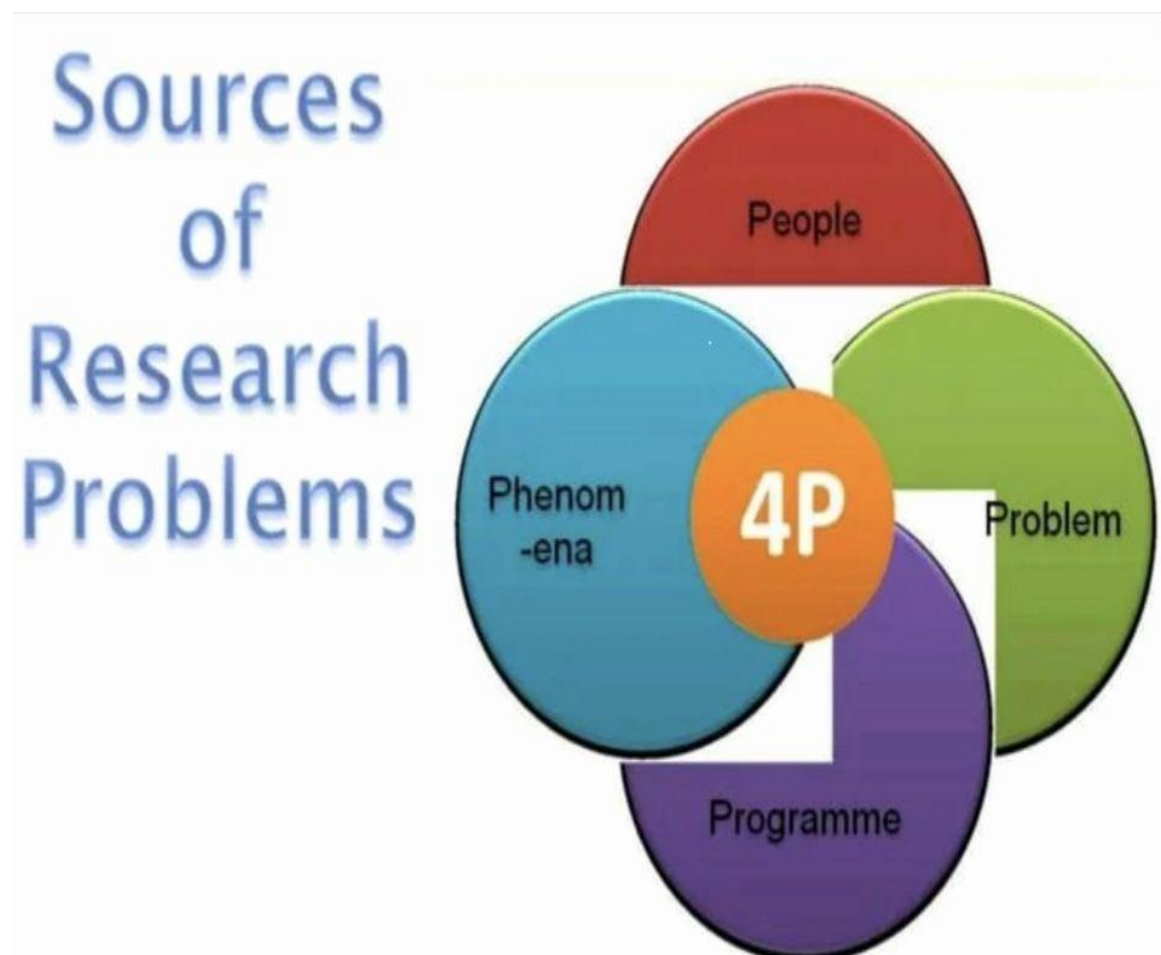
Formulation of Research Problem

What is the research problem ?

- Any question that you want answered and any assumption or assertion that you want to challenge or investigate.
- not all questions can be transformed into research problems.
- However :
 - the process of formulating them in a meaningful way is not at all an easy task.
 - it requires considerable knowledge of both the subject area and research methodology.
- A research problem is a perceived gap between what is and what should be.
- Research problem arise from;
 - Evolution of theories.
 - Peers and supervisors etc.
 - Published research (literature review).
 - Day-to-day experience.
- The way we formulate the research problem determines every step that follows:
 - type of study design that can be used .
 - type of sampling strategy that can be employed.
 - research instrument that can be used or developed.
 - type of analysis that can be undertaken.

Sources of research problem :

- People
- Problem
- Phenomena
- Programme



Steps in formulating research problem:

- **Step 1:** identify a broad field or subject area of interest to you.
- **Step 2:** Dissect the broad area into subareas.
- **Step 3:** Select what is of most interest to you .
- **Step 4:** Raise research questions .
- **Step 5:** Formulate objectives.
- **Step 6:** Assess your objectives.
- **Step 7:** Double-check

The Formulation of research Objectives :

What is an 'objective'?

A clear and specific goals you set out to attain in your study.

Two types of objectives:

◦ Main objectives

- ☐ Overall statement of the thrust of your study.
- ☐ It is also a statement of the main associations and relationships that you seek to discover or establish.

◦ Sub objectives

- ☐ The specific aspects of the topic that you want to investigate within the main framework of your study.
- ☐ One sub-objective contains one aspect only

- Sub-objectives should be numerically listed.
- Use action-oriented words or verbs when writing your objectives.

E.g. start with; ‘to determine’, ‘to find out’, ‘to ascertain’, ‘to measure’, ‘to explore’.

- the wording of your objectives determines the type of research design you need to adopt to achieve them.

Function of research Objectives :

1- Focus the study

(narrowing it down to essentials).

2- Avoid the collection of data

which are not necessary for understanding and solving the problem you have identified.

3- Organize the study

in clearly defined parts or phases.



Introduction

The search for knowledge is closely linked to the object of study; that is, to the reconstruction of the facts that will provide an explanation to an observed event and that at **first sight** can be considered as a **problem**. It is very human to seek answers and satisfy our curiosity.

What is Research ?

Research is the careful consideration of study regarding a particular concern or problem using scientific methods. **"Research is a systematic inquiry to describe, explain, predict, and control the observed phenomenon. It involves inductive and deductive methods"**

OR is an original and systematic investigation undertaken to increase existing knowledge and understanding of the unknown to establish facts and principles

What are Methods ?

Methods are **the specific tools and procedures you use to collect and analyze data** (for example, experiments, surveys, and statistical tests). In shorter scientific papers, where the aim is to report the findings of a specific study, you might simply describe what you did in a methods section.

- **The systematic process by which we conduct research.**
- **Rooted in certain assumptions on ‘reality’ and ‘knowledge’**

Research Methods :

Refers to all those methods, techniques and procedure, that are applied during the course of studying research to **answer research problem are known as the research method.**

In other words, a research methods explains how a researcher identifies, collects, processes and analyzes data

Purpose of Research :

1. Answer questions and acquire new knowledge.
2. Research is the primary tool used in virtually all areas of science to expand the frontiers of Knowledge.
3. Research is frequently used for :
 - a- Describing a thing or event .
 - b - Discovering relationship between phenomena .
 - c - Prediction .

Classification Of Research :

Basic and Applied Research

Basic research aims to develop knowledge theories and predictions, while **Applied research** aims to develop techniques, products and procedures.

BASIC RESEARCH	APPLIED RESEARCH
expand knowledge of social organizational processes	Improve understanding of specific social or organizational problems
develop universal principles	create solutions to social or organizational problems
produce findings of significance and value to society	develop findings of practical relevance to public and organizational stakeholders

Types of Research:

- Qualitative research :

Qualitative research involves non-numerical data, such as opinions and literature. It uses descriptions to obtain the meanings and feelings involved in a situation. Businesses often use qualitative research to determine consumer opinions and reactions

- Quantitative research :

Quantitative research depends on numerical data, such as statistics and measurements, to investigate specific questions, like who, what, where or when. The results are usually presented in tables or graphs

Basic Process of doing Research :



Research Shared Characteristics :

Research among different fields and sciences, share certain Characteristics :

- 1, Testing .
2. Hypotheses .
3. Careful Observation and Measurement .
4. Systematic Evaluation of Data .
5. Drawing Valid Conclusions .

Designing the Research Plan

(Part 2)

Quick tips for an outstanding research Plan :

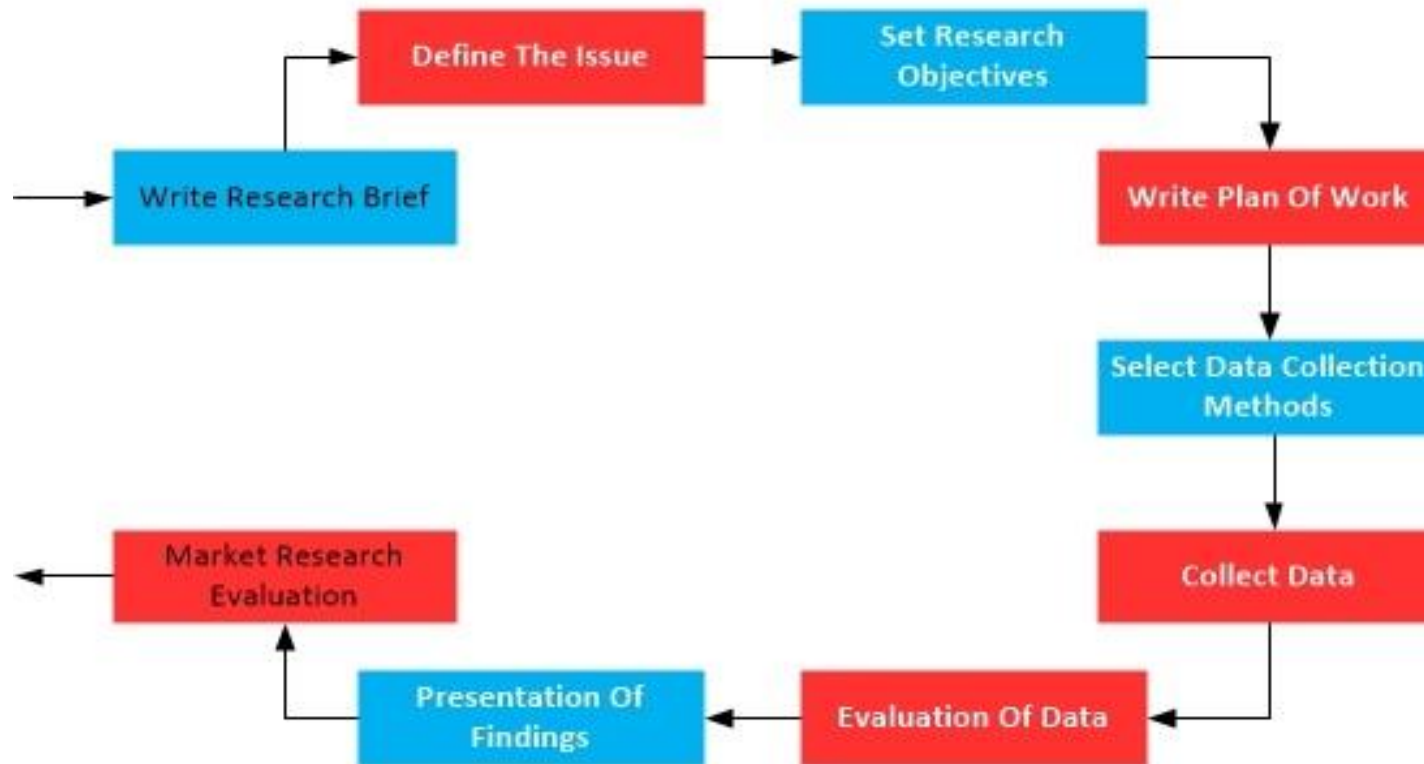
1. Identify the resources you'll need to carry out your research. Doing so will help plan the budget and the project's implementation, as well.
2. Think of possible alternative strategies for problems you might face along the way. Be prepared for the actual work as much as possible.
3. Clearly study any primary research studies. Examine your personal progress and extract what others have achieved in the same area as yours.
4. Consider your audience. Your research plan might need adjustment based on your audience.

Research time line plan :

A **timeline** is a very important part of a project proposal. It basically shows the chronological order of events that you plan to do in your project. It is supposed to give the reader a wide overview of the project

It does not have to be very detailed. Normally, events are arranged along a horizontal line.

Research Planning Process



Research Plan Process

1. Write a Research Brief :

This sets out what is to be researched.

2. Define The Issue :

At this stage it is important to go into more detail about the research.

3. Set Research Objectives :

Any project including research projects needs to have objectives.

4. Research Proposal and Plan of Work :

When researching it is important that you have a plan of work.

5. Collection of Data:

The data collection methods should be based on validity, accuracy and the reliability of the data they will generate. You will also need to take into account the cost of the data collection methods.

6. Analysis and Evaluation of Data :

Once data has been collected it needs to be analyzed. You may employ someone to analyze the data or you may do it yourself.

7. Presentation Of Findings :

It is important to present your findings in a form that will make the conclusion of your research easy to understand and interpret.

8. Evaluation of Market Research :

Look through your research and the methods that you used and think about what you can do to improve it. Is there any way to make your research methods and findings better and more accurate ? Was there anything you missed out ?