

# Procedure of Research Methodology in Research Studies

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## Abstract

*Research is a professional training process through which we can learn to think and work systematically. The advantage of systematic thinking is that it contributes to accuracy and a more orderly approach and is reliable in handling research. Research is a process of planning, executing and investigating in order to find answers to our specific questions in a systematic manner to understand logic and believe in our report. This paper is a practical guideline for students so that they can efficiently handle their research projects and write good dissertations and project reports. In other words they must learn how to formulate a problem, how to choose a particular method and how to argue and motivate. They must also learn how to write a valid and reliable report, which is useful for the purpose of research.*

**Keywords** – Research, methodology, problem, report, variables, hypothesis.

**1. Introduction** – The word ‘methodology’ is the combination of two words ‘method’ which implies a particular way of doing something plus ‘logus’ the Latin word which implies ‘study’. Thus, ‘methodology’ implies a systematic way of studying something. The full form of Research is:

R = rationale way of thinking

E = expert/exhaustive treatment

S = search for solution

E = exactness

A = adequate data; analytical analysis

R = relationships among facts, information

C = careful recording; critical observations

H = honesty; hard work

A broad definition of research is given by Martin Shuttleworth - "In the broadest sense of the word, the definition of research includes any gathering of data, information and facts for the advancement of knowledge (Shuttleworth, Martin (2008)).

Creswell states - "Research is a process of steps used to collect and analyze information to increase our understanding of a topic or issue". It consists of three steps: Pose a question, collect data to answer the question, and present an answer to the question (Creswell, J. W. (2008)).

## 2. Research Process

It consists of a series of steps or actions that are necessary to execute a research in effective way. The steps in a research process are as follows:

- Define Research Problem
- Initial Literature Review
- Setting and Fixing Hypothesis
- Research Design
- Collection of Data
- Analysis of Collected Data
- Interpretation and Report Finding

(i) **Define Research Problem** – It is the first step of research process. The heart of any research project is its problem. A research problem defines the goal of the researcher in clear terms. To answer a research problem, the researcher must be able to answer the following two questions:

- (a) What is the actual problem?
- (b) What is the best way to solve the problem?

Researcher sees that research problem is a question. When researcher has really established what he/she wants to know, and how this relates to present insights, researcher has a clear research problem.

### Considerations in selecting a research problem:

- **Interest:** A researcher should select research topic of his/her own interest.
- **Magnitude:** It is extremely important to select a topic that researcher can manage within the time and resources at his/her disposal. Narrow the topic down to something manageable, specific and clear.
- **Measurement of concepts:** Make sure that researcher is clear about the indicators and measurement of concepts (if used) in researcher's study.
- **Level of expertise:** Make sure that researcher have adequate level of expertise for the task you are proposing since you need to do the work yourself.
- **Relevance:** Ensure that researcher study adds to the existing body of knowledge, bridges current gaps and is useful in policy formulation. This will help you to sustain interest in the study.
- **Availability of data:** Before finalizing the topic, make sure that data are available.
- **Ethical issues:** How ethical issues can affect the study population and how ethical problems can be overcome should be thoroughly examined at the problem formulating stage.

**Steps in formulation of a research problem:** subject area within which the study is to be undertaken. Without such knowledge it is difficult to clearly and adequately 'dissect' a subject area.

Step 1 Identify a broad field or subject area of interest.

Step 2 Dissect the broad area into sub areas.

Step 3 Select what is of most interest to the researcher.

Step 4 Raise research questions.

Step 5 Formulate objectives.

Step 6 Assess your objectives.

Step 7 Double check.

So far researcher has focused on the basis of researcher study, the research problem. But every study in sciences has a second element, the study population from whom the required information to find answers to your research questions is obtained.

As researcher narrows the research problem, similarly he/she need to decide very specifically who constitutes his/her study population, in order to select the appropriate respondents.

**(ii) Initial Literature Review-** When researcher is conducting they are supposed to use 'relevant theory'. Its functions are:

- a. Bring clarity and focus to researcher problem;
- b. Improve researcher methodology;
- c. Broaden researcher knowledge;
- d. Contextualize researcher findings.

**Procedure for reviewing the literature:**

- a. search for existing literature in research area of study;
- b. review the selected literature;
- c. develop a theoretical framework;
- d. develop a conceptual framework.

**(iii) Setting and fixing Hypotheses** - Hypothesis is usually considered as the principal instrument in research. Its main function is to suggest new experiments and observations. It brings clarity, specificity and focus to a research problem.

According to Kerlinger, 'A hypothesis is a conjectural statement of the relationship between two or more variables'.

There are two types of hypothesis:

**a. Null hypothesis:** If researcher is compare method A with method B about its superiority and if researcher proceeds on the assumption that both methods are equally good, then this assumption is termed as the null hypothesis.

**b. Alternative hypothesis:** As against null hypothesis, researcher may think that the method A is superior or the method B is inferior, researcher are then stating what is termed as alternative hypothesis.

The null hypothesis is generally symbolized as  $H_0$  and the alternative hypothesis as  $H_a$ .

Statisticians have developed several tests of hypotheses (also known as the tests of significance) for the purpose of testing of hypotheses which can be classified as: (a) Parametric tests or standard tests of hypotheses; and (b) Non-parametric tests or distribution-free test of hypotheses. Parametric tests usually assume certain properties of the parent population from which we draw samples. Assumptions like observations come from a normal population, sample size is large, assumptions about the population parameters like mean, variance, etc., must hold good before

parametric tests can be used. But there are situations when the researcher cannot or does not want to make such assumptions. In such situations researcher use statistical methods for testing hypotheses which are called non-parametric tests because such tests do not depend on any assumption about the parameters of the parent population. Besides, most non-parametric tests assume only nominal or ordinal data, whereas parametric tests require measurement equivalent to at least an interval scale.

The important parametric tests are: (a) z-test; (b) t-test; (c)  $\chi^2$ -test, and (d) F-test. All these tests are based on the assumption of normality i.e., the source of data is considered to be normally distributed.

The important non-parametric tests are: (a) Sign Tests (b) Fisher-Irwin Test

(c) McNemer Test (d) Wilcoxon Matched-pairs Test (or Signed Rank Test) (e) Rank Sum Tests (f) One Sample Runs Test (g) Spearman's Rank Correlation (h) Kendall's Coefficient of Concordance.

**(iv) Research Design-** The various concepts relating to designs are:

**a. Dependent variable:** A variable that is potentially influenced by the independent variable is called a dependent variable. It is directly manipulated by researcher.

**b. Independent variable:** A concept that can be measured is called a variable. A variable is any quality or characteristic in a research investigation that has two or more possible values.

**c. Extraneous variable:** Independent variables that are not related to the purpose of the study, but may affect the dependent variable. If the researcher wants to test the hypothesis: a relationship between children's gains in science studies achievement and their self-concepts. Self-concept is an independent variable, science studies achievement is a dependent variable. Intelligence may as well affect the science studies achievement, but since it is not related to the purpose of the study undertaken by the researcher, it will be termed as an extraneous variable.

**(v) Collections of Data –** There are two types of data:

**a. Primary data:** These data are collected for the first time and are generally accepted as original data. There are several methods for collecting primary data.

- (1) observation method
- (2) interview method
- (3) through questionnaires
- (4) through schedules
- (5) other methods which include:
  - (a) warranty cards
  - (b) distributor audits
  - (c) pantry audits
  - (d) consumer panels
  - (e) using mechanical devices
  - (f) through projective techniques
  - (g) depth interviews
  - (h) content analysis.

**b. Secondary data:** The secondary data is also known as published data. Data which are not originally collected but rather obtained from published sources and statistically processed are known as secondary data. Secondary data may either be published data or unpublished data. Usually published data are available in:

- (a) various publications of the central, state or local governments;
- (b) various publications of foreign governments or of international bodies and their subsidiary organizations;
- (c) technical and trade journals;
- (d) books, magazines and newspapers;
- (e) reports and publications of various associations connected with business and industry, banks, stock exchanges, etc;
- (f) reports prepared by research scholars, universities, economists, etc. in different fields;
- (g) public records and statistics, historical documents, and other sources of published information.

The sources of unpublished data are many; they may be found in diaries, letters, unpublished biographies and autobiographies and also may be available with scholars and research workers, trade associations, labour bureaus and other public/private individuals and organisations.

Researcher must be very careful in using secondary data. Researcher must make a minute scrutiny because it is just possible that the secondary data may be unsuitable or may be inadequate in the context of the problem which the researcher wants to study.

**(vi) Analysis of collected data** –Researcher has to specify whether the data will be analysed manually or by computer. For computer analysis, identify the program and where appropriate the statistical procedures researcher plan to perform on the data. For quantitative studies also identify the main variables for cross-tabulation.

For qualitative studies, describe how researcher plan to analyse interviews or observation notes to draw meanings from what respondents have said about issues discussed or observation notes made. Researcher first need to decide whether he/she want to analyse information manually or use a computer program for that purpose.

Researcher need to write the analysis of the data whether research study is quantitative or qualitative and in both cases researcher use a similar structure. The main difference is in the proposed procedures and methodologies for undertaking the research endeavor. When providing details for different parts of the research proposal, for quantitative studies, researcher will write detail quantitative methods, procedures and models and, for qualitative studies, proposed process will be based upon methods and procedures that form the qualitative research methodology.

In this stage of research, the collected data should be processed and analysed. The processing stage includes the editing, coding, classification and tabulation of collected data that are ready to analyse. The analysing stage includes hypotheses testing and interpretation of findings through statistical tests of significance to determine the validity in which the conclusions would be based on. In other words analysis of data represents the way of testing hypotheses and supports the approach of achievement of findings and so the conclusion of the research is to be facilitated.

**Processing of data:** The questionnaires after collection must be arranged. In other words it means that out of all received questionnaires some of them are useful and others not and therefore in this step, these received questionnaires must be edited, coded, classified and tabulated.

- **Editing:** The purpose of editing is that careful scrutiny of all collected questionnaires to produce completeness, error-free and readability.
- **Coding:** The purpose of coding is the assigning codes (numbers) for each category of answers, for example the code No 1 for the answer less than 25%, the code No 2 for the answer 26% up to 50% and so on.
- **Classification:** The purpose of classification is to divide the received questionnaires on the basis of their groups. For example in this study the received questionnaire is divided into three groups including, group one (top management and executive managers), group two (auditors and inspectors) and group three (experts).
- **Tabulation:** The purpose of tabulation is the process of summarizing data and displaying them in the appropriate tables that further analysis are to be facilitated.

**(vii) Interpretation and findings** –The empirical study, researcher found out from data collection, is presented here. This section is often a major part of the report, as the findings are presented in detail with supportive tables and figures. Researcher has to refer back to his/her research questions or hypothesis and

present findings in accordance with these in a systematic, structured and logical manner. The findings, tables and figures should follow a systematic, chronological or psychological order. The most important thing is to prune out irrelevant information and findings. The method for presentation of findings is:

- (a) **By order of occurrence:** Here researcher will present the findings chronologically. Example – Aayasha, 1960.
- (b) **By criteria or Topics:** Researcher will use his/her own heading from questionnaire or problem statement dependent or independent variable to present the findings. Hypothesis 1, 2, 3..... and then discuss each of these in the same sequence.
- (c) **By order of location:** For heading of finding researcher can use findings from south, east or central parts of the country, or from different countries or continents.
- (d) **By order of importance:** Researcher should make listing criteria according to their importance.

### 3. The International Dimensions of Research

(a) **Topic and Research Problem:**

- Ensure comparability of concepts
- Determine scope
- Check the influence of culture

(b) **Research Design and Plan:**

- Identify comparability differences
- Select methodology with minimum comparability problems
- Check practical issues; budget; time, etc.

(c) **Data Collection and Measurement:**

- Attach weight to eliminate cultural differences
- Identify local biases
- Check reliability of data
- Check understanding of scales for comparability

(d) **Data Analysis and Interpretation:**

- Watch for comparability issues
- Ensure that unexpected findings are not due to local biases
- Adjust interpretation level to different countries/cultures/markets

(e) **Presentation of the findings and report:**

- Think of international readers and communicate accordingly
- Watch for language and terminology
- Avoid culturally sensitive conclusions
- Check implications for different markets

**4. Conclusion** - This paper provide an overview of the research process which has been broken into seven steps. The steps are operational in nature, following a logical sequence. Quantitative and qualitative research is differentiated in terms of the methods of data collection, the procedures adopted for data processing and analysis, and the style of communication of the findings. There are many styles of writing but researcher has to select according to his/her discipline and university. Main theme of this paper is that while a writing the thesis or project reports every point should be logical, systematical, step by step and relevant to the study. Every point should be presented in simple and straightforward way. The conclusions should also be related to objectives and research questions.

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