CHAPTER ONE
RESEARCH METHODOLOGY

1.1 Definition /Meaning of Research

The word Research is composed of two words 're' and 'search' where re means repeatedly or again and again and search means to investigate or find. Thus, to search again and again is research. Research can be defined as a systematic inquiry or investigation to discover new information or relations to expand and verify knowledge existing for some special purpose.

Research is the systematic process of collecting and analyzing information in order to increase our misunderstanding of the phenomenon with which we are concerned or interested. Research can be defined as a process that is followed by a person to answer either his/her own queries or somebody else queries about a particular object, person, subject etc. .

According to Sekaran "Research is a systematic and organized effort to investigate a specific problem that needs a solution." Sekaran has defined research as an Organized, systematic. Data-based, critical. scientific, inquiry or investigation into a specific problem, undertaken with the objective of finding answer or solution to it. Research should be: -

- Well organized
- Systematic, objective controlled and logical
- Based on Data and empirical evidences
- Scientific
- Solution oriented

Social Research: The research work conducted to evaluate the Human Development, Culture, History, Religion etc is considered as Social Research**.** It is research involving social scientific methods, theories and concepts which can enhance our understanding of the social procession such as human behavior, festivals, rituals, language, culture, heritage, tradition etc. and problems encountered by individual and group in society.

1.2 Objective of a research:

General Objective *:*To set new theory or identify proper solution of a problem by systematic and deep study.
Specific Objectives: The specific objectives of research may vary from one research to another, but it can be implanted in following points:

- To generate new knowledge
- To solve a specific problem
- To establish new theory
- To develop new policies
- To support the decision making
- To test the established theory in practice
- To interpret culturally/historically significant phenomena
- To make good predictions about the behaviour/phenomena
- To explore diversity
- To identify general patterns and relationship
- To find out the causes and effect of changes social norms.
- To solve current social problems.
- To evaluate applied rules and regulations or plan and programs.
- To help administrative reforms

Research activities or process

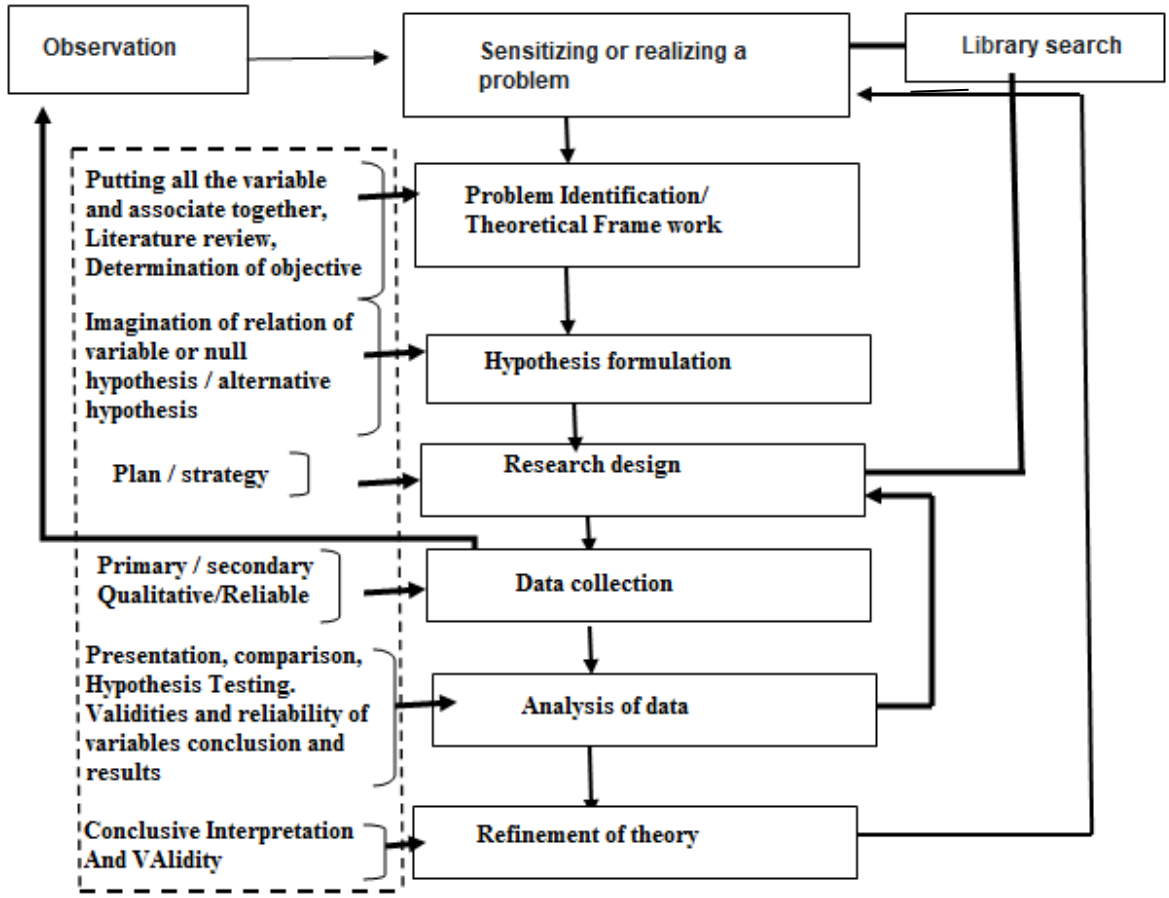
Research is a scientific study so, it should follow a systematic process. The following are the different activities involved in research :

- Selection of Topic
- Define the Problem
- Identification of variables
- Prepare research Question
- Collection and analysis of Data
- Abstract new theory or Solution

Scientific Research:

Scientific research is a systematic, step by step & logical process of identifying problems, collect Data, analyze data and draw conclusion. Any research which follows the above steps is known as scientific research .It relies on empirical evidence, utilizes relevant concepts, commits to objectivity, adheres the ethical neutrality and aims at formatting theory.

Fig:The scientific Research Process



1.3 Phases or Steps of Research.

- **Realizing or Sensing problem** : The first step in any scientific inquiry is observing the situation and sensing the problem.New problems keep on emerging in the environment. We somehow sense these developments occurring in the environment. At this stage, we may not know exactly what is happening, but we can definitely sense that things are not going as smoothly as they should be.

- **Identification of problem :** Once we increase our level of awareness of what is happening in the environment, we would then focus on the problem and the associated factors through further search of information. In this step we try to identify what exactly are the problems in the situation**.** It is thus, problem-defining stage. Without a focused definition of problem, data tends to be irrelevant, expensive and confusing. Research problem should be specific.

- **Theoretical frame work:** In the third step of scientific research, we make an attempt to integrate the information logically so that the reason for the problem can be conceptualized. The critical variables are examined and the association among them is identfied. Putting all the variables and their association together, a theoretical framework is developed.This step essentially involves a review of related literature. It familiarizes the researcher with what is already known and what is still unknown and untested.

- **Formulation of hypothesis :** Hypothesis for the study are drawn from the theoretical framework. A hypothesis is a tentative answer to question. It is an educated guess. It is generally based upon prior research. It is subjected to the process of verification or disconfirmation. Hypotheses are logically conjectured relationship between two or more variables expressed in the form of testable statements.

- **Research design:** The fifth step is devising the plan for the. Research. The research design is the strategy for conducting research. It describes the general framework for collecting, analyzing, evaluating data after identifying:
  - what the researcher wants to know and
  - what has to be dealt with in order to obtain recruited information.

- **Data collection :** Data collection, the sixth step in scientific research is also known as field work because researcher has to visit field for administering the research instruments to collect data. At this stage, the researcher has to collect data as expected. Data can be obtained from primary source or secondary source. Questionnaire, interview, observation are major instruments to collect data.

- **Data analysis :** Data analysis is the statistical analysis of data that have been edited, coded and tabulated. In other words, data analysis means the categorizing, ordering, manipulating and summarizing of data to obtain answer to research's question. It is especially important in cases where the researcher has amassed large amounts of information from many respondents. With the use of different statistical techniques, the hypotheses are tested.

- **Interpretation and Generalization:** The final step involves interpretation and generalization of the findings into the larger body of knowledge about the phenomenon. In the case of applied research, specific implementation strategy is proposed to solve the problem identified by the study**.** Interpretation takes the result of data analysis, makes inference pertinent to the research relation studied and draws conclusion about the relations. Generalization is the act of giving general form to these conclusions.

- **Report preparation:**Finally the researcher has to prepare the report of his/her research. Its objective is to tell readers the problems investigated, the method used to solve problems, result of the investigation and the conclusion from the result.

1.4. Types of Social Research

There are following types of social research

A) Basic vs Applied Research

Basic Research: According to **K D Bailey** "Basic research is values developing and testing theories and hypothesis that are intellectually challenging to the researcher but may or may not have practical application for present time or in coming future."

This research is also called *fundamental research* or pure research. This is a research which is carried out by the research student or a professor to generate new knowledge or to set new theory & principle which has no intermidiate or planned application. It is done in their field of interest by selecting a desired topic. This is the types of research which is done for the fulfilment of an academic exercise. It may not be applied to solve the any practical problem,policies which exists in society.

The following could be some topics of basics research:

i) Privatization of public enterprises in Nepal.
ii) Technological changes and women employers.
iii)The role or tourism in National economy .

Applied Research: This is a research which is conducted to acquire proper solution of a specific problem. The purpose of applied research is to answer practical questions about polices, programmes or organizations by regular collection, presentation and interpretation of reliable data relating to the particular problem during the day to day activity of org.. In general, applied research is conducted by the experts of particular field to solve the problem.This type of researches concerned with the knowledge that has immediate applications.It aims at finding about a solution for immediate problem faced by a society and organization. It is also known as **decisional , practical** or **emperical research**.

Some research topics:

I. Improvement in living condition of farmers by the use of modern plough.
II. A feasibility study of a commercial Bank in Banepa etc.

B) Descriptive Vs Analytical Research

Descriptive research includes surveys and fact finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present.

Analytical Research is conducted to find the cause and eflcct of the any problem. It demands the analytical skills of the researcher.

C) Quantitative Vs Qualitative Research

Quantitative Research basically expressed with numbers. Various statistical tools are used for the analysis of data.
Qualitative Research deals with the fact finding meaning, concepts and description of the facts.
Differences Between Qualitative and Quantitative Research

Quantitative	Qualitative
Objective is to test hypotheses that the researcher generates.	Objective is to discover and encapsulate meanings once the researcher becomes immersed in the data.
Concepts are in the form of distinct variables	Concepts tend to be in the form of themes, motifs, generalizations, and taxonomies. However, the objective is still to generate concepts.
Measures are systematically created before data collection and are standardized as far as possible; e.g. measures of job satisfaction.	Measures are more specific and may be specific to the individual setting or researcher; e.g. a specific scheme of values.
Data are in the form of numbers from precise measurement.	Data are in the form of words from documents, observations, and transcripts. However, quantification is still used in qualitative research.
Theory is largely causal and is deductive.	Theory can be causal or non-causal and is often inductive.
Procedures are standard, and replication is assumed.	Research procedures are particular, and replication is difficult.
Analysis proceeds by using statistics, tables, or charts and discussing how they relate to hypotheses.	Analysis proceeds by extracting themes or generalisations from evidence and organizing data to present a coherent, consistent picture. These generalisations can then be used to generate hypotheses.

D) Conceptual Vs Empirical

Conceptual Research is generally conducted for making pollicies, or for future planning. Past events and present developments are made the basis for devlopment of new concepts. Conceptual research is that related to some abstract idea(s) or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones.
Empirical research is research that derives its' data by means of direct observation or experiment, such research is used to answer a question or test a hypothesis. The results are based upon actual evidence as opposed to theory or conjecture, as such they can be replicated in follow-up studies.

1.5 Characteristics of Scientific Research.

A research study has to meet certain conditions in order to be called a scientitic research. In other words, scientific research has some characteristics which it must satisfy. These are: .

a. Purposiveness:Scientific research must have a focus or a specific purpose. Research without purpose leads the study nowhere. The purpose of research directly influences all the activities of a researcher. It is the purposiveness which helps to follow the proper way of investigation.

b. Testability : The purpose of scientific research is to develop and test the hypotheses. If the hypotheses could not be tested then it is not called scientific research. The ultimate outcome of scientific investigation is to see that the hypotheses are tested.

c. Replicability: By using similar method and procedures of the data collection and analysis as followed by the previous study, the other research study must also come out with similar result. Replicability, thus,

indicates that the hypotheses, which were substantiated by previous study, had not been supported merely by chance.

d. Objectivity: Researchers might start with some initial subjective value and beliefs, their interpretation of data should be striped personal values and biases. They should strive to attain objectivity in their research methods and interpretations. In other words, the facts should determine the conclusions. The researcher must take extra caution to keep the research process bias-free.

e. **Rigour**: Scientific research is rigorous process. It is the level of rigorous that drives the investigation towards the exactness. Lack of rigour in research may lead to
(i) the selection of faulty research design,
(ii) inappropriate and biased collection and interpretation of data and
(iii) wrong conclusion.

f.Generalizability: Scientific research aims at making generalizations. Generalization means the wider applicability of the research findings. A more elaborate sampling design would increase the generalizability of the result. The more generalizable the research, the greater its usefulness and value.

1.6 Role of Research in Engineering

- Engineers are Directly or indirectly related with management, because the Engineers are involved in problem solving and decision making activities.
- It helps for Making policies, programmers
- Data required for correct managerial decisions
- Identifies the factors and events responsible for the overall development of organizations.

CHAPTER TWO
FUNDAMENTAL CONCEPT ON RESEARCH

2.1 . Hypothesis

A hypothesis is a tentative statement, the validity of which remains to be tested. In this elementary stage a hypothesis may be any hunch, guess, imaginative idea which becomes the basis for action or investigation.Hypothesis may be defined as a statement or assumption for research which may or may not be true.

Sekuran (1992) has defined hypothesis as 'a logically conjectured relationship between two or more variables expressed in the form of testable statement.Any theory is a hypothesis before that is proved.

Theory: A hypothesis is not the same as theory; although two are clearly related. According to William H. George, 'Theory is elaborated hypothesis'. Hypothesis is a generalization drawn from theory and when it has been tested and found correct, it becomes part of the theory. Thus. A theory in its early form is only a theory. In other words, a theory may be defined as the verified statement concerning the relationship among variables referring to the set of interrelated concepts. In brief, Hypothesis which is proved after test is known as theory.

Research Question: Maxwell says "Research questions state what the researcher wants to learn and hypothesis are the statements of researcher's tentative answers to these questions'
Example of Research Question:
"What is the relationship between population growth in Kathmandu before the introduction of family planning and after the introduction of family planning"

Research Hypothesis
Research hypothesis may be defined as the formal affirmative statement predicting the research outcome . **According to Kerlinger**"A research hypothesis is a conjectural statement between two or more variables." It is also the answer of research question, i.e. the hypoyhesis on the basis of previous research question may be, "There is a significant difference in the population growth in Kathmandu between ·when family planning was first introduced and five years later "

Null Hypothesis and Alternative Hypothesis:

- **Null hypothesis** :A Hypothesis of no different is called null Hypothesis. we usually consider the nullity between two variables i.e there is no difference between two phenomenon. It is the negative form of research hypothesis, lf research hypothesis states there is relationship between two variables; null hypothesis states there is no relationship. The null hypothesis is generally symbolized as H_o. **Examples**:
  - There is no any difference in the population growth in Kathmandu between when family planning was first introduced and five years later
  - Method A and method B are equally effective".
  - There is no difference between results of MBA and MBS students in TU

- **Alternative hypothesis**:It is opposite of the null hypothesis. The alternative hypothesis is generally symbolized as H_A.Usually in alternative hypothesis there is some different between two variables. When null hypothesis is rejected alternative hypothesis is accepted .The main function of alternative hypothesis is to specify the relationship that will be considered as true.

If we are to compare method A with method B about its superiority and if we proceed on the assumption that both methods are equally good, then this assumption is termed as the null hypothesis. As against this, we may think that the method A is superior or the method B is inferior, we are then stating what is termed as alternative hypothesis.

Suppose we want to test the hypothesis that the population mean (μ) is equal to the hypothesised mean i.e μ_{H_o}=100

Then we would say that the null hypothesis is that the population mean is equal to the hypothesised mean 100 and symbolically we can express as:
H_o: μ= μ_{H_o}=100

If our sample results do not support this null hypothesis, we should conclude that something else is true. What we conclude rejecting the null hypothesis is known as alternative hypothesis. In other words, the set of alternatives to the null hypothesis is referred to as the alternative hypothesis.

Characteristics of hypothesis: Hypothesis must possess the following characteristics:

- Hypothesis should be clear and precise. If it is not so, the inferences drawn on its basis cannot be taken as reliable.
- The hypothesis should be simple and pointing to the problem
- Hypothesis should be capable of being tested and justiable through scientific methods / techniques.
- Hypothesis should state relationship between variables, if it happens to be a relational hypothesis.
- Hypothesis should be limited in scope and must be specific. A researcher must remember that narrower hypotheses are generally more testable and he should develop such hypotheses.
- Hypothesis should be stated as far as possible in most simple terms so that the same is easily understandable by all concerned. But one must remember that simplicity of hypothesis has nothing to do with its significance
- It should explain the facts that are needed for explanation
- Hypothesis should be consistent with most known facts i.e., it must be consistent with a substantial body of established facts. In other words, it should be one which judges accept as being the most likely.
- Hypothesis should be amenable to testing within a reasonable time. One should not use even an excellent hypothesis, if the same cannot be tested in reasonable time for one cannot spend a life-time collecting data to test it.
- Hypothesis must explain the facts that gave rise to the need for explanation. This means that by using the hypothesis plus other known and accepted generalizations, one should be able to deduce the original problem condition. Thus hypothesis must actually explain what it claims to explain; it should have empirical reference

Funcions of hypothesis

- It brings clearity to the research
- It provides a study with focus
- It signifies what specific aspects of a research is to be investigated
- It clarifies what data to be collected and what data not to be collected
- It can enhanced the objective of study
- It formulate the theory/test theory
- It enable to conclude with what is truth and what is false.

Steps of hypothesis testing procedure

a) Frist state null hypothesis and then state alternate hypothesis
b) Select the appropriate test ststistuc and level of significance
c) State the decision rules
d) Compute the appropriate test static and make the decision
e) Interpriate the decision

Sources of hypothesis

- **General culture**: -In social studies a hypothesis may be formulated with the help of general pattern of culture ,the culture has a great influence upon the thinking process of people and hypothesis may be formed to test one or mote of these ideas.
- **Scientific Theory**: -A theory gives us the basic idea of what has been found to e correct. The knowledge of theory leads us t form further generalization and corollaries from it. Threes generalization and corollaries forms parts of a hypothesis.
- **Analogies:-**Sometimes, a hypothesis is formed from the analogy . A similarity between two phenomenon is observed at a circumstance. A hypothesis is then formed to test whether two phenomenon are similar in other circumstances too.
- **Personal Experiences:-**Some times , the facts are there but a right individual see it in right perspective and formulates a hypothesis. Thus for example ;-every body had seen the falling of an apple from a tree but Isaac Newton was only the person who could stick the idea of the force of gravitation

2.2 SAMPLING

Sampling is a technique of data collection in which some samples are taken for the study which represents the whole population. Sampling can be defined as the selection of some part of an aggregate or totality, the bases of which a judgment or inference about the aggregate or totality is made . The sampling process is based on the principle that a sufficiently large number drawn at random from a population will be representative of total population; that is the sampling group will posses the same characteristics in the same propertions as the total population.

According to Fred.N.Kerlinger:"Sampling is taking any portion of a population or universe as representative of the population." **AccordingtoY.D.Keskar:**"Sampling is the generalization in terms of the whole group through the facts assembled relate to only part of it."

Sample: Any number selected to represent the population due to difticulties of considering the whole population is termed as the Sample. A sample is a small proportion of population selected for observations analysis. From the observation of the sample some conclusion is drawn about the Population parameters. The selection process or technique of such sample is called **sample design** and the survey conducted on the basis of sample is described as **sample survey**.

Census: It is the study or evaluation of each and every individual of the population which has the higher accuracy and exact information as it covers all the members and free from sampling errors.

Needs of Sampling: Sampling is used in practice for a variety of reasons such as:

- It can save time and money. A sample study is usually less expensive than a census study and produces results at a relatively faster speed.
- It may enable more accurate measurements for a sample study is generally conducted by trained and experienced investigators.
- It remains the only way when population contains infinitely many members.
- It remains the only choice when a test involves the destruction of the item under study.
- It usually enables to estimate the sampling errors and, thus, assists in obtaining information concerning some characteristic of the population.
- It has greater speed as it is completed soon.

Sample Design: In sample design the following three points has to be considered

- Sampling frame (List of population).
- Selection of Sampling items (Method of Sampling) .
- Size of sampling .(Larger the sample size, more accurate it is)

These three points are further extended and explained in seven steps:

A. Define the population
   - Elements, units, time

B. Specify the sample frame
   - Employee roster
   - Students' name list
   - maps
   - Telephone directory

C. Specify Sampling Unit
   - Generally number

D. Selection of sampling method
   - Probability sample
   - Non- probability sample

E. Determination of sample size
   - Depends upon: quantity and quality
   - Larger the sample size reater the accuracy

F. Specify sampling plan
   - Specification ·of decision making
   - Operational procedures .

G. Select the sample
   - Selection of sample elements. (Consider: Geographical region, ethnic group, uge group, etc)

Characteristics of a sample

- Sample should be as correct as possible.
- It should be representative of the whole population.
- Quality of sample is important than its quantity
- Sample should not be prejudice and biased.
- Sample should fulfil the purpose of the study.
- A sample should be independent i.e. interchangeability of units. Each unit should be free to include in the sample.
- The size of the sample should be adequate to generalize conclusions to the whole population.
- A sample should be in coeternity with the objective of the study.
- The units included in the sample should be homogenous.
- Sampling should result in small sampling error.
- Sampling should be economy in terms of time, cost and effort.
- Sampling should have scientific base.

Types of Sample

There are two types of sample which are discribed below

A. Probability Sampling: Probability sampling is the sampling in which each item or element in universe has equal chance of being selected. Probability sampling is also known as 'random sampling' or 'chance sampling'.Under this sampling design, every item of the universe has an equal chance of inclusion in the sample. It allows application of statical/sampling theory to result to generalize and to test hypothesis.
The implications of probability sampling (or simple random sampling) are:

a) It gives each element in the population an equal probability of getting into the sample; and all choices are independent of one another.
b) It gives each possible sample combination an equal probability of being chosen.

Types of probability sampling

a) Simple Random Sampling: This is very simple and basic method of sampling. In this method any item may be selected from the mass free from personal bias, in such a way that each has chance of being selected, and each choice is independent of any other choice..It is very useful for homogenous population there are two types of simple random sampling they are:

- Simple random sampling without replacement
- Simple random sampling with replacement

Eample: Any 100 students from the college

b) Systematic Random Sampling: In this method the sample is selected in every n^{th} interval of the list. It involves the arrangement of units in the population in a serial manner. Example: Every student having no. 5 in his/her roll no. 5, 15, 25 , 35 etc

c) Stratified Random Sampling: This method is used in heterogeneous population. It involves the division of the whole population into number of strata Example: 10 students from each class, Sample from both boys and girls

d) Cluster or multistage Sampling: This is a multistage sampling related to the geographical region. Cluster is naturally occurring groupof participants. They are randomly selected. Once the cluster has been selected ,then all participants with in the cluster are surveyed .Example: If we have to study about the conditions of schools in Lalitpur district, we can take Samples as:

- Select 4 schools from municipality and 12 schools from VDCs
- Take 4 schools from each constituency among 12
- Take 1 secondary school, 1 lower secondary school and 2 -primary schools

B. Non probability sampling: Non probability sampling is sampling in which all items in the population don't have equal chance of being selected, it uses that ever subjects are available rather than following a specific subject selection process. This method does not believe in equal chance. Some elements have more chance of being selected that depends upon the personal convenience or judgment of the researcher.It doesnot provide any type of ground/space for estimating the probability of each item in population.

Types of non-probability sampling

a) **Convenience sampling:** In this method, selection of sample depends upon the convenience of the researcher. A sample is chosen purely for expedience because it is cheap to find. The sample then would not necessarily be a representative one. Commonly used convenient samples are friends, relatives, family members, associations etc.Example: taking interviews with the drivers, passengers or pedestrians in a street.

b) **Judgmental sampling or purposive sampling:** In this method samples are taken at the judgment of the researcher as that fulfils his purpose. It refers to the sample selected on the basis of what some experts think particular sampling unitsor elements will contribute to answering particular questions at hand. Example:Taking views of 10 doctors about the eradication of T.B.

c) **Quota sampling:** Quota sampling derives its name from the practice assigning quotes or proportions of kind of people to interviewers.This is better method of non probability sampling. In this method. some quota are divided to each group of items and required samples are selected (More priority to the small nos.)

d) **Sequential sampling:**In fixed-size sampling the number of items is decided upon in advance whereas in sequential sampling, the number of items is not presented. On only a single unit or the population or a group of population units at a time. The measurement or each group is cumulated with those of previously measured groups. The data are analyzed as they are assembled and sample size is not predetermined. The mathematics underlying sequential samplings are more complex and time consuming.

Advantages of Sampling:

The following are the advantages of sampling:

- It saves time and resources
- Work load is small so study can be done in depth
- Small group of surveyor required which may need large nos. in census.
- Scope is limited so easy to work
- Limited nos. of surveyors are used, easy to provide directions to the subordinates/surveyors.

Disadvantages or problems of Sampling:

The following are the disadvantages of sampling:

- It is difficult to define population.
- Difficult to define sample size and characteristics
- Does not give good results if sample is biased
- Difficult to judge whether the samples are good representation of population or not
- Some time it is difficult to relay on sample and difficult to convince to the people on validity of the research.

Factors for the Size of Sample

The size ofthe universe: proportional
The desired degree of Accuracy: higher the accuracy higher will be the size of sample
The resources available
Homogeneity/heterogeneity of the universe: Small /Larger size
Nature of study
Method of sampling adopted: smaller for stratified and larger for random sampling methods
Nature and number of respondents

Sampling and non-sampling Error

Sampling error: Difference between statistic (based on sampling mean) and parameter (based on Population mean)

Non-sampling error: biases and incorrectness irithe result. failkure to measure som memebers, measurement and processing

2.3 FIELD WORK: Field work is an organized, systematic,data-based scientific investigation in specific situation undertaken with the objective of gathering information that enables the students to gain familiarity with the situation and generate more knowledge about phenomena under investigationField workis an important Component of the research. It is the laboratory of the researcher actual data is obtained from the observation of the study field and discussion with the local people

Key points to be considered in field work:

- **Selection of field :**
  - Field area should be identified clearly
  - Field area should be related to the topic
  - Field area should be accesible
  - Field area should be geographically , socially and environmentally applicable

- **Preparation for field work :**
  - Preparation of individuals (Surveyor)
    - Surveyor should be mentally and physically prepared
    - Surveyor should be clear about the study
    - Surveyor should be expert of his field
    - Surveyor should be able to work in adverse situation.

  - Preparation of accessories/instruments
    - (pen, pencil, papers, maps. camera) stationerie
    - clothes, foods;medicines .

- **Preliminary survey :**
  - Preliminary study of concerned literatures
  - Inquiry with the experts of that field
  - Rehearsal of the field survey

- **Repport maintenance:**
  - Field worker should not be biased
  - He/She should talk less and listen more
  - He should not be involved in political and other a1Tairs of the local people
  - He should have good character

- **Use Of key informints:**
  - Field worker should contact to the people who keep good information about that society.

- **Note taking:**
  - All information should be noted
  - When people are taking about something they should not be disturbed and interrupted.
  - Note taking should be fast by using symbols.

- **Election of field:**

Preparation for Field Work

Pre-field activities:

The students make some preparations before they actually visit the organization for study. At this stage , students should prepare following activities:

a) Selection of study area that depends upon the student interest, capability and feasibility of the study.
b) Selection of study scheme such as survey case study or feasibility study.
c) Selection of organization for location for field study.
d) Preparation for plan/data needs such as data collection method and instruments.
e) Consulting library for more information.
f) Consulting the professor to finalize entire scheme of the field work.

Field work activities:

At this stage,students should prepare the following three phases:

1. At the initial phase, students should introduce himself to the organization and try to learn more about the organization. They should include: meeting the chief executive, meeting officer-in –charge, the unit and collection the relevant materials.

2. At the observation phase student should study and observe the organization action. This is practical phase of fieldwork.The students do this activity. Overview of the organization, observation of the unit selected field study, collection of relevant data,observation of the work system, questionnaire to administration;etc
3. At the concluding final phase,the collected materials or observed systems in operation should be wrapped up.

The following points should be noted:

- One should make sure that enough materials for report writing and oral presentation have been collected.
- The student should test and verify his/her impressions and findings of observation.
- The student should make a courtesy call on the chief executive and gratitude to them for their cooperation.

Post field work activities

This is the final phase of the field work assignment, at
this stage, student should prepare for report writing.
The following activities should be performed: -
i.Organizing data in meaningful way.
ii.Recording observations in a logical manner and present them in the report where appropriate.
iii.Writing the fieldwork report in prescribed style and reporting the field report.
iv.And finally submitting the fieldwork report to the concerned authority and preparing for the oral presentation

2.4 Validity

Validity is generally concerned with measurement of the data. Data are considered to be valid when they measure what they are supposed to measure.

According to F.N. Kerlinger:-"The commonest definition of validity is epitomized by the question: Are we measuring what we think we are measuring."

According to J.W. Best and J.V. Kahn:-"Validity is that of gathering instrument or procedure that enables to measure what it is supposed to measure"

Basis of validity:

There are four basis of validity:

- **Logical validation** : If something is proved on the basis to general knowledge that is logical validation . This type of validation is derived from the careful defination of the continuum of a scale and the selection items to be measured.*Example:* Students of boarding school are d ea ver than that of geli.er'al schooL
- **Jury opinion:** Something is said valid if many experts of that field say the same. The behavior scientist's ordinary element to measure content validity by such jury opinions.That is,several content experts may be as judge whether the items being used instrument and representative of the field be investigated. *Example:* Act passed by the parliament; (People have right of casting vote after the age of 18)
- **Known group::**In this method, the measuring instrument is applied on known group at first, then that is used in other field and checked the result. *Example:* Both questions and answers taken from the teachers and compared the answers of the students.
- **Independent criteria:** In this method some criteria is prepared and ability of individals are checked on that criteria. This method is applicable to check the educational. social, economical status of the individuals by which the study of the society is possible. *Example:* Criteria to check the economical status:
  - Poor: having monthly income less than Rs. 3000
  - Normal: having monthly income 3000-10000.
  - Rich: having monthly income 1 0000-20000.
  - Very rich: having monthly income above 20000

2.5 Reliability

Reliability means the consistency between measurements in a series. Reliability indicates the precision of measurement scores. A result can be reliable if repeated measurement by same or different instrument has similarity. It is the consistency and accuracy of scores obtained by the same variable when retested with the identical or equivalent test. Synchronous for reliability are: dependability, stability, predictability, accuracy.

According to Best and Kahn:"A test is reliable to the extent that it measures what ever is measuring consistently".

According to Boyd and Others:" Reliability is the characteristics ofresearchmethodology which allow it to be repeated again and again by the same and by different researchers".

There are three methods of measurement of reliability.

a) **Test-retest reliability**:In this method reliability is tested by taking repeated measurements by the same instrument. The results of the two administrations are then compared and the degree of correspondence is determined. The greater the difference, the lower the reliability and viceversa. If all the measurement give similar results then that is more reliable.

b) **Alternative- form reliability:**In this method, two equivalent forms of measuring instruments are applied to the same subject and compare the results. The result of the two instruments is compared on item-by-item basis and the degree of similarity is determined. The scores on a test are highly correlated with scores on an alternative from of test.The greater the difference lowers the reliability and viceversa.

c) **Split-half reliability:** In this method, the items are divided into the parts and measured separately. Generally the items are divided in odd and evep numbers and correlation betv;een the two groups are checked to observe the reliability

CHAPTER THREE
RESEARCH DESIGN

3.1 Definition: Research design is the plan for collection, analysis and evaluation of data within which research is conducted. It is the frame work prepared for the study after identification of the problem and formulation of the hypothesis. Research design includes methods of collection data, instruments required for research and plan for sampling.It focuses on the data collection methods, the research instruments utilized and the sampling plan to be used

Elements of a research design

The following are the basic elements of a research design :

a) Problem (subject for investigation)
b) Methodology
c) Data ·c.ollection
d) Data analysis
e) Report writing

Kothari has further extended these elements in following 10 points. According to him, research design should give the answer of the following questions:

i. What is the problem?
ii. What is (study) research for?
iii. Where to study?
iv. What types of data required?
v. What are the sources of data?
vi. What is the required time for study?
vii. What will be the plan as such?
viii. What is .the methodology adopted for data collt:ction?
ix. What is ·the method of data analysis?
x. How to prepare the report?

Purpose Of research design:

The main purpose of the research design is to control the researcher from going out of track. There may be number of variables and methods to get answer oftheparticular problem. The research design defines the scope and benefits the variable and methods which saves time, money and effort in research.

3.2 Types of research design/research methods.

There are different models of research design suggested by various.scholilrs.According to Selltiz (1962), there are 3 categories of research design :

a. Descriptive research design - Based on mass
- Describes the problem

b. Exploratory Research design - Self oriented
-To set new theory

c. Experimental Research design - Based on experiment
- Comparative - Practical oriented

Isaac has classified research design in nine divisions.

a. Historical research: It is concerned with the past phenomena. It tries to show the relevance of historical events to the present. For this, either cross sectional or longitudinal study method is adopted. In this research .social, economical & political issues can be studied. Both primary and secondary types of data are used in historical research

Limitations of historical research

- difficult to find past data
- present biasness
- difficult to verify reliability
- cannot be observed directly

The major steps to be followed in historical research are:

a. Identification & defining the problem
b. Defining objective
c. Statement ofhypothesis
d. Collection and analyses of data
e. Evaluate the data
f. Preparation of Report with findings ofthe study.

(These steps are almost similar to all types of research design)

b. Descriptive Research Design

Descriptive research is conducted to study about the educational, economic or social condition of the society. It is also adopted to describe the occupational, cast and gender issues of particular Area.

Limitations

- Demands discovery of facts
- Dominates statistical tools

c. Developmental Research

This research is concerned with the future trends. The study is focused on the rate of change, directions and inter-relations of variable which affect the future. Developmental research may be conducted in the following three ways:

-Longitudinal growth study
-Cross -sectional growth study
-Trend study

Limitations

- Based on regression analysis
- Information is not justifiable
- Future pattern may not be truth

d. Co- relational Research

This research is adapted to describe the relation of two variables. Variables may be closely related, moderately related or completely unrelated.In this research, relevant variables are identified and study is carried out by selecting appropriate measuring instruments. Correlations may be positive,negative or un-correlation
Example: A good student can be a good leader(?). Variahle: Student : Leader.

e. Case or field study research

This research is a scientific inquiry to identify the relations and interactions between the variables in social institutions. In this study the relations among the attitudes, values, perceptions and behaviours of individuals or groups in a situation is studied.

Example: Problem of health institutions in a district.
Education condition of Baitadi.

Limitations:

-Expensive
-False sense of confidence to generalization
-Lack of quantitative study
-Possibility of error

f. Causal- comparative research

In this type of research one or more dependent variables are studied to find out causes and effects about the situation. The researcher goes back through time to seek the past situation how the causes were immerged.
Example: Good production of crops depends upon seed or and fertilizer.

Limitations

-lack of controrover independent variable
-independent variables are already fixed, so no chance of selecting

g. True- experimental research

In this research it is tried to find out the possible causes and effects relation between two groups by keeping one group in a controlled condition . The deferences in results of two groups indicate how the result has been

affected by the cause. Example: Some samples are tested in controlled temperature and humidity and others tested on uncontrolled situation.

Limitations:
-Practical problem of organization
-Theoretical problen1 relating toreplic.ation
-The degree of accuracy is not confidential

h. Quasi experimental design.

This research design is adopted where the true - experimental research is not possible. In many cases of social science, totally controlled experiment is not possible. In quasi-experimental the study is approximated and the research is carried out as in case study.

i. Action research

Action research deals the problems which are related to the practical field. This research develops new techniques to solve the problems. This is more interested in results & innovations and less interested in experimental controls.

3.3 Research Proposal

It is an argument for the proposed study which needs to explain the logic behind the proposed study. This is prepared before carrying the research work. Purpose of the research proposal is to explain and justify the proposed study. Many steps or formats for the researches are in practice. One of the basic formats or contents are shown as below:

a) Title
b) Background
c) Problem statement
d) Research problem
e) Scope and limitation
f) Theoritical framework
g) Hypothesis
h) Study area
i) Research methods
j) Budget,resources(human resources) and study period
k) Expexted results
l) references

Common sources of Errors in the research design

a) Selection of improper research design
b) Poor data collection methods
c) Poor logic
d) Inadequate sample design
e) Inappropriate statiscal procedures

3.4 Selection of Topics of Research

Criteria for good research topics which can be considered with marking scores in a range and the highest score is selected.

1. Interest
2. Relevance
3. On- duplication
4. Feasibility
5. Accessibility
6. Applicability
7. Cost-effectiveness
8. Ethical considerations

CHAPTER FOUR
DATA COLLECTION

4.1 Meaning of data collection: Data collection is an important step in social research. It is also known as **fieldwork**. Data collection does not only mean to collection of information regarding a particular subject but also the collection of facts which is achieved by observation, whether these facts are visible or invisible. The observation depends upon owns consciousness. Those materials, which are collected without researchers own consciousness, do not fall within material of data collection. Only receiving information from answerers is not the data collection. Those materials, which are observable and recordable, can he considered as facts. Those facts or incidents which are observed by the researcher himself /herself and finds it useful can be important basis. The experience of researcher also plays important role in material collection. Accordingly, data collection comprises collection of all above stated facts in a systematic way.

Data: Data is the building block of any research . Data is Defined as the values collected through record-keeping, observing or measuring. It is facts, texts, or numbers that can be collected only the number but it may be in other many forms such as transcripts of interviews, maps, photographs and videotapes or social interaction.
Data are observations and evidence regarding some aspects of the problems/issue under study. **According to *John Geltang:* "A datum is what is observed, in manifest or phonotypical".**
Data provide information for decision making. Information reduces uncertainties in a decision making.

4.2 Importance of data collection: Data collection plays an important role on research activities. By the help of data interrelationship among various incidents can be identified. As scientifically and without biasness the data is collected, so pure and applicable is the research output. In fact the data are the raw material and their proper way of processing results effective research.

- Data collection completely fulfills the data requirements of a research project. It is the connecting link for the researchers to the world of reality.
- It provides the sources of comparative data by which data can be interpreted and evaluated against each other. Based on the data collection, data are presented and analyzed.
- It suggests the type and method of data for meeting the information needed. Several data collection methods are used to collect several types of data.
- It serves as a source of future reference and evidence because they are used to prepare written records. They can now provide lots of material for the subsequent research.
- It helps to takes ordered information from reality and transferring into some recording system so that it can be later examined and analyzed. It is from that pattern that social behavior can be predicted.

4.3 Types and sources of Data: Data sources may differ depending on the need of a particular research project. The selection of data sources depends on the experience and exposure of the researcher. As trust worthy and reliable is the source of data, so proven is the collected data. Data may be obtained from various sources, It is difficult to specify all sources of data. However, in general, it is classified in two types.They are discribed below

4.3.1 Primary sources: The source of data, which is gathered by direct observation of researcher is called primary sources of data collection. These data are original and is the first hand data collected by the researcher for the research project. These data are achieved by eyewitness. These are reported by an actual observer or participant in an event. These data have not been previously collected or assernbled for any other known project. Primary data are those data, which did not previously exist in any organized form. Primary data can be collected through interviews, observations or experiments.

4.3.2 **Secondary sources**: Secondary sources are those, which is already gathered by others. In these sources the researcher is not an eyewitness. They are attained indirectly. The firsthand information is collection by someone else for some other purpose. The sources of secondary data can be divided into two groups. i.e.

(i) **Internal secondary data**: If any research is carried out by a company or organization, then certain data can be achieved from within the company. In this case the company itself is a source and is referred to as internal sources. Sources of such data include representatives report, shipment records, accounting data etc

(i i) **External secondary data:**Those data include staff record financial record, internally generated research, outcome. External sources are the sources outside company. Such sources include books periodicals, published, reports, and computer data bank .

Important Consideration for Data Collection

The Following criteria should be considered while making data collection decisions:

1. Statement of the problem
2. Scope of the enquiry
3. Cost
4. Implementation time
5. Is the sample available
6. Response rate
7. Technology available
8. Sensitive questions
9. Size and complexity

CHAPTER FIVE
DATA COLLECTION TECHNIQUE AND CLASSIFICATION

5.1 SURVEY

5.1.1 Introduction

The survey method gathers data from a relatively large number of cases at a particular time. It is not concerned with the characteristics of individuals as individuals. lt is concerned with the generalized statistics that result when data are abstracted from number or individual cases .

Generally entire population under study is considered during survey but in certain cases only a sample group, carefully selected from the total population can also be considered. It requires experts and imaginative planning, careful analysis and interpretation of data gathered, and logical and skilful reporting of the finding. The outcome of the survey may be for example;

(i) 210 families out of 4821 families within Bhaktapur city is entirely dependent on agriculture.
(ii) 220 number of Raute tribe are residing in Mahvanpur district.
(iii) Out of total industries in Biratnagar. 15% industries are metal processing . industries.

5.1.2 Types of survey

Various types of survey can be classified as follow:

a) **Social or Public opinion survey:** The survey, which is carried out to identify the social position, behavior, attitude or .activities of human being is called social survey. This type of survey reveals the impact of certain changes on human beings. Various techniques can be followed in public opinion survey .Such as; by telephone, by interview. by questionnaire and by requesting through newspaper. Many research agencies carry on these surveys and report their findings in magazines and as an article in a newspaper For example, a survey on the relation between television viewing and intelligence, economic life of a certain tribe or community, nature and causes of automobile accidents in Kathmandu etc. fall within social survey.

b) **Regular or Adhoc survey:** Those surveys, which is carried out in certain time interval iscalled regular survey. Census is carried out in an interval of every 10-years. The survey, which is carried out to fulfil certain purpose at specific time is called adhoc survey. Once the purpose is fulfilled, it is not repeated.

c) **Official or Non-official survey:** The survey, which is carried out by the government or for the government is called official survey. The survey carried out by the municipality, corporations, NGOs fall within non-official survey. Becausc the government has the capacity to utilize more resources, the official survey is considered as more reliable one.

d) **Primary or Secondary survey:** If the researcher carries out the survey personally; then this type of survey is called primary survey. If the researcher depends on the survey that was carried out by some one else then this survey is called secondary survey. The primary survey is considered more valuable than the secondary survey

e) **Frist or repetitive survey:** If the survey is carried out frist time in a particular field, then this survey is called frist survey. But if the survey is carried out repeatedly on the same field then this type of survey is called repetitive survey.

f) **Open or confidential survey**: If the outcomes of survey is revealed to the public then this type of survey is called open survey. But if the outcomes of survey is kept secreat and used only for research agency then this type of research is called confidential survey. This bussiness sgencies carry out the survey but donot bring the outcome to the public.

5.2 INTERVIEW

5.2.1 Introduction: This technique of data collection is widely used in the fields that do not demand experimental works. In this process the interviewer and interviewee sit in front of each other and put questions. A good interviewer will let the respondent do most of taking; he needs only ask the questions. Clarify them and make transitions to new questions. The researcher may ask questions on the issues of his research interest and record the answers of the respondent Recording can be carried out using various techniques i.e. audiotape, movie camera, paper and pencil etc . It is important that the interviewer uses the same kind of approach for all the interviews of a study. By treating all respondents uniformly the accuracy of the data is enhanced .

5.2.2 Importance of Interview

Researcher can caarry out in depth study by this process Interview can be carried out with uneducated, disabled or elderly people too. Not only the spoken words but also the physical expressions of interviewee help the interviewer to gather some information. If the researcher feels that the given statement is false, then it can be rectified by asking cross-questions. This is the process , in which true and false statement can be easily distinguished.

Interviews are useful in the following situations:

- where there is an exploratory or explanatory element to the research;
- when you want to know the meanings which respondents ascribe to various phenomena;
- where it will be important to establish personal contact;
- where the researcher needs to exercise control over the nature of those who supply data;
- when there are a large number of questions to be answered;
- when questions are complex or open-ended;
- when the order and logic of questioning may need to be varied.

5.2.3 Interview Schedule

The interview research instrument is called interview acheduk. lt is guideline which the interviewer follows indicating which question should be asked.

5.2.4 Types of Interview

Generally interview technique is classified as follow;

a) According to Subject matter

According to subject matter, the interview may be diyided into three types;

i. **Quantitative Interview:** In this types of interview. certain sets of facts are collected about a large number of person, as in census.

ii. **Qualitative Interview:** This type of interview consists of certain complex, serious and nonquantifiable subject matter. For example, interviews held for case studies are qualitative, because the interviewer has to range over past, present and future to know enough about a case.

iii. **Mixed Interview:** A mixed interviewis method where both types of data are required. Some of the data may be quantifiable and some not.

b) According to Purpose

According to purpose of interview, it maybe classified into the following types:

i. **Clinical Interview:** In this type the interviewer try to understand the abnormalities. In clinical psychology artd psychoanalysis; the preliminary interviews with patients are held with a purpose to grasp the nature and cause of the disease.

ii. **Selection Interview**.*:* This type of interview is done to select an individual with particular qualities.

iii. **Research Interview:** This interview is done to collect information about certain problems to find out the truth.

iv. **Interviews to fulfil curiosity:** These interviews are held to fulfil the curiosity of the interviewer, which lurks in his/her mind.

c) According to formalness

According to formalness the interview can be divided into two types:

i. **Structured interview***:* In this type of interview, the researcher may ask the questions and then suggest a list of possible answers. When the answer is received, the interviewer ticks appropriate answers on the interview schedule.

ii. **Unstructured Interview***:* If a data collector did not know what exact information he/she could obtain, then he could ask question letting the interviewee answer them in his own style. This technique is called unstructured or open interview. In this type of interview. the interviewer writes responses either during the interview or after the interview depending on the style of interview. The unstructured interview provides greater flexibility . Although the series of questions to be asked and the procedure to be followed are decided upon before hand, the interviewer is largely free to arrange the form and timing of the questions. He can thus rephrase the questions. modify them and add new questions to the list.

d) According to Number

This category has been classified under two main types;

i. **Individual interview:** In this method a single individual is interviewed . This method helps to establish personal contacts between the interviewer and interviewee.

ii. **Group Interview***:* On group interview method, two or more person are interviewed for collecting information from them. This method economizes both time and money in comparison to individual interview method but the knowledge gained through this method is very superficial and routine like.

e) According to period of contact: On the basis of contact period, the interview method is cattagorized as:

i. **Short Contact Interview***:* Sometimes in social research filling up of questionnaires requires only a single sitting of small duration. For this type of job a short contact interview is the most useful method.

ii. **Prolonged-Contact interview:** When the case history or an individual ora group of persons is required, prolonged contact· interview is necessary. Establishment of close personal relations between interviewer and interviewee is very likely.

f) According to Role: Classification of interview according to the role assumed by the respondent and the interviewer and the interviewee are:

i. **Non-directive Interview:** In this method there is no pre-planned set of questions, control or any direc·tion to ask.The interviewer encourages the respondent to talk about the given topic without ·questioning him/her. For achieving the proper goal, the interviewer should create a suitable atmosphere in which the individual is able to speak freely fearlessly about hirn/her.

ii. **Focused interview:** The main purpose of this type of interview is to examine a particular hypothesis. Such interviews are based on pre-determined situations. This type of interview gives importance to the emotional feelings or attitudes of the individual in a particular situation.

iii. **Repetitive Interview:** The main objective of this interview is to study the dynamic functions, attitudes and behaviour of certain individuals. This type of interview requires that the respondents rriust be available when required.

5.2.5 Application of interview

We can find three distinct functions of the interview:

Frist: It can serve as an Exploratory Device when a study is first being designed. In this type of function , the interview will reveal relevant research variables and research hypotheses. The researcher goes into the field and discusses with either future respondents or experts the research prohlem. This gives the researcher both a preview of the types of possible respondents and more information about the research problem.

Second: Research interviews are used as a Data Collection instrument on the variables, which are being observed. Interviews are used for collecting data about opinions. attitudes, as well as specialized information.

Third: Used as **Follow-up** or **as a supplement** to the previous research findings. The follow- up lnterview also provides researchers with a chance to explore unexpected results by intensively interviewing specified sections of the population under study.

lnterviews can be conducted either face-to-face or over the telephone. The general practice is that most unstructured interviews are conducted face-to-face and mostly unstructured interviews are conducted through telephone. Telephone Interviews are best suited when many respondents are to be researched over a wide geographical area and the time available for interview is very short.

5.2.6 Framing an Interview study

a) Questions must be framed in language that insures effective communication between interviewer and the respondent. **Omit all ambiguous vocabulary**.

b) Make certain the respondent appreciates the purpose of each question he is asked. **Avoid arousing any suspicion or resistance.**

c) Ascertain whether the population from which the respondents have been selected actually has the information sought by the interview and that the questions permit the reasonable recovery of this information.

d) **Avoid leading questions** (questions which suggest a desirable. or preferred answer).

e) Insure that the frame of reference surrounding each question is clear so that each respondent hears the question in the same way **avoiding misinterpretations.**

f) **Pre-test the interview** in pilot study to elimimite weaknesses and experiment with alternative items or techniques.

5.3 QUESTIONNAIRE

5.3.1 Introduction

This is one of the data collection techniques. A questionnairy is a formal list of questions designed togotther responses from respondent on given topic, Questionnaire is mailed to the selected samples and requested to fill it and send back. This is an easy method for collecting data from the persons living at distance. A questionnaire is used when factual information is desired.

5.3.2 Questionnaire Design

A questionnaire can be designed to obtain different types of primary data from the respondents, i.e.

- Intention
- Attitudes and Opinions
- Activities of behaviour and
- Demographic characteristics

A researcher should pay particular attention to what information he/she would like to seek from the respondents. One should make a plan of his information requirements. Collecting unnecessary information may consume more time and resources.

5.3.3 Type of questionnaire

Experts have classified the questionnaire in different ways. One way of classification is as follow:

a) **Structured Questionnaire**: The structured questionnaire is the one, which is prepared before the research is started and is not changed later. If the area of study is very large then this type of questionnaire is used, Having prepared beforehand, it is systematic and same questionnaire is utilized for each sample, so that concrete information can he expected.

b) **Unstructured Questionnaire:** This type of questionnaire is more flexible. It is not-prepared beforehand. It is like a guideline for the researcher, rather than a systematic questionnaire. The researcher is free to modify the questions as per requirement.

c) **Closed Questionnaire:** In this type of questionnaire the answer is suggested within the questions. The answer must be selected from within the given options. The respondent is not allowed to answer the questions freely

d) **Open uestionnaire:** It is just opposite to the closed questionnaire. The questions do not suggest the options. The respondent is free to answer his own way. Enough space is provided to write answers. This type of questionnaire is used for qualitative data collection; Sometimes the information received from this type of questionnaire is difficult to classify and there may be irrelevant data

e) **Pictorial Questionnaire:** This type of questionnaire contains pictures and requested to tick the appropriate one. It is attractive and even an illiterate person can answer the question.

f) **Mixed Questionnaire**: Depending on the information desired, single questionnaire may contain different types of questions. This types of questionnaire is broadly being used these days.

5.3.4 Feature of a good Questionnaire

To gather reliable and real data through questionnaire, the questionnaire itself must be properly selected and arranged. A good questionnaire should have following qualities:

a) **Length**: The question should be simple and short. The longer the questionnaire, there is less chance to get good response. The respondent may get irritated. A longer questionnaire costs more for the interpretation of

data.

b) Language: The language should be easy, clear and written in clean letter. Every critical word should be clearly defined. Such as: if the word "educated" is used then it should be defined that what levels of education mean that. The words used in the questionnaire should not be rude and ambiguous. Simple words should be used which is easily understood by general people or selected samples

c) Comfortable: . While recording or hearing a questionnaire , it should be comfortable enough for the respondent. It should not hurt the respondent in any way, Even if a single question found to be such, the respondent declines to respond any question.

d) Order: The questions within the questionnaire should be arranged in proper order. Question order is especially important when multiple-choice questions are to be used. The usual practice is to begin with general questions and then lead to specific ones.

e) Arrangement: If there are open type questions then enough space should be left for writing. The font and size of the letter should be such that it should be legible and applauding.

5.3.5 Components of a Questionnaire

The major components of a questionnaire fall into three basic categories;

a) Explanation Information: To explain the purpose of the study to the respondent, explanation information is provided by the researcher. These information are usually given at the beginning of the questionnaire in the form of a letter or instructions. Explanation information states
(i) The purpose of the study,
(ii) makes an appeal for responses, and
(iii) provides information on completing the questionnaire pmperly

b) Basic Information: This is the main part of the questionnaire. This section covers all necessary subjects of the study accurately. This part may be may be a few questions in length or it may be several pages, depending upon the amount of data sought.

c) Classification Information: At the end of the questionnaire, a section on Classification Information" or "Personal Information" can be designed. Most of the commonly gathered classification information include: (i) age (ii) gender (iii) education (iv) marital status (v) family income (vi) occupation and so on.Classification information enables the researcher to analyse the data obtained through cross-tabulation. Such information are also important for drawing profile of the respondents and determine significant differences between groups of respondents. Personal or demographic data could be organised as follow: ·Example.

Age	education	service year	martial status	income
under 25	literate	less than 1	married	under rs.1000
25 – 35	high school	1 – 5	single	1000 – 3000
35 – 45	intermidiate	5 – 10	divorced	3001 – 5000
45 – 55	graduate	10 – 15	separated	5001 – 10000
over 55	master	over 15	widow/widower	0ver 10000

Please check appropriate category

5.3.6 Advantages and Disadvantages of questionnaire It is considered that every action has certain advantages and disadvantages. It only differs in level. The positive and negative sides of questionnaire can be discused as follow :

Advantages

- **Study area:** It can cover wide range of study area. It has no geographical boundary. A researcher can send the questionnaire wherever there is postal facility.

- **Freedom for Respondent:** Because the respondent has to till the questionnaire in absence of researcher, the respondent can answer his une way freely and unbiasly. If the researcher is in front of the respondent then the

re searcher may impress the respondent and get the answer according to his will, but with mail questionnaire there is not Stich chance

- **Cheaper:** Regarding the volume of data, it is cheaper compared to other methods of data collection. It requires an envelope and a stamp to reach the sample. It is always recommended that an extra envelop with stamp should be incorporated within the sent envelop so that a respondent can return the filled questionnaire without difficulty.

- **Faster:** Within short period of time, large amount of data can be collected.

- **Uniformity:** The questionnaires are sent almost the same time to the samples and returning time is also almost the same. The impact of time and overall situation is almost the same. So that there is chance of similar approach of the respondent.

- **No time constrain infilling out the questionnaire**: There are no time constrains when filling out the questionnaires and this gives the advantage of allowing the respondent time to consider his answer. Sometimes. a respondent needs time to check his information; this extra time then can be very valuable to acquire exact information.

Disadvantages

- **Little chance of returning all questionnaires:** The major weakness of questionnaire is obtaining return from the respondents. The people may be reluctant to fill up and post back the questionnaire.

- **Not understanding the question:** Some of the questions may not be understood correctly by the-respondent. The only way this problem can be . minimizes is by pre-testing the questionnaire on a small sample of the population. From the pre-test the questionnaire can be revised and modified before apr lying to the actual samples.

- **Not understanding the response:** Some times the writing of the respondents maynot be legible which creates a great problem.

5.4 CASE STUDY

5.4.1 Introduction

The case study is very popular in study process that requires qualitative analysis. In a case study an investigator makes an intensive investigation of a Social Unit that is a person a family, a social group. an institution or a part of a life cycle of the unit. The case study probes deeply and analyse interaction between the factors that explains present status or that influence change or growth. It is a longitudinal approach, showing development or a period of time. According to Broomly: A "case" is not only about a person but also about that “kind of person”.

5.4.2 Steps for case study

While carrying out the case study, following steps are followed:

a) **Stating the objectives**:what is the unit of study and what characteristic relationships, and processes will direct the investigation.

b) **Designing the approach**. How will the units be selected? What sources of data are available? What data collection methods will be used?

c) **Collecting the data**

d) Organizing the information to form a coherent, well-integrated reconstruction of the unit of study.

e) Reporting the results and discussing their significance.

5.4.3 Characteristics

a) Case studies are in-depth investigations of a given social unit resulting in a complete, well organized picture of that unit. Depending upon the purpose, the scope of the study may encompass an entire life cycle or only a selected segment; it may concentrate upon specific factors or take in the totality of elements or events.

b) Compared to a survey study which tends to examine a small number of variables across a large sample of units, the case study tends to examine a small number of units across a large numbers of variables and conditions.

5.4.4 Limitation

a) A case study is more expensive because of its explorawry nature.

b) A generalization drawn from a single case · cannot be applied to all c.ases in a given population. Because of their narrow focus on a few units, case studies are limited in their representativeness. They do not allow valid generali ~oations to the population from which their units came until the appropriate follow-up research is accomplished, focusing on specific hypotheses and using proper sampling methods.

c) There is some element of . subjectivity . An investigator must guard against permitting personal biases and standards to influence his interpretation.

5.4.5 Strengths

a) Case studies particularly useful as background information for planning major investigations Because they are intensive, they bring to light the important variables, processes and interactions that deserve more extensive attention. They pioneer new ground and often are the source offruitful hypothesesfor further study.

b) Case study data provides useful anecdotes or examples to illustrate more generalized statistical findings.

5.5 OBSERVATION

5.5.1 Introduction

The data collecting techniques, such as; office record, interview, questionnaire, survey etc are relative indirect techniques. In those techniques, the researcher entirely depends upon other people.A more direct way of gathering information is to observe events as they occur.The observation method is the most commonly used method specially in studies relating to behavioural sciences. In a way we all observe things around us, but this sort of observation is not scientific observation. Observation becomes a scientific tool and the method of data collection for the researcher, when it serves a formulated research purpose, is systematically planned and recorded and is subjected to checks and controls on validity and reliability. Under the observation method, the information is sought by way of investigator's own direct observation without asking from the respondent. In this technique,eye is effectively used rather than ears and voice (Mouth). In observation technique, the researcher collects the data by seeing the event himself

5.5.2 Types of observation

Observation can be carried out various ways. The types of observations are as follow:

a) Participant Observation*:* In participant observation the researcher is or becomes the member of the group he studies. He does not let the real member of the group feel that he is an outsider. Other member of the group accepts him as a member of that group. The researcher participates in all the activities of that group. The researcher behaves as if he/she is real member of that group or family

Advantage of participant observation

i. **Direct observation:** Participant observation he Ips in direct study. The researcher understands by actual events. He does not have to rei y on others to get the information.

ii. **In-depth and minute study: Being** a membei· of that family or group, nothing is hidden from him/her. The researcher happens to know ever;. fact of the events within the group or family.

iii. **Actual behavioural study:** The researcher comes to know the behaviour of each ·individual.

iv. **Possible to test collected data/information:** Any doubt arouse during study, he/she can Clarify immediately by asking to the real person. Being in contact with all the member ofthe family or group, he/she always has an opportunity to test the information for clarity.

v. **Easy study** :Being the family member of the study group,· he/she can get the actuial information without any difficulties.

Disadvantage of participant observation

i. **Full involvement is not possible**:By nature, a human favour or not favour an individual. A researcher may favour or not favour some one within the family so that he may not bevequally involved in every activity within the family or group.

ii. **Change in behaviour of the family or group**.· Because of addition of new person in a group or family, there may be change in behaviour of that group or family.

iii. **Expensive method ofstudy***:* In full participant ohsen ation, a person may have to spend a heavy resource.

iv. **Time consuming:** It takes long time to observe even a single group. In some cases, the researcher may have to spend his almost whole life in studying a single case.

b. **Non-participant observation:** In this techniquem the researcher go to research site and observe from distance. The researcher does not take part in any event. He observes some of the events and enquires from the other member of the family for required information. This technique takes less time end investment.

c. **Quasi observation:** This is mid way of participant and non-participant observation. The researcher takes part in certain events but not fully remain within the family or group. It is considered as unbiased study. It has the advantage of both participant and non participant observation. .

d. **Mass observation***:* In certain cases, a group of experts is formed to observe and collect the information or data. In this group, expert on ditferent aspects are incorporated. This technique is called mass observation. Being expensive, generally this technique is followed by an institution or research agencies.

e. **Uncontrolled Observation:** In this technique, there is no control on event or sometimes on the researcher. The researcher goes to the study site and collects the information by incident. According to *Good and Hat,* "Most of the knowledge which people have about social relation is derived from uncontrolled observation whether participant or. Non participant".

f. **Controlled observation:**In this technique, all tht· data collection procedures are preplanned and observed in controlled situation. Events are controlled as per social condition and researcher is controlled by using various tools such as; questionnaire, schedules and observation planning.

g. **Structured and unstructured observation:**The style of recording the observed information, standardised conditions of observation and the selection of pertinent data of observation, then the observation is called as **structured observation**. But when observation is to take place without these characteristics to be thought of in advance, the same is termed *as* **unstructured observation**. Structured observation is considered appropriate in descriptive studies, whereas in an exploratory study the observational procedure is most likely to be relatively unstructured.

5.5.3 Recording observations

The observed information or data should be recorded and later analyzed for findings. The recording of observations should be done as soon as possible, while the details are still fresh in the mind of the observer. This practice minimizes the errors that result from faulty memory. Obviously, a video record permits later recording and coding of the observed data.

Various tools and techniques are developed for recording observed data. The structured records of observations can be kept by using:

a) **Rating system:** These systems require that an observer judges the behaviour he sees and then make a record of his judgment. The mark made by an observer on his observation sheet represents not the classification of a unit of behaviour, but ajudgment based on many individual behaviours. Characteristics judged by using a rating system are usually recorded on a scale. Such scales can be of many different types. For example.

i. ***Numerical Rating Scale****:* In this system. a number is used to describe the characteristics or behaviour of a person or group. For example;

Apathetic	1	2	3	4	5	alert
Extremely poor	1	2	3	4	5	Excellent

Rude	1	2	3	4	5	Modest

Using such a scale, the observer circles or crosses 0~11 the number. be thinks most closely describes the behaviour observed.

ii. ***Graphic Rating Scale****:* This consists of a continuous straight line with cues or categories along the line to guide the rater. The classifications may be set up in five to seven categories in such terms. For example;

i.superior	above average	average	fair	inferior
ii.Excellent	good	average	below average	poor
ii.always	frequently	occasionally	rarely	never

iii. ***Category System:*** This system consists of descriptions of a number of fairly specific categories or types of behaviour. Using these, a record is kept showing the number of times that each particular category of behaviour occurs. **For example**, if a category of interest to the researcher is "smile showing teeth" then each time a person smiles showing his teeth, a record would be made. At the end of observation period. A count could then be made to determine how many times the person smiled in such a way. Sometimes, depending on the study topic, the events or behaviour are listed and categorized . and each event is recorded in certain time intervals. For example: to access a class activities:

a. Lecture
b. Teacher asking question
c. Student asking question
d. Student answering
e. Teacher answering
f. Teacher dictating

The observer may note down the number in the interval of 10 second. i.e. 1 1 1 3 5 5, that mean the teacher lectured for 30 second, student asked question for 10 second and teacher answered for 20 second.

5.6 DATA ANALYSIS AND PRESENTATION.

5.6.1 Data Analysis :The main purpose of analysing the data is to change it from raw form to an understandable presentation . The analysis of data consists of ;

a) Organizing
b) Tabulating
c) Performing statistical analy sis and
d) Drawing inferences

5.6.2 Types of data analysis

Data is analysed different ways; depending on the research topic.

a) ***Descriptive Analysis:*** Descriptive statistical analysis limits generalization to the particular group of individuals observed. No conclusions are extended beyond this group. and any similarity to those outside the group cannot be assumed. The data describe one group and that group only. Much simple action research involves descriptive analysis and provides valuable information about the nature of a particular group of individuals.

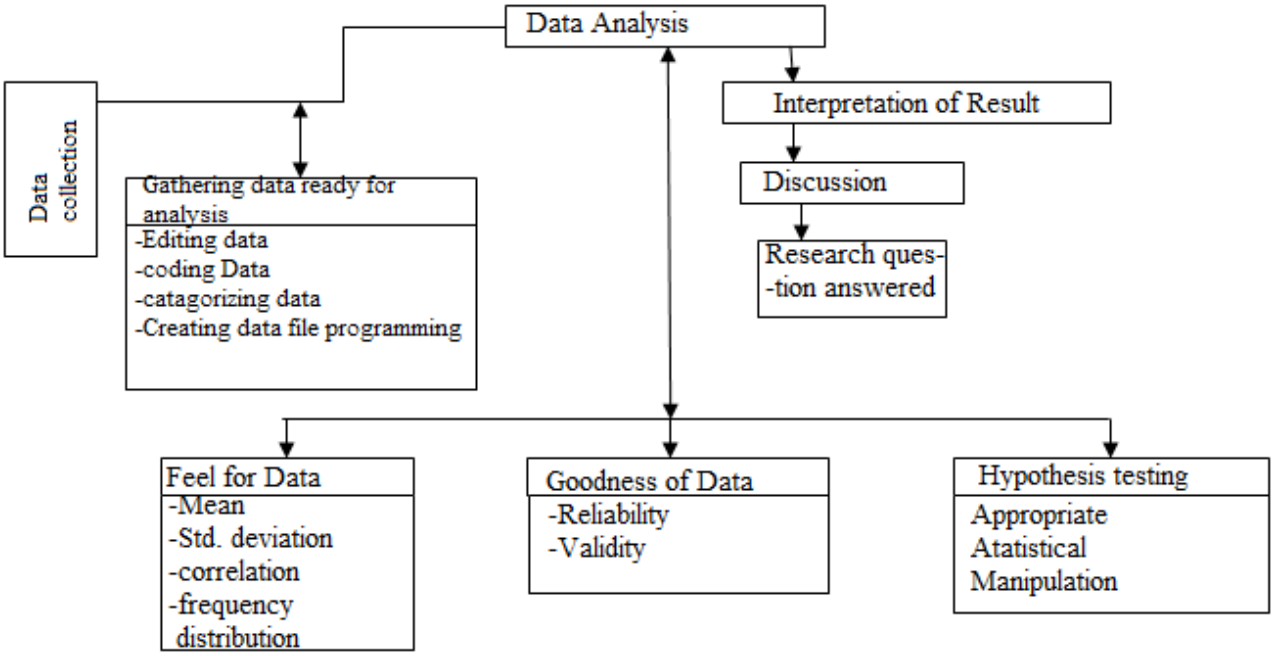
b) ***Inlerential Analysis:*** Inferential statistical analysis always involves the process of sampling and the selection of a small group that is assumed to be related to the population from which it is drawn. Drawing conclusions about populations based upon observation of samples is the purpose of inferential analysis.

c) ***Computer Data Analysis:*** The computer can perform many statistical calculations easily and quickly. Computation of means, standard deviations, correlation coefficients. t tests, analysis of variance, analysis of covariance, multiple regression, factor analysis, and various nonparametric analyses are just a few of the programs and subprograms that can be run in a computer.

5.6.3 Presentation of data

The presentation of data is the basic organization and classification of the data for analysis. The collected data is in raw form. It is necessary to arrange the data so that it makes some sense to the researcher and so that it can later be presented to the readers of the thesis. Different types of data require different methods of

summary and presentation. There are a number of methods, which can be used to simplify the data. The easiest way to understand the data is by examining it in charts, graphs, and tables. But even before the data can be arranged in tables. The data analysis process is shown hereunder.



5.6.4 Organization and Processing of data.

The activities in data processing include;

a) **Editing:** It implies checking and correcting the data gathered in a systematic way to ensure their accuracy and completeness

b) **Coding:** It is the process which includes identifying and categorizing of each response on a data collection instrument with a designed symbol. . The purpose of coding is to facilitate the transfer the data from data collection instrument into computer table form.

c) **Classification:** It refers to dividing of the data into different categories, classes, groups or headings.

d) **Tabulation:** It is the process of transfeiring classified data from data gatheringtools to the tabular form in which they may be systematically examined.

5.6.5 Presenting data in figures

Presenting data for two variables, which have a relationship is in a figure or chart. It works best when data is continuous. This is a characteristic of parametric data.

CHAPTER SIX

MEAN ,MEDIAN AND STANDARD DEVIATION

6.1 Arithmetic Average/Average mean:Arithmetic mean of set of observation may be defined as the sum of observation divided by the total number of value in the set. It is denoted by $\bar{x}$

i.e. $\bar{x} = \frac{\text{Sum of observation}}{\text{Number of observation}}$

$\therefore \bar{x} = \frac{\sum x}{n}$

Calculation of mean

a. For Individual series

Let x_1, x_2. X_3 ... X_n be the values of the variables .then mean is defined as

$\bar{x} = \frac{\sum x}{n}$

b. For Discrete Series and continuous series

For discrete and continuous data also known as frequency data, Let X_1, X_2, X_3, ... X_n be n observation with corresponding frequency f_1, f_2, ... f_n. Then the arithmetic mean or simply mean is defined as:

$\bar{x} = \frac{\sum fx}{N}$

Where N=∑f is total frequency

Merits and demerits of Arithmetic mean

Merits

1. It is rigidly defined.
2. It is easy to understand and easy to calculate.
3. If the number of items is sufficiently large, it is more accurate and more reliable.
4. It is a calculated value and is not based on its position in the series.
5. It is possible to calculate even if some of the details of the data are lacking.
6. Of all averages, it is affected least by fluctuations of sampling.
7. It provides a good basis for comparison.

Demerits

1. It cannot be obtained by inspection nor located through a frequency graph.
2. It cannot be in the study of qualitative phenomena not capable of numerical measurement i.e. Intelligence, beauty, honesty etc.,
3. It can ignore any single item only at the risk of losing its accuracy.
4. It is affected very much by extreme values.It cannot be calculated for open-end classes.
5. It may lead to fallacious conclusions, if the details of the data from which it is computed are not given.

6.2 Median : Median is a positional average i.e. its value depends on the position occupied by a value in the frequency distribution. Median is the value of the variable that divides the ordered set of values in to two equal halves i. e. 50% value are to the left of median and 50% are to the right of median . . It is most preferable measure of location for asymmetric distribution.

Calculation of median

A. For individual series

a) Arrange the data in either ascending or descending order of magnitude.
b) If the number of observations is odd , the middle value gives the median and if number of observations is even there will be two middle values so the arithmetic mean of two middle values gives the, median.
c) Formula for calculating the median is as,

Median = Value of $\left(\frac{n+1}{2}\right)$th item. Here n is the number of observations.

B. For discrete series

i. Arrange the data according to their ascending order of magnitude,
ii. Form the cumulative frequency distribution.

iii. To calculate median we use the following formula as

Median = Value of $\left(\frac{N+1}{2}\right)^{th}$ items,

Where 'N' is the total num.ber of observation.

B. For Continuous series

a) Prepare the less than cumulative frequency distribution
b) Find the value of N/2
c) The class with cumulative frequency just equal or greater than $\frac{N}{2}$ is median class and this contains median.
d) The value of median is calculated by using following formula.

$$\text{Median} = L + \frac{\frac{N}{2} - c.f}{f} \times h$$

Where L is lower limit of median class,
N = ∑f, total frequency,
C. f. is cumulative frequency proceeding to the median class, 'f" is the frequency of median class, and 'h' is size of median class

Merits of Median

1. Median is not influenced by extreme values because it is a positional average.
2. Median can be calculated in case of distribution with open-end intervals.
3. Median can be located even if the data are incomplete.

Demerits of Median

1. A slight change in the series may bring drastic change in median value.
2. In case of even number of items or continuous series, median is an estimated value other than any value in the series.
3. It is not suitable for further mathematical treatment except its use in calculating mean deviation.
4. It does not take into account all the observations.

Mode

The mode refers to that value in a distribution, which occur most frequently. It is an actual value which has the highest concentration of items in and around it. It shows the centre of concentration of the frequency in around a given value. Therefore, where the purpose is to know the point of the highest concentration it is preferred. It is, thus, a positional measure.

Its importance is very great in agriculture like to find typical height of a crop variety, maximum source of irrigation in a region, maximum disease prone paddy variety. Thus the mode is an important measure in case of qualitative data.

Computation of the mode

Ungrouped or Raw Data

For ungrouped data or a series of individual observations, mode is often found by mere inspection.

Example 8

Find the mode for the following seed weight

2 , 7, 10, 15, 10, 17, 8, 10, 2 g

∴Mode = 10

Grouped Data

For Discrete distribution, see the highest frequency and corresponding value of x is mode. Example:

Find the mode for the following

Weight of sorghum in gms (x)	No. of ear head(f)
50	4
65	6
75	16
80	8
95	7
100	4

Solution

The maximum frequency is 16. The corresponding x value is 75.
∴ mode = 75 gms.

Continuous distribution

Locate the highest frequency the class corresponding to that frequency is called the modal class. Then apply the formula.

$$\text{Mode} = l + \frac{f_x}{f_p + f_s} x\ c$$

Where,
l=lower limit of the model class
f_p=the frequency of the class preceeding the model class
f_s the frequency of the class succeeding the model class
and
c = class interval

6.3 Standard deviation: Standard deviation is the absolute measure of dispersion. It fulfills all the requisites of a good measure of dispersion except that it is sensitive to extreme values. That is why it is known as standard deviation. It is defined as the positive square root of the mean of the square of the deviations taken from mean ($\bar{x}$). It is denoted by **σ** . It is also known as mean error, mean square error or root mean square deviation from mean**.**

Calculation of mean deviation

6. **For individual:** $\sigma = \sqrt{\frac{\sum(x-\bar{x})^2}{n}} = \sqrt{\frac{1}{n}\sum x^2 - \left(\frac{\sum x}{n}\right)^2}$

7. **For Discrete and continuous:** $\sigma = \sqrt{\frac{\sum f(x-\bar{x})^2}{N}} = \sqrt{\frac{1}{N}\sum fx^2 - \left(\frac{\sum fx}{N}\right)^2}$
where N=∑**f**

CHAPTER SEVEN
REPORT WRITING

7.1 Definition: A report is a document which describes about things or events that have already occurred. It is a concise, clear communications of the important findings of the research work It is the tina I product of a research, which conveys information to the concerned.

The Report Process;
There are five steps in general reports.
a) lnformation Source;
- Field Survey
- Literatures
- Reports

b) condensation;
- Data entry
- Coding
- Data sheets

c) combination;
- Preparing Charts, Tables, Graphs, Pictures, Diagram

d) Assimilation;
- Analysis
- Interpretation
- Diagram
- Pictures

e) Finished Product;
- Report

Types of Report.
Reports can be classified as folow:

a) Short Report: Short reports are appropriate when the problem is well defined is of limited scope and has a simple and straight forward methodology. Most informational, progress and interim reports are of this kind. Short reports are about five pages. At the beginning, there should be a brief statement about the authorization for the study, the problem examined and it's breadth and depth. Next come the conclusion and recommendations; followed by the findings that support them. Detailed information on the research method could be omitted. although an overview could appear in the appendix.

The purpose of this type of report is to distribute information quickly in easy-to-use format Short reports are also produced for clonta with small, relatively inexpensive projects. The letter is a form of short report. Its tone should be informal. The format follows any good business letter and should not exceed a few pages. A letter report is often written in personal style (we. you), although this depends on the situation.

b) Long Reports: Long reports are of two types, the Technical or base report and the Management report. The choice depends on the audience and the researcher 's objectives. Man projects will require both types of reports: a **technical report,** written for audience of reserchers, and a **management report,** written for the non-technically oriented manager or client. The two types of audiences have different technical training , interests and goal.

- **The Technical Reports :**This report should include full documentation and detail. It is the report that other researcher will want to see because it has the full story of what was done and how it was done. Sufficient procedural information should be included to enable others to replicate the study. This includes sources of data; research procedures, sampling design, data gathering instruments, index construction and data analysis methods. Most information should be attached in an appendix.

- **The management report:** Somtimes the client has no research background and is interested in results rather than in methodology. The major communication medium in this case is the management report. Readers are less

concerned with methodological details but more interested in learning quickly the major findings and conclusions. Often the report is written for a single person and needs to be written with the person's characteristics and needs in mind. The style of the report should encourage rapid reading and quick comprehension of major findings, and it should prompt understanding of the implications and conclusions. The report tone is journalistic and must be accurate. The sentences and paragraphs should be short and direct.
For **thesis purpose** the following classification could be better one;

a. Descriptive Report: In descriptive report the facts are presented in descriptive form taking the real value. It indicates the problem and provides the solutions.

b. Analytical Report: In this report the facts are further analyzed in relation to the problem. This report follows the process of scientific investigation and reporting. More tables and charts are used than descriptive.

c. Combination of Descriptive and Analytical Report: In this report the feature of both reports are included.This type of report is being more popular now.

Procedur for report writing.
There is no any hard and fast rule for report writing. The general procedure is given below;

a. **Planningand preparing the document:** This is the first step of writing a report. An outline. :which will contain in the report,_should be prepared at the beginning. By following that outline the draft report is prepared.

b. **Planning the time:** The schedule time should be checked and re-scheduling is done if required . The time has to be a1located also for unfore seen problems,_ which cause delay to finish the report.

c. **Arranging the data:** The data has to be processed and tabulated first. After analysis that should be arranged in tabular, chart, or graph form for the presentation .

d. **Starting to write:** Generally writing is started from the introduction and tu conclusion. But, to develop confidence, starting can be done from any section.

e. **Preparing the draft:** No report can be excellent at the first attempt. So, draft is prepared first and corrected later on.

f. **Consultation with supervisor:** After writing one chapter or few pages that should be presented to the supervisor. Supervisor comments and guidance is necessary for further writing.

g. **Review and rewrite:** Once the report is finished, that should be revised thoroughly. There may be mistake in grammar, spelling sentences structures etc that needs correction. After whole revision the report is presented to the supervisor for the final check. Before producing the final repott proof reading is necessary.

Format of report writing: .·
There is not a specific format of report writing. Different university may have their own types of fornat. General format adopted by 'T.U. is as follows:
Part of a report: A report has three parts :

1. Preliminaries of the report:
There are the initial requirement for the main body of a report . Which includes:

i. Ti tle page (Page i).
ii. Acknowledgement (No extravagant dedication). (Page ii).
iii. E xecutive summary (Abstract) : Not more than 200 words) (Page iii).
iv. Table of content (Avoid third level sub-section). (Page iv)
   a. List of abbreviations (Page v)
   b. List of illustrations (Page vi).
   c. List of figures (Page vii).
   d. List of tables (Page viii)

2. Body of the report:
This is the major part of a report. Generally it is presented in 5 chapters
Chapter I - Introduction: Problem statement, Research objectives, Background.
Chapter II- Literature Review
Chapter III- Methodology: Sampling design, Research design , Data collection. Data Analysis, Limitations.

Chapter IV- Results and discussions.
Chapter V- Conclusion and Recommendations.

3. References:
This is a supplementary section of the report. There are mainly two part is this section.
a. Reference/ Bibliography

The document, Books, Proceedings, Magazines, web-site etc. which are cited on the research report is called reference and the list of those documents should be incorporated at the final part of the report. The books, Proceedings, Magazines, web-site etc, which is read by the researcher or may be supporting or-useful for this kind of research but has not been cited in the research report is called **Bibliography** and the list of these kind of document or web-site should be incorporated just after the list of Reference. But current practice is to put all the lists within bibliography itself.

There are various ways of listing the reference or bibliography material. While preparing the list of reference or bibliography, name of author, date of publication; mime of the book and name of publisher are gjven clearly in sequence. The common practice is to write as Basu, A.R. (2003): "Strength of Materials", Vikash Publishing House Pvt. Ltd.,. new Delhi.

b. Appendices: It is the last contenf of the thesis report. lt includes tables, charts, questionnaire or any extra information which is referred in the .report

Typing a report:

There are various formats for the report typing. Various universities or institutions have developed their own format or they follow some standard format which has already developed by any recognized institution. For Example;
A report should be in:

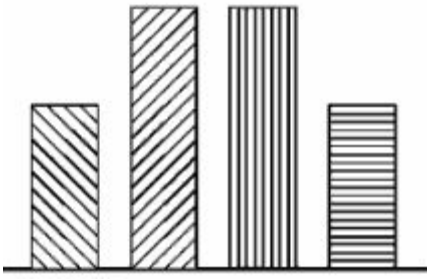
- A4 size paper only in one side of a paper
- Margin 3.0 cm at the left and 2.5 em at the bottom , top and right.
- Spacing 1.5
- Letter Type: Times New Roman
- Letter size 12 point (font) .
- Page number at the bottom centre
- The body of the thesis should be no more than **50 pages,** including tables, figures and illustrations Writers should keep in mind that this is a ceiling, not a target.
- *The* abstract should be **200** words maximum. lf your abstract exceeds 200 words, shorten it.

7.2 Presentations of data in diagram and charts:
It is a good method of preseriting data in a report.Generally charts are used to show the change of dependent variables in relation to the independent variable. Bar chart, pie chart and line charts are popular to present in a report:

Methods of diagrammatic presentation

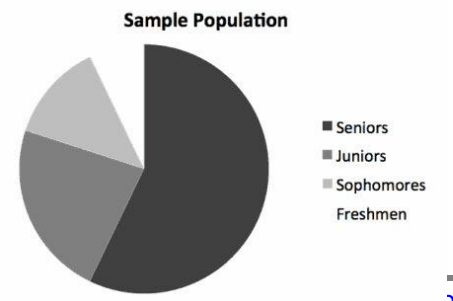
Bar chart

It depicts the magnitude of the data by length of various bars which have been laid with reference to horizontal or vertical scale. They can be bilateral or two way which show both positive and negative characteristics of data



Pie chart

It is a circle divided into sections such that the sixe of each section corresponding to a portion of the total. It permits quick and easy



understandings of relative percentage or division of the whole.

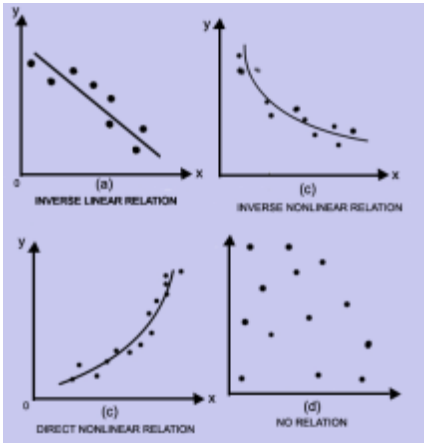
Line Or Circle Or Sector Charts

It depicts change in quantitative data over time. Bar shows only the total amount for a time period

only whereas line charts shows variations within each time period.

A line chart is preferred over a bar chart in the following situations

- When the data involves a long time period
- When several series are compared on the same chart
- When emphasis is on the movement rather than the actual amount
- When trends of frequency distribution are presented.



Scatter Diagram

It is used to examine the relationship between two variables such as price and scales; incomes and expenses; production and cost; manpower and cost; and so on.

7.3 Presentation of data in tables:

Presentatlon of data in table is an effective method of a report. A table can be formed from both parametric and non-parametric data. It is also possible to make a table from just one variable.

Table 1.1 Reason for Absenteeism in work

Reason	Responses	%
sickness	8	32%
sickness in the family	3	12%
family holiday	4	16%
others	10	40%
Total	25	100%

Construction of tables

The research data can be presented in tabular form. A table is systematic method of presenting statistical data in vertical column and horizontal rows. Tables enable the reader to comprehend and interpret masses of data rapidly and to…….significantly details and relations at a glance. Tabulation involves arrangement of data in the form of tables.

Types of tables

- **Simple table:**It is often called marginal table. It consists of a count of the number of response that occurs in each of the data categories that comprise a variable. It is one dimension or uni-variate table. It makes no difference how many categories any single variable has. Such tables commonly occur in newspapers, government publications etc.

- **Two way or bi-variate table:**It is two dimensional tables with two variables. The variables are interrelated. Table showing the male and female population is an example.

- **Three-way table:**It indicates three mutually related and interlinked attributes of phenomenon. The male category of a population can be classified as poor, middle income and rich. It tells the relation among three variables at a time.

- **Multiple tables:**It gives information about four or more mutually related attributes.

7.5 Bibliography:

A bibliography is a list of published works. However, by common use both published and unpublished materials are listed in bibliography. It is added at the end of research report. It is always arranged alphabetically. If the bibliography is extensive, it can be divided into books, periodically, newspaper, reports and public documents.

Rules for preparing bibliography

For a book with one author

Kotler, P (1998). Marketing management: Analysis, planning, implementation and control. New Delhi: PHI

Note:

- Use surname of the author first followed by middle name or two initials. Use the name of institutions or agency if there is no author name.
- Place the parenthesis immediately after the name to enter the year of publication.
- Name the books in italic if computer printed, and use underline if it is typed.
- Give the place of publication and name of publisher.
- In case of two or more works by the same author, the author's name is not to be repeated; a short horizontal line followed by a period should take the place of author's name

Rules for preparing bibliography

- If there are two or more works by one , arrange them chronologically, most recent last.
- Use double space between the entries. The second line of an entry should be single spaced.

For a book with two authors

Kotler, P and Armstrong (2005), Principle of marketing , New Delhi

For an edited book

Blois, Keith (Ed.) (2000). The oxford text book of marketing, New York: Oxford University Press Line.

For a corporate or institutional author

Nepal Red Cross(1991). Fire representative training manual. Kathmandu: NRC

For a newspaper article

The Rising Nepal. April 15, 1997. P3. Col4