Research Methodology for M.Com/M.Phil

INTRODUCTION TO RESEARCH

Definitions

- Information gathering
- Collecting and analyzing new information in order to increase our understanding
- Attempt to achieve systematically and with the support of data the answer to a question, the resolution to a problem, or the greater understanding of a phenomenon
- Generation of new information and testing of ideas

Nature of Research

- **Systematic –** plan, identify, design, collect data, evaluate
- **Logical –** examine procedures to evaluate conclusions
- **Empirical –** decisions are based on data (observation)
- **Reductive –** general relationships are established from data
- **Replicable –** actions are recorded

Characteristics of Research:

- A research aims at solving a problem.
- Research is purposive i . e. it deals with a well defined significant problem. Research involves collection of primary data from first hand sources or involves use of existing data for new purpose.
- Research activities are carefully detailed and clearly outlined through a research design.
- These activities are defined by carefully designed procedure and analysis tools.
- Research should be objective and logical.

- The finding should be free from bias and the results should be carefully verified.
- Every process, term and tool used in the research should be carefully documented and reported.

Objectives of Research:

There are the four broad objectives of research

- To Explore
- To describe
- To Diagnose
- To Establish causal relationship

The Hallmarks of Good Research

- Serves a purpose and is relevant
- Clearly focussed and scoped
- Scientific (depends on context)
- Uses appropriate techniques & methods of data collection
- Findings are presented as objectively as possible
- Conclusions are based on the findings
- Sources of information and ideas are clearly attributed

Criteria for a Good Research:

- The purpose of the research should be clearly defined and common concepts to be used.
- The research procedure used should be described in sufficient detail to permit another researcher to repeat the research for further advancement, keeping the continuity of what has already been attained.
- The procedural design of the research should be carefully planned to yield results that are as objective as possible.
- The researcher should report with complete frankness, flaws in procedural design and estimate their effects upon the findings.
- The analysis of data should be sufficiently adequate to reveal its significance and the methods of analysis used should be appropriate.
- The validity and reliability of the data should be checked carefully.

- Conclusions should be confined to those justified by the data of the research and limited to those for which the data provide an adequate basis.
- Greater confidence in research is warranted if the researcher is experienced, has a good reputation in research and is a person of integrity.

Importance of Research

- . To get a degree
- . To get respectability
- . To face a challenge
- To solve a problem
- . To get intellectual joy
- . To serve society by increasing standard of living in case of S&T, and • by showing right path to society in case of Social and Behavioural Sciences

Significance of Research:

- Research inculcates scientific and inductive thinking and it promotes the development of logical habits of thinking and organization.
- The role of research in several fields of applied economics, whether related to business or to the economy as a whole, has greatly increased in modern times.
- Research provides the basis for nearly all government policies in our economic system.
- Research has its special significance in solving various operational and planning problems of business and industry.
- Research is equally important for social scientists in studying social relationships and in seeking answers to various social problems.

Qualities of Good Research

- Purpose/ objectives clearly defined in common concepts
- Procedure enumerated to keep continuity
- Carefully planned design leading to objective results

- Complete frankness; flaws reported and their effect estimated
- Adequate analysis of data with appropriate methods of analysis
- Carefully checked data for validity & reliability
- Conclusions confined to those justified by the data
- Confidence, competence/ reputation, experience, honesty & integrity of researcher.

Research Methodology

- A science of studying how research is done scientifically
- A way to systematically solve the research problem by logically adopting various steps
- Methodology helps to understand not only the products of scientific inquiry but the process itself
- Aims to describe and analyze methods, throw light on their limitations and resources, clarify their presuppositions and consequences, relating their potentialities to the twilight zone at the 'frontiers of knowledge'.

Benefits of Research Methodology

- Advancement of wealth of human knowledge
- 'Tools of the trade' to carry out research; Provides tools to look at things in life objectively
- Develops a critical and scientific attitude, disciplined thinking or a 'bent of mind' to observe objectively (scientific deduction & inductive thinking); Skills of research will pay-off in long term particularly in the 'age of information' (or too often of misinformation)
- Enriches practitioner and his practices; Provides chance to study a subject in depth; Enable us to make intelligent decisions; Understand the material which no other kind of work can match
- As consumers of research output helps to inculcate the ability to evaluate and use results of earlier research with reasonable confidence and take rational decisions
- Doing research is the best way to learn to read and think critically.

Research Process

- Selection & formulation of Research Problem
- Literature survey
- Development of working hypotheses
- Research design
- Sampling strategy or sample design
- Pilot (quick & dirty) study
- Data collection
- Processing & analysis of data
- Testing hypotheses
- Interpretation & generalization
- Preparation of the report

Types of Research

1. **Descriptive/ Survey (Ex- Analytical Post Facto)** • Uses facts or information already available and analyze to make a • Surveys & fact-finding critical evaluation enquiries • State of affairs as it exists • No control over variables • Try to discover causes (I.e., ex- post facto)
2. **Fundamental (Basic Or Pure**) • Concerned with generalizations & 2. APPLIED formulation of theory • Finding a solution for an • Knowledge for knowledge's sake immediate problem & not (I.e., pure or basic research) rigorous / flexible in application of the conditions
3. **Quantitative Qualitative** • Measured & expressed in terms of • Involves quality or kind quantity • Helps in having insight into • Expression of a property or problems or cases quantity in numerical terms
4. • **Quantitative research** helps: i. Precise measurement ii. Knowing trends or changes overtime EMPIRICAL iii. Comparing trends or individual • Relies on experience or libraries / units observation alone, i.e.,data based research • Capable of being verified by

5. **Conceptual Observation Or Experiment** • Related to some abstract idea or • Experimenter has control theory (for thinkers & over variables philosophers) contd… • Relies on literature
6. **Exploratory research:** Identify and frame a new problem (e.g., “a survey/outlook of personalized search”)
7. **Constructive research**: Construct a (new) solution to a problem (e.g., “a new method for expert finding”)
8. **Empirical research**: evaluate and compare existing solutions (e.g., “a comparative evaluation of link analysis methods for web search”).

CASE STUDY

Definition of a Case Study

- Case study is “the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances”
- Case study research is the in-depth study of instances of a phenomenon in its natural context and from the perspective of the participants involved in the phenomenon

Characteristics

- Under this method the researcher can take one single social unit or more of such units for his study purpose; he may even take a situation to study the same comprehensively.
- Here the selected unit is studied intensively i.e., It is studied in minute details. Generally, the study extends over a long period of time to ascertain the natural history of the unit so as to obtain enough information for drawing correct inferences.
- In the context of this method we make complete study of the social unit covering all facets. Through this method we try to understand the complex of factors that are operative within a social unit as an integrated totality.
- In respect of the case study method an effort is made to know the mutual inter-relationship of causal.
- Under case study method the behavior pattern of the concerning unit is studied directly and not by an indirect and abstract approach.
- Case study method results in fruitful hypotheses along with the data with the data which may be helpful in testing them, and thus it enables the generalized knowledge to get richer. In its absence, generalized socialized social science may get handicapped.

Advantages:

- Gain a holistic understanding of real-life events
- Seek ‘uniqueness’ and ‘commonality’
- Refine and develop theories

- Generate new insights
- Allow for readers’ decision-making
- Reflect on human experience
- Suggest a step to action

Limitations

- Concerns about generalizability
- Use of "abnormal" cases
- Issues connected with thick description and triangulation
- Objectivity versus subjectivity
- The data-driven rather than theory-driven approach
- Attrition
- Constraints on quantitative analysis of small-sample data,
- Ethics in protecting the privacy of participants

SURVEY RESEARCH

A method of primary data collection based on communication with a representative sample of individuals (called respondents) is called survey research.

Steps in Survey Research

1. State the objectives of the survey
2. Define the target population
3. Define the data to be collected
4. Define the required precision and accuracy
5. Define the measurement `instrument'
6. Define the sample frame, sample size and sampling method
7. Select the sample
8. Collect the data
9. Data analysis
10. Results

Advantages of Surveys

Speed – Faster data collection than other methods

Cost - Relatively inexpensive data collection

Accuracy – Survey data can be very accurate if sampling is properly done

Efficiency – Measured as a ration of accuracy to cost, surveys are generally very efficient data collection methods

Disadvantages

Survey error – Potentially large sources of error in surveys

Communication Problems - Each of the different communication survey methods has its own unique problems.

- Several threats to the validity of the instrumentation process in surveys can cause individuals to respond differently than they might otherwise.

- Examples:
    - Extraneous events (a fire drill).
    - Leading or insensitive questions.
    - Vocabulary used.
    - Different conditions (dinner time, poorly lit rooms, etc.).
- Threats to Internal Validity
    - Mortality.- Arise in longitudinal studies.
    - Location.- Arise if places, where data is collected, may affect responses.
    - Instrumentation.-.
- Instrument decay. Can arise if the interviewer get tired or are rushed

RESEARCH DESIGN

Definition :

The logical and systematic planning and directing a piece of research.

Essentials of research design

- It is an activity and time based plan.
- The design is based on the research questions.
- The design guides the selection of sources and types of information.
- It is a frame work for specifying the relationship among the study's variable.
- It outlines the procedures for every research activity.

Need For Research Design

- The research design has to be prepared on account of the following reasons
- Blue Print of the Proposed Research
- Plan Sampling Procedure
- Gives General Idea
- Efficiency in Research
- Reliability

Classification of Research Design

- Method of data collection
- Researcher's control of variables
- Purpose of the study

Descriptive studies

The research concerned with finding out who, what, where, when or how much is a descriptive study.

Casual studies

If the researcher is concerned with analyzing how one variable produces changes in another, it is called a casual study.

Testing Casual Hypotheses

To test casual hypotheses, three types of evidence can be opted Co variation between the variables. Time order of events moving in the hypothesized direction. No other possible causes for change in the dependent variable .

Causation and Experimental Design

Control Group

Random Assignment

Causation and Ex Post Facto Design

Time Dimension

Scope

The Research Environment:

Participants Perceptions

Type of investigation

Units of Analysis

Extent of Crystallization of Research Question

Combining the approaches listed above four techniques could be derived.

Secondary data analysis

Experience survey

Focus groups

Two-stage design

Errors in Research Design

Error is the variation between the true mean value in the population of the variable of interest and the observed mean value obtained in the social research project.

Types of Research Errors

Several types of error can affect the quality of research design. A good research design made attempts to control the various sources of error.

Random sampling error

Non-Sampling error

Non-response error

Response error

Researcher error

1. Information error
2. Measurement error
3. Population definition error
4. Sampling frame error
5. Data Analysis Error

II. **Interviewer Error**

1. Respondent Selection error
2. Questioning Error
3. Recording error
4. Cheating Error

Respondent Error

1. Inability error
2. Unwillingness error

HYPOTHESIS

The formulation of hypotheses or propositions as to the possible answers to the research questions is an important step in the process of formulation of the research problem.

Meaning of Hypothesis

Hypothesis is a tentative proposition formulated for empirical testing.

Hypothesis is proposition, condition or principle which is assumed, perhaps without belief, in order to draw its logical consequences and by this method to test its accord with facts which are known or may be determined.

A tentative statement about something, the validity of which is usually unknown**.**

Characteristics of Hypothesis:

- It should be clear and precise.
- It should be capable of being tested.
- It should state relationship between variables.
- It should be limited in scope and must be specific.
- It should be understandable.
- It should be consistent with most known facts.
- It should be test with amenable time.

Purposes of Hypothesis:

- It provides bridge between theory and reality and in this sense unifying of two domains.
- It provides powerful tool, for the advancement of knowledge since they enable the researcher to objectively enter new areas of discovery.
- It provides direction for any research Endeavour by tentatively identifying the anticipated outcome.
- It is guide to the thinking process and the process of discovery.
- It serves as a framework for drawing conclusions.

Types of Hypotheses

- Descriptive Hypotheses
- Relational Hypotheses
- Causal hypotheses
- Working Hypotheses
- Null Hypotheses
- Statistical Hypotheses
- Abraham Kaplan
- Common Sense Hypotheses
- Complex Hypotheses
- Analytical Hypotheses

Functions of Hypothesis

- Helps Directions
- Specify the Source of Data
- Determine the Data
- Suggest type of research
- Helps Suitable Technique
- Development of Theory
- Possible to Test Theories
- Constructed Theory

Steps to Hypothesis Testing

- Describe in words the population characteristic about which hypotheses are to be tested
- State the null hypothesis, H_o
- State the alternative hypothesis, H_1 or H_a
- Display the test statistic to be used.
- Identify the rejection region-Is it an upper, lower, or two-tailed test?
- Determine the critical value associated withα, the level of significance of the test.
- Compute all the quantities in the test statistic, and compute the test statistic itself.

- State the conclusion. That is, decide whether to reject the null hypothesis, H_o, or fail to reject the null hypothesis. The conclusion depends on the level of significance of the test. Also, remember to state your result in the context of the specific problem.

Sources of Hypothesis

- Hypotheses can be derived from various sources
- Theory
- Observation
- Analogies
- Intuition and Personal Experiences
- Findings of Studies
- State of Knowledge
- Culture
- Continuity of Research

RESEARCH PROBLEM

A research problem is an issue or concern that an investigator presents and justifies in a research study.

A problem that someone would like to research Anything that a person find unsatisfactory or unsettling , a difficulty of some sort, a state of affairs that need to be changed . A problems involve areas of concerns to researchers, for condition they want to improve , difficulties they want to eliminate , questions for which they want to seek answers .

Search for a Problem.

- Read more about your problem
- Take notes or keep a research journal.
- Seek professional advice.
- Keep the topic interesting.
- How to Identify a Research Problem
- Follow a general procedure.
- Identifying the problem situation.
- Study the available research.
- Write statement identifying and defining the problem.
- Have colleagues read your final statement identifying and defining the problem
- situation
- What to do: problem identification and definition

Importance of Marketing Research Problem

1) Fulfillment of clients need. All the effort, time and money will be wasted if the problem is misunderstood.

2) Better communication and more involvement in problem definition are the most frequently ways of improving the usefulness of research.

Importance of Research Problem

Establishes importance of topic

Creates reader interest

Focuses reader's attention on how study will add to literature

Research problems are educational issues or concerns studied by researchers

- In education, a problem is a concern to educators that exists in educational settings.

Selection of Research Problem

Researchers interest in a topic.

National or agency priorities.

Urgency of an issue.

Availability of research funds.

Availability of supervision.

Steps In Defining Research Problems

1. Identify a broad topic
2. Identify a narrow topic within the broad topic
3. Raise questions
4. Formulate objectives
5. Use action-oriented words
6. Demonstrate
7. Evaluate
8. Measure

Formulating the Research Problem

1. Specify the Research Objectives

A clear statement of objectives will help you develop**effective research.**It will help the decision makers evaluate your project. **It's critical** that you have manageable objectives. (Two or three clear goals will help to keep your research project focused and relevant.)

2. Review the Environment or Context of the Research Problem

As a marketing researcher, you must work closely with your team. This will help you determine whether the findings of your project will produce enough information to be worth the cost.In order to do this, you have to identify the environmental variables that will affect the research project.

3. Explore the Nature of the Problem

Research problems range from simple to complex, depending on the number of variables and the nature of their relationship.If you understand the nature of the **problem as a researcher**, you will be able to better develop a solution for the problem.To help you understand all dimensions, you might want to consider focus groups of consumers, sales people, managers, or professionals to provide what is sometimes much needed insight.

4. Define the Variable Relationships

Marketing plans often focus on creating a sequence of behaviors that occur over time, as in the adoption of a new package design, or the introduction of a new product. Such programs create a commitment to follow some behavioral pattern in the future. Studying such a process involves:

- Determining which variables affect the solution to the problem.
- Determining the degree to which each variable can be controlled.
- Determining the functional relationships between the variables and which variables are critical to the solution of the problem.

During the **problem formulation** stage, you will want to generate and consider as many courses of action and variable relationships as possible.

5. The Consequences of Alternative Courses of Action

There are always consequences to any course of action. Anticipating and communicating the possible outcomes of various courses of action is a primary responsibility in the research process.

Sources of Research Problems

1. Casual observation
    a. The relationships between the cognitive and affective realms
    b. The effect of positive and negative reinforcement
2. Deductions from theory
    a. Use of math manipulative
    b. Learning and instructional style congruence
3. Related literature
    a. The use of math manipulative in secondary schools
    b. The comparison of state and national dropout profiles
4. Current social and political issues
    a. Gender and race equity
    b. Inclusion policies
5. Practical situations
    a. Evaluating a specific instructional program
    b. Evaluating a specific school restructuring effort
6. Personal interests and experience
    a. Teaching statistics from an applied perspective
    b. Effectiveness of non-threatening classroom assessments
7. Replication of previous studies
    a. Checking the findings of a major study
    b. Checking the validity of research findings with different subjects
    c. Checking trends or changes over time
    d. Checking important findings using different methodologies
8. Clarification of contradictory research results

Comparing Quantitative and Qualitative Research Problems

Quantitative problems	Qualitative problems
Specific	General
Closed	Open
Static	Evolving
Outcome oriented	Process oriented

Scientific research is driven by societal problems. When choosing a research problem, one must remember that finding the problem is only the beginning. After identifying the problem, one must articulate it in such a way that is carefully phrased and represents the single goal of the total research effort. The purpose of this analysis is to analyze what constitutes a researchable problem, the components of a well formed research problem, and what constitutes a reasonable theoretical framework for the need of a study. When choosing a problem in society to research, "one must be sufficiently knowledgeable about the topic of interest to know what projects might make important contributions to the field" .

Strategies:

1. **Look at the world around oneself**.- Looking around can be very helpful to the researcher because phenomena that need explanation are everywhere.
2. **Read the literature**.- Choose a topic that other will find interesting and worthy of attention (Leedy&Ormrod,2010).
3. **Attend professional conferences.-** Attending professional conferences will help the researcher to find out about hot topics within their field of study, and also help them network with other professionals who share the same research interests.
4**. Seek the advice of experts**.- Asking an expert about a topic of interest while attending a conference can also be a great way of identifying a research problem.
5 **Choose a topic that intriguing or motivating**:

6**.Reading the literature** will help the researcher“challenge research findings that seem contradictory to what one already knows or believes to be true (Neuman, 1994). Finally, researchers must also remember future employers may make judgments about them based on their topic of research. One’s resume or curriculum vitae will be more apt to attract employer’s attention if the research is pursuing an issue of broad scientific or social concern, or more generally, a hot topic in a particular field.

Once the researcher has used the six strategies listed above to find a meaningful problem in society to research, the job of articulating it in such a way that is carefully phrased and represents the single goal of the total research effort then presents itself.

REVIEW OF LITERATURE

Literature

It means past or previous studies about the current topic / title..

Literature in this context consists of books, journals, reports and research thesis, newspaper.

- Books
- Journals
- Reports
- Research Dissertations and theses.
- Newspapers
- Micro Forms

Purposes of Review

The reasons for review of related literature are

- to gain a background knowledge of the research topic,
- to identify the concepts relating to it, potential relationships between them and to formulate researchable hypotheses;
- to identify appropriate methodology, research design, methods of measuring concepts and techniques of analysis,
- to identify data sources used by researchers
- to learn how others structured the reports.

Sources of Literature

- Subject Catalogues of Libraries
- Documentation Service
- Documentation Service
- Lists of Books and Publishers' Bulletins:
- Journals
- Government Reports
- Research Abstracts
- Internet Sources

Significance of Review of Literature

- The researcher should undertake the survey of literature related to the problem because it is an eye-opener for research work.
- Help to study the past
- Basic knowledge of information
- Proper sources of social results
- Helps the reliable conclusions
- Guidelines the Direction of Analysis

QUESTIONNAIRE:

Introduction:

A questionnaire is a research instrument consisting of a series of questions people answer about their life condition, beliefs or attitudes.

A questionnaire can be administered either as a printed document that respondents fill out or as a list of queries posed by an interviewer, who then compiles interviewees' answers either by writing on a printed form or by recording the replies on audio tape or videotape.

Key Features for Constructing a Questionnaire:

- The researcher must be well acquainted with the research problem.
- Rough draft of the Questionnaire should be prepared and questions must be in sequence.
- Researcher must invariably re-examine, and in case of need may revise the rough draft for a better one.
- Technical defects must be identified and removed if any.
- Questionnaire must contain simple but straight forward directions for the respondents so that they may not feel any difficulty in answering the questions.

Types of Questions

Open Format Questions

- Closed Format Questions
- Leading Questions
- Dichotomous Questions
- Likert Questions
- Importance Questions
- Bipolar Questions
- Rating Scale Questions

Questions to be avoided In a Questionnaire:

- Embarrassing questions
- Positive / Negative
- Connotation questions
- Hypothetical questions

Steps to Develop a Questionnaire:

- Determine which information is being sought.
- Choose a question type (structure and amount of disguise) and method of administration (for example – written form, e-mail , telephone , interview etc.).
- Determine the general question content needed to obtain the desired information.
- Determine the form of response Choose the exact question wording.
- Arrange the questions into an effective sequence.
- Specify the physical characteristics of the Questionnaire, such as – paper type, number of questions per page, etc.
- Test the Questionnaire and revise it as needed.

Type of Questions

- **Factual:** Age, gender, education, experience (often used to investigate relationship**)**
- **Informative:** What respondents know about a given topic (How do you come to know about the availability of e-journals?)
- **Attitudinal/Opinion**Provide quantifiable answers

- Relatively easy to analyse
- **ion:** To obtain info about respondents' beliefs, feelings, values (Do to agree that current copyright law is fair?)
- **Self-perception:** Allows subjects to compare their ideas or actions with others (How active are you in the community work? How will you describe your computing skills?)
- **Standard of Action:** How respondents will act in a situation (For which party you will vote in the next election? Will you join the organ donation society?)
- **Projective Questions:** Allow respondents to answer in an indirect manner by imposing their feelings, attitudes or beliefs on others (Are most of the Singaporeans quitters or stayers? Are students happy with the grading scheme?)
- **Unstructured Questions:** Allow respondents to reply freely without having to select one of several provided responses (also called open-ended questions). Useful for exploratory studies in which various dimensions and facets of a problem are examined. Usually difficult to analyze responses. What steps are required to improve the quality of National
- **S**ervice? Usually low response rate.
- **Dichotomous:** yes/no, true/false, agree/disagree
- **Multiple Choices:** What sources do you use for writing term reports? (Check all that apply).How many hours do you exercise per week (check only one response) .How satisfied are you with the quality of canteen 'A' food?
- **Contingency:** Determine if the respondent is qualified to answer a subsequent question).Do you use databases available through iGems? (If no, please move to question 15) .Have you participated in DIS orientation? (Yes/No)
    - If yes, how effective was this briefing? (Very effective, effective, ineffective …)
- **Likert-type Scale:** Each response is assigned a numeric ranking based on a continuum that contains predetermined units of measurement. Designed to show a differentiation among respondents opinions
    - How important is …. (Very important, important ….)

- How adequate are …. (v. adequate ……..inadequate)
  - How frequently do you ... (frequently … infrequently

- **Semantic Differential Scale:** Provides a set of bipolar adjective pairs

- Q. How would you rate performance of the Income Tax staff?
  - 1 2 3 4 5 6 7
- Bad … … … … … … … Good
  - Unfair … … … … … … … Fair
- Harsh … … … … … … … Gentle
- **Rank-order or Comparative Ranking Scale**

- Respondents are expected to rank responses according to their importance/ preference. Should be used carefully as many respondents face difficulty in Understanding/responding
- Only use a short list of responses

- **Q.** What sources do you prefer for writing term reports? Please rank them according to …… (1= most preferred; 7= least preferred)
  - --- Books
    - --- Encyclopaedia
      - --- Friends
      - --- Internet
      - --- Journals
      - --- Lecture notes
      - --- Personal collection

Advantages of a Questionnaire

- There is low cost even when the universe is large and is widely spread geographically.
- It is free from the bias of the interviewer; answers are in respondents' own words.
- Respondents have adequate time to give well thought answers.
- Respondents, who are not easily approachable, can also be reached conveniently.
- Provide quantifiable answers.
- Relatively easy to analyse.

Disadvantages of a Questionnaire

- Low rate of return of the duly filled in questionnaires.
- It can be used only when the respondents are educated and cooperating.
- It is difficult to know whether willing respondents are truly representative.

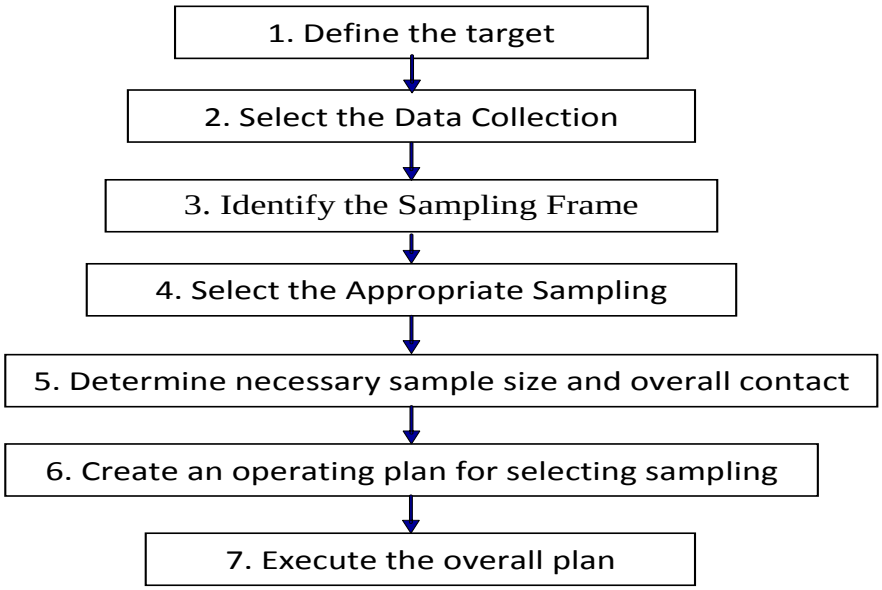
- This method is time consuming and very slow in process.
- Varying response -Misunderstanding/misinterpretation.
- Need to get it right first time-Hard to chase after missing data.

SAMPLING AND SAMPLING DESIGN

The terminology “Sampling” indicates the selection of a part of a group or an aggregate with a view to obtaining information about the whole.

Steps in Developing a Sampling Plan

The following are the logical steps involved in the sample execution.



Census Method

The object of a census or complete enumeration is to collect information for each and every unit of the population.

Types of Sampling

Element selection	**Representation Basis**	
	Probability	**Non Probability**
Unrestricted	**Simple random**	**Convenience**

Restricted	**Complex random** **Systematic** **Stratified** **Cluster** **Double**	**Purposive** **Judgement** **Quota** **Snowball**

Probability Sampling

Size of sample

Probability of selection = Size of Population

Determination of Appropriate Sampling Design

- Research objectives
- Scope of the Research
- Availability of Resources
- Time Frame
- Advanced Knowledge of the Target Population
- Degree of Accuracy
- Perceived Statistical Analysis Needs

Advantages and Disadvantages Of Basic Sampling Techniques

Sl.	Techniques	Advantages	Disadvantages
1.	I. Non probability sampling Convenience sampling	Less expensive, less time consuming, most convenient	Bias selection, lack of representative items, not suggested for descriptive and causal research
2.	Judgement sampling	Convenient, Low cost, not time consuming	Subjective in nature. Does not allow generalization.
3.	Quota sampling	Simple method, easy to understand the field staff	Biased selection, no assurance of representativeness.
4.	Snowball sampling	Can practice rare occasions	Time consuming, expensive method

5.	II. Probability Simple random sampling	Simple method, easily understood results projectable.	Difficult to construct sampling frame, expensive lower precision.
6.	Systematic sampling	Easy to make use, sampling frame not necessary, more representativ eness.	Chances of biased sample selection.
7.	Stratified sampling	Includes all sub-population, precision	Expensive method difficult to select relevant variables.
8.	Cluster sampling	Easy to implement cost effective.	Difficult to compute and interpretations

METHODS OF COLLECTION OF DATA

Source of Data

Data source can be broadly categorized into three types' viz., primary, secondary and tertiary.

Documentary Sources (Secondary Data)

- Books
- Report of Surveys
- Memories
- Accounts of Travels
- Historical Account
- Official Published Data
- Other Unpublished record

PRIMARY DATA

Data collection method is integral part of the research design

SCHEDULE

The schedule is the form containing some questions or blank which are to be filled by the workers after getting information from the informants.

- Purpose of Schedule
- To attain objectivity
- To Act as Memory

Essentials of a Good Schedule

- Type Of Questions
- Open-end Questions
- Structured Questions
- Dichotomous Question
- Multiple-Choice Questions
- Leading Questions
- Ambiguous Questions
- Ranking Item Question

QUESTIONNAIRE

Form of Questionnaire

- Size of Questionnaire
- Appearance
- Clarity
- Sequence of Questions
- Catching interest

Factors affecting response

- Special Characteristics of The Groups
- Prestige Sponsoring Groups
- Importance of the Problem Under Study
- Nature of Questionnaire
- Nature of Reaction
- Size of Questionnaire
- Sequence of the Questions

INTERVIEW

"Interview may be regarded as a systematic method by which a person enters more or less imaginatively into the life of a comparative stranger."

Kinds of Interviews

- Structured Interview
- Unstructured Interview
- Focused Interview
- Repetitive Interview

Technique of Interview

- Establishing Contact
- Starting an Interview
- Establishing Rapport
- Recall
- Probe Questions
- Encouragement
- Guiding the Interview
- Recording
- Closing the Interview
- Report

OBSERVATION

Observation is probably the oldest method used by man in scientific investigation.

Kinds of Observation

- Participant Observation
- Non-Participant Observation
- Non-Controlled Observation
- Controlled Observation

Limitations of Observation as a Method of Social Research

- Some of the occurrences may not be open to observation.
- Not all occurrences open to observation can be observed when observer is at hand.
- Not all occurrences lend themselves to study observational techniques.

Importance of Observation in Social Research

- Simplest method
- Useful in Framing hypothesis
- Greater Accuracy

- More Convincing Results
- Test of Validity
- A common Method for All Sciences

Other Methods of Data Collection

- Warranty Cards
- Store Audits
- Pantry Audits
- Consumer panels
- Mechanical Devices

Projective Techniques

- Word Association Test
- Sentence Completion Tests
- Story Completion Test
- Verbal Projection Tests
- Pictorial Techniques
- Thematic Appreciation Test (T.A.T)
    - Rosenweiz Test
    - Rorschach test
    - Holtzman Inkblot Test (HIT)
    - Play Techniques
- Quizzes, Tests and Examinations
- Sociometry

PROCESSING OF DATA

Editing of Data

This will facilitate coding and tabulation of data. In fact, the editing involves a careful scrutiny of the completed questionnaires

- Field editing
- Central Editing

Coding of Data

The coding is necessary for the efficient analysis of data.

Classification of Data

In most research studies, voluminous raw data collected through a survey need to be reduced into homogeneous groups for any meaningful analysis.

Statistical Series

A series is defined as a logical or systematic arrangement of observations or items

Visual Aids in Reports

Visual aids are an essential part of report. Carefully presented visual aids can make the report more interesting and understandable.

Types of Visuals

- **Tables**
  - A table is a collection of information presented in columns and rows. Tables should contain enough information to enable the readers to understand its contents.
- **Bar Graphs**
  - A bar chart depicts numbers by height or length of its rectangular bars.
- **Pie charts**
  - A pie chart is used to show the relative sizes of parts of a whole.
- **Pictograms**
  - A chart that uses symbols instead of words or numbers to portray data is known as pictogram.
- **Organization Charts**

- The organization chart illustrates the positions, units or functions of an organization and the way they interrelate.

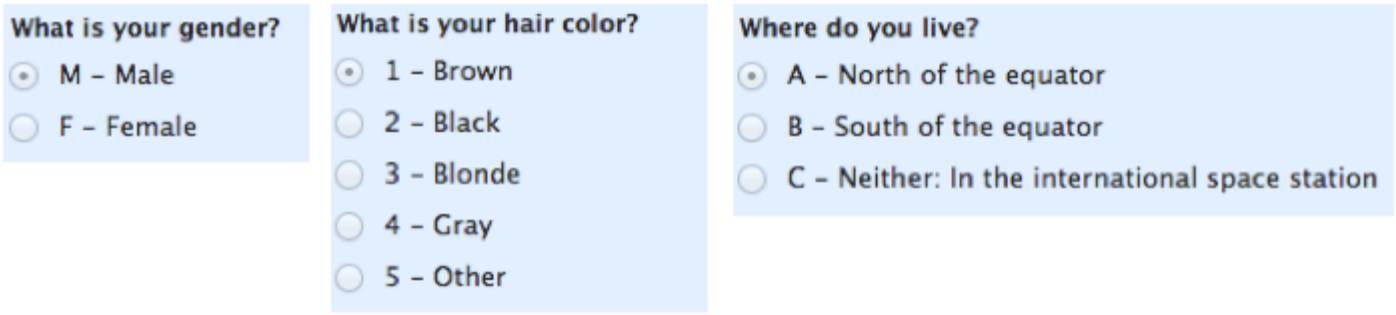
- **Decision Charts**
  - A decision chart or decision tree is a flow chart that uses graphs to explain whether or not to perform a certain action in a certain situation.
- **Gantt Charts**
  - A Gantt chart represents the schedule of project.
- **Photographs**
  - Photographs enable to capture the exact appearance of an object and uses visual appeals to capture the readers' attention .

MEASUREMENT SCALES

There are four measurement scales (or types of data): nominal, ordinal, interval and ratio. These are simply ways to categorize different types of variables. This topic is usually discussed in the context of academic teaching and less often in the "real world." If you are brushing up on this concept for a statistics test, thank a psychologist researcher named Stanley Stevens for coming up with these terms. These four measurement scales (nominal, ordinal, interval, and ratio) are best understood with example, as you'll see below

Nominal Scale

Let's start with the easiest one to understand. Nominal scales are used for labeling variables, without anyquantitative value. "Nominal" scales could simply be called "labels." Here are some examples, below. Notice that all of these scales are mutually exclusive (no overlap) and none of them have any numerical significance. A good way to remember all of this is that "nominal" sounds a lot like "name" and nominal scales are kind of like "names" or labels.



Examples of Nominal scale

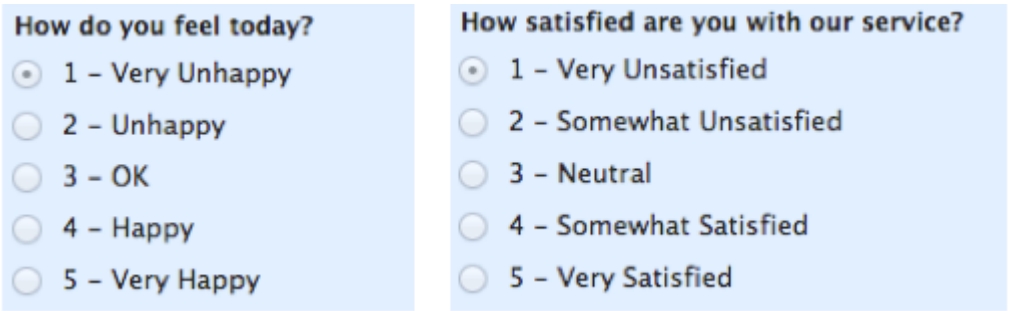
Ordinal Scale

With ordinal scales, it is the order of the values is what's important and significant, but the differences between each one is not really known. Take a look at the example below. In each case, we know that a #4 is better than a #3 or #2, but we don't know–and cannot quantify–how *much* better it is. For example, is the difference between "OK" and "Unhappy" the same as the difference between "Very Happy" and "Happy?" We can't say.

Ordinal scales are typically measures of non-numeric concepts like satisfaction, happiness, discomfort, etc.

"Ordinal" is easy to remember because is sounds like "order" and that's the key to remember with "ordinal scales"–it is the *order* that matters, but that's all you really get from these.

Advanced note: The best way to determine *central tendency* on a set of ordinal data is to use the mode or median; the mean cannot be defined from an ordinal set.



Example of Ordinal Scales

Interval Scale

Interval scales are numeric scales in which we know not only the order, but also the exact differences between the values. The classic example of an interval scale

is Celsius temperature because the difference between each value is the same. For example, the difference between 60 and 50 degrees is a measurable 10 degrees, as is the difference between 80 and 70 degrees. Time is another good example of an interval scale in which the increments are known, consistent, and measurable.

Interval scales are nice because the realm of statistical analysis on these data sets opens up. For example,*central tendency* can be measured by mode, median, or mean; standard deviation can also be calculated.

Like the others, you can remember the key points of an "interval scale" pretty easily. "Interval" itself means "space in between," which is the important thing to remember–interval scales not only tell us about order, but also about the value between each item.

Here's the problem with interval scales: they don't have a "true zero." When it comes to time, there is no such thing as "no time," just as there is no such thing as "no temperature." Without a true zero, it is impossible to compute ratios. With interval data, we can add and subtract, but cannot multiply or divide. Confused? Ok, consider this: 10 degrees + 10 degrees = 20 degrees. No problem there. 20 degrees is not twice as hot as 10 degrees, however, because there is no such thing as "no temperature" when it comes to the Celsius scale. I hope that makes sense. Bottom line, interval scales are great, but we cannot calculate ratios, which brings us to our last measurement scale.

Example of Interval Scale

Ratio Scale

Ratio scales are the ultimate nirvana when it comes to measurement scales because they tell us about the order, they tell us the exact value between units, AND

they also have an absolute zero–which allows for a wide range of both descriptive and inferential statistics to be applied. At the risk of repeating myself, everything above about interval data applies to ratio scales + ratio scales have a clear definition of zero. Good examples of ratio variables include height and weight.

Ratio scales provide a wealth of possibilities when it comes to statistical analysis. These variables can be meaningfully added, subtracted, multiplied, divided (ratios). Central tendency can be measured by mode, median, or mean; measures of dispersion, such as standard deviation and coefficient of variation can also be calculated from ratio scales.

REPORT WRITING

A report is a prepared account of what happened, about a particular event, presented in formal and organized format backed with statistical evidence.

"A report is a statement of the results of an investigation or of any matter on which definite information is required"

Importance of Report

- To present the findings and results.
- To keep records.
- To tell about failures and successes
- To tell the progress of the project/research

Types of Reports

- Oral Report
- Written Reports
    - Time Interval Reports
    - Special Reports
    - Functional Reports
        - Informational Report
        - Examination Report
        - Analytical Report
- Field Report
- Physical Report

- Relationship Report
    - Administrative Report
    - Professional Report
    - Independent Report
- Employment Report
- Private Report
- Government Report
    - Formal Report
    - Informal

Stages in Report Writing

- **Pre-writing Stage**
    - Analyzing the Situation
    - Problem Definition
    - Developing the Statement of Purpose
    - Developing a Preliminary Outline
    - Preparing the work plan
    - Investigating information
    - Adapting the report
    - Selecting the Appropriate Channel and Medium
- **Writing Stage**
    - Deciding the Format and Length
        - Pre-printed form
        - Memo
        - Letter
        - Manuscript
    - Choosing the approach
    - Structuring the reports
    - Composing Reports
- **Post-Writing Stage**
    - Revision
    - Production the Report

    - Proof reading
- Integral parts of a report
- The preliminaries
- Letter- of transmitted
- Title page
- Preface
- Table of contents
- Guidelines
- List of table
- List of illustrations
- The text
- Introduction
- Background
- Problem statement
- Research objectives
- Methodology
- Analysis of study and findings and conclusion
- Reference material
- Bibliography
- Appendix

Features of good Report Writing

- It is complete & self-explanatory
- It has a clear thoughts
- It has suitable format for readers
- It is accurate in all aspects
- It is comprehensive but compact
- It support facts & is factual
- It has proper date & signature
- It has an impersonal style
- It follows an impartial approach

- It has a reference to relevant details
- It is arranged in a logical manner
- It is a reliable document
- It is presented in a lucid style
- It has all essential technical details

Steps to Report Writing

- Define the problem
- Gather the necessary information
- Analyze the information
- Organize the information
- Write the report

Report Structure:

Letter of transmittal

- A Salutation
- The purpose of the letter
- The main finding of the report
- Any Important Considerations
- An Acknowledgement of any Significant help
- An Expression of pleasure or gratitude

Title page

- title
- writer
- organization
- date
- person/group who commissioned the report

Table of content

- accurate, clear layout
- section numbering system and indentation
- complete
- page numbers
- list of illustrations if applicable

List of abbreviations and/or glossary

- arranged alphabetically

Executive summary/abstract

- appropriate length
- complete summary of key information
- informative, not descriptive, in form
- impersonal tone
- connected prose

Introduction

- relating topic to wider field
- necessary background information
- purpose of report
- scope of report
- explanation of arrangement of report sections

Body

- A Report of Primary Research would include
- Literature review
- Method
- Findings of results
- Discussion
- A report of secondary research
- Information organized under appropriate topics with sub heading
- Analysis / Discussion of the source of reporting.

Conclusions/summary

- Summarize what has been discovered
- Repeat the question
- Give the answer
- Outlines the findings of the research
- Do not introduce new information in the conclusion.
- Analysis of the advantages and disadvantages of various courses of action.

Recommendations

- based on the conclusions
- practical
- specific
- well organized, with the most important first

Bibliography

- texts consulted but not referred to directly in the report

Appendices

- placed at end of a report if included
- arranged in the order referred to in the report

Process of Report Writing

The Objective

- It defines the scope of your investigation.
- Identify the purpose… To inform? To convince?

Planning Your Report:

- How much time do you have to write the report?.
- How can your work be divided up into the various stages?
- Set yourself deadlines for the various stages.

Collecting Information:

- What is the information you need?
- Where do you find it?
  - Survey Organizations
  - Online:
  - Google
  - Publications
- How much do you need?

Organizing Information:

- Discriminate between relevant and irrelevant information.
- Sort/organize information under main ideas/details.
- The computer program, Inspiration, can help in organizing .

The Audience:

Often 3 different audiences

- The casual reader/big boss who wants the main message as painlessly as possible.
- The interested reader who wants more detail but doesn't want to grapple with all the gory technical details
- The guru who wants the whole story.

What to Do? :

To address all 3 audiences effectively,

- Include an abstract for the big boss
- A main body for the interested non-specialist
- A technical appendix for the guru
- Thus, a structure emerges!

Finishing the Report:

Writing style

Structure alone is not enough for clarity – you must also write clear sentences.

Rules:

- Write complete short sentences
- Avoid jargon and cliché,
- strive for simplicity
- One theme per paragraph

Who Is The Reporter?

- All reports should be written in the third person
- i.e., as an objective observer!.
- Avoid using terms such as ``I did this experiment and ..".
- Instead substitute terms, such as ``The experiment was performed ...".
- Some friendly help…
- The view of an objective and completely fresh reader can be of great benefit. This person may also be able to pick up spelling or grammatical errors which you yourself are unaware of.

Finishing Touches:

Type

- Don't use too many styles
- Avoid All Caps
- Difficult to Read

- Double Space
- Number Placement
- Bottom Center

Paper

- High Quality
- 20# Weight White
- /Off-White
- 8 ½ x 11

Margins

- Top & Sides - 1”
- Bottom - 1 ½”
- Left & Right 1.25”