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## UNIT - I RESEARCH DEFINITION

### **CONCEPT OF RESEARCH**

Research in common parlance refers to a search for knowledge. One can also define research as a scientific and systematic search for pertinent information on a specific topic. In fact, research is an art of scientific investigation.

The Advanced Learner's Dictionary of Current English lays down the meaning of research as —a careful investigation or inquiry specially through search for new facts in any branch of knowledge.

Redman and Mory define research as a —systematized effort to gain new knowledge. Some people consider research as a movement, a movement from the known to the unknown. It is actually a voyage of discovery. We all possess the vital instinct of inquisitiveness for, when the unknown confronts us, we wonder and our inquisitiveness makes us probe and attain full and fuller understanding of the unknown. This inquisitiveness is the mother of all knowledge and the method, which man employs for obtaining the knowledge of whatever the unknown, can be termed as research.

Research is an academic activity and as such the term should be used in a technical sense. According to Clifford Woody research comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organising and evaluating data; making deductions and reaching conclusions; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis. D. Slesinger and M. Stephenson in the Encyclopaedia of Social Sciences define research as —the manipulation of things, concepts or symbols for the purpose of generalising to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art. Research is, thus, an original contribution to the existing stock of knowledge making for its advancement. It is the pursuit of truth with the help of study, observation, comparison and experiment. In short, the search for knowledge through objective and systematic method of finding solution to a problem is research. The systematic approach concerning generalisation and the formulation of a theory is also research. As such the term 'research' refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analyzing the facts and reaching certain conclusions either in the form of solutions(s) towards the concerned problem or in certain generalisations for some theoretical formulation.

### **BUSINESS RESEARCH**

Business research is a process of acquiring detailed information of all the areas of business and using such information in maximizing the sales and profit of the business. Such a study helps companies determine which product/service is most profitable or in demand. In simple words, it can be stated as the acquisition of information or knowledge for professional or commercial purpose to determine opportunities and goals for a business.

Business research can be done for anything and everything. In general, when people speak about business research it means asking research questions to know where the money can be spent to increase sales, profits or market share. Such research is critical to make wise and informed decisions.



For example: A mobile company wants to launch a new model in the market. But they are not aware of what are the dimensions of a mobile that are in most demand. Hence, the company conducts a business research using various methods to gather information and the same is then evaluated and conclusions are drawn, as to what dimensions are most in-demand, This will enable the researcher to make wise decisions to position his phone at the right price in the market and hence acquire a larger market share

### FEATURES OF RESEARCH

1. Should be systematic in nature.
2. Should be logical.
3. Should be empirical and replicable in nature.
4. Should be according to plans.
5. Should be according to the rules and the assumptions should not be based on the false bases or judgments.
6. Should be relevant to what is required.
7. Procedure should be reproducible in nature.
8. Controlled movement of the research procedure.

### TYPES

**Basic research** is driven by a scientist's curiosity or interest in a scientific question. The main motivation is to expand man's knowledge, not to create or invent something. There is no obvious commercial value to the discoveries that result from basic research.

For example, basic science investigations probe for answers to questions such as:

- How did the universe begin?
- What are protons, neutrons, and electrons composed of?
- How do slime molds reproduce?
- What is the specific genetic code of the fruit fly?

**Applied research** refers to scientific study and research that seeks to solve practical problems. Applied research is used to find solutions to everyday problems, cure illness, and develop innovative technologies, rather than to acquire knowledge for knowledge's sake.

For example, applied researchers may investigate ways to:

- Improve agricultural crop production
- Treat or cure a specific disease
- Improve the energy efficiency of homes, offices, or modes of transportation

### Exploratory research:

It is a type of research conducted for a problem that has not been clearly defined. Exploratory research helps determine the best research design, data collection method and selection of subjects.

- The results of exploratory research are not usually useful for decision-making by themselves, but they can provide significant insight into a given situation.



- Exploratory research is not typically generalizable to the population at large.
- Exploratory research can be quite informal, relying on secondary research such as reviewing available literature and/or data, or qualitative approaches such as informal discussions with consumers, employees, management or competitors, and more formal approaches through in-depth interviews, focus groups, projective methods, case studies or pilot studies.

### **Descriptive research**

It refers to research that provides an accurate portrayal of characteristics of a particular individual, situation, or group. Descriptive research, also known as statistical research. These studies are a means of discovering new meaning, describing what exists, determining the frequency with which something occurs, and categorizing information.

In short descriptive research deals with everything that can be counted and studied, which has an impact on the lives of the people it deals with. For example, Finding the most frequent disease that affects the children of a town. The reader of the research will know what to do to prevent that disease thus, more people will live a healthy life.

### **PHASES OF BUSINESS RESEARCH**

1. Selection of Research Problem.
2. Extensive Literature Survey
3. Making Hypothesis
4. Preparing the Research Design
5. Sampling
6. Data collection
7. Data Analysis
8. Hypothesis Testing
9. Generalization and Interpretation
10. Preparation of Report

### **PROCESS AND FORMULATION OF RESEARCH PROBLEM**

#### **Identify the Broad Study Area**

This is a great idea to thinking about the subject area of your interest. You should identify the field in which you would like to work a long time after your academic study or graduation. It will help you tremendously to get an interesting research topic. For example- if you do graduation in sociology, you must decide your research study area in sociology. You might choose social problems like unemployment, road accident, community health, HIV/AIDS, etc.

#### **Dissect the Broad Study Area into Subareas**

In this stage, you need to dissect and specify your research broad study area into some subareas. You would consult with your supervisor in this regard. Write down subareas. For example- if you select unemployment as your broad study area, then dissect it into unemployment & social stability, unemployment & crime, unemployment & individual frustration, etc. In this case, your research title maybe how unemployment produces criminal activities. Or how it creates frustration in mind among unemployed people.



### **Mark-up your Interest**

It is almost impossible to study all subareas. That's why you must identify your area of interest. You should select issues in which you are passionate about. Your interest must be the most important determinant of your research study. Once you selected your research study of interest, you should delete other subareas in which you do not feel interested. Keep in mind that if you lose your interest in your research study it won't bring any results eventually.

### **Study Research Questions**

In this step in formulating a research problem, you would point out your research questions under the area of interest as you decided in the previous stage. If you select unemployment as your study area, your questions might be "how unemployment impacts on individual social status?" "How it affects social stability?" "How it creates frustration on individuals?" Define what research problem or question you are going to study? The more you study the research problem it will be just as relevant and fruitful to solve the problem indeed.

### **Set Out Objectives**

Set out conspicuously your research root objectives and sub-objectives. Research objectives essentially come from research questions. If you do study "Impact of unemployment on individual social status" as your research problem or research question. Then, set out what would you like to explore to address. For Example- your main objective might be to examine the unemployment status in a particular society or state. And sub-objectives would be its effects on individuals' social life. Setting out specific main and sub-objectives are so crucial.

### **Assess your Objectives**

Now, you should evaluate your objectives to make sure the possibility of attaining them through your research study. Assess your objectives in terms of time, budget, resources and technical expertise at your hand. You should also assess your research questions in light of reality. Determine what outcome will bring your study. If you can assess accurately the purpose of the research study it will bring significant results in the long run. In fact, research objectives determine the value of the study you are going to work out.

### **Check Back**

Before you go on research work you should review all steps in formulating a research problem and all the things that you have done till now for the purpose of your research study. Then, ask yourself about your enthusiasm. Do you have enough resources to step up? If you are quite satisfied, then you forward to undertake your research work. You can change any of your plans in the light of reality if it requires.

## **SOURCES OF RESEARCH**

### **Primary sources**

It contain first-hand information, meaning that you are reading the author's own account on a specific topic or event that s/he participated in. Examples of primary resources include scholarly research articles, books, and diaries. Primary sources such as research articles often do not explain terminology and theoretical principles in detail. Thus, readers of primary scholarly research should have foundational knowledge of the subject area. Use primary resources to



obtain a first-hand account to an actual event and identify original research done in a field. For many of your papers, use of primary resources will be a requirement.

**Examples of a primary source are:**

- Original documents such as diaries, speeches, manuscripts, letters, interviews, records, eyewitness accounts, autobiographies
- Empirical scholarly works such as research articles, clinical reports, case studies, dissertations
- Creative works such as poetry, music, video, photography.

**Secondary sources**

It describe, summarize, or discuss information or details originally presented in another source; meaning the author, in most cases, did not participate in the event. This type of source is written for a broad audience and will include definitions of discipline specific terms, history relating to the topic, significant theories and principles, and summaries of major studies/events as related to the topic. Use secondary sources to obtain an overview of a topic and/or identify primary resources. Refrain from including such resources in an annotated bibliography for doctoral level work unless there is a good reason.

**Examples of a secondary source are:**

- Publications such as textbooks, magazine articles, book reviews, commentaries, encyclopaedias, almanacs

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## UNIT - II SAMPLING

### **SAMPLING**

Sampling is a process used in statistical analysis in which a predetermined number of observations are taken from a larger population. The methodology used to sample from a larger population depends on the type of analysis being performed, but it may include simple random sampling or systematic sampling.

### **NATURE OF SAMPLING**

A population is the entire set of persons, objects, events or entities that a researcher intends to study. However, in many instances a population study may not be feasible so the researcher selects a sample or a subset of a target population. Sampling method refer to the different ways of selecting the sample from the target population.

Some sampling method aims at obtaining a sample that is representative of the target population. Generalising the study results to the rest of the target population can then be made. However if a sample is biased, generalising from the sample to the population may be valid less or lead to incorrect inference.

### **TYPES OF SAMPLING**

Sampling design refers to the process of selecting samples from a population. There are two types of sampling designs.

- Probability or Random sampling
- Non-probability or Non-random sampling

Probability sampling is of following types:

- Simple random sampling
- Stratified random sampling
- Systematic random sampling
- Cluster sampling

Non-probability sampling may be classified into:

- Convenience or accidental sampling
- Purposive (or Judgement) sampling
- Quota sampling
- Snow-ball sampling

### **PROBABILITY SAMPLING**

A probability sample is one in which each element of the population has a known non-zero probability of selection. Each subject has a known probability of being selected.

Allows application of statistical sampling theory to results to:

- Generalise



- Test hypotheses

Probability samples are the best, they ensure

- Representativeness
- Precision

### Types of Probability Sampling

#### Simple random sampling

##### Merely choosing anyone from anywhere, no order no criteria

- Each element in the population has an equal probability of selection AND each combination of elements has an equal probability of selection
- Names drawn out of a hat
- Random numbers to select
- elements from an ordered list

#### Merits

##### Lack of Bias

Because individuals who make up the subset of the larger group are chosen at random, each individual in the large population set has the same probability of being selected. This creates, in most cases, a balanced subset that carries the greatest potential for representing the larger group as a whole.

##### Simplicity

As its name implies, producing a simple random sample is much less complicated than other methods, such as stratified random sampling. As mentioned, individuals in the subset are selected randomly and there are no additional steps.

#### Demerits

##### Difficulty Accessing Lists of the Full Population

In simple random sampling, an accurate statistical measure of a large population can only be obtained when a full list of the entire population to be studied is available. In some instances, details on a population of students at a university or a group of employees at a specific company are accessible through the organization that connects each population.

However, gaining access to the whole list can present challenges. Some universities or colleges are not willing to provide a complete list of students or faculty for research. Similarly, specific companies may not be willing or able to hand over information about employee groups due to privacy policies.

##### Time Consuming

When a full list of a larger population is not available, individuals attempting to conduct simple random sampling must gather information from other sources. If publicly available, smaller subset lists can be used to recreate a full list of a larger population, but this strategy takes time to complete. Organizations that keep data on students, employees, and individual consumers often impose lengthy retrieval processes that can stall a researcher's ability to obtain





the most accurate information on the entire population set.

### **Costs**

In addition to the time it takes to gather information from various sources, the process may cost a company or individual a substantial amount of capital. Retrieving a full list of a population or smaller subset lists from a third-party data provider may require payment each time data is provided. If the sample is not large enough to represent the views of the entire population during the first round of simple random sampling, purchasing additional lists or databases to avoid a sampling error can be prohibitive.

### **Sample Selection Bias**

Although simple random sampling is intended to be an unbiased approach to surveying, sample selection bias can occur. When a sample set of the larger population is not inclusive enough, representation of the full population is skewed and requires additional sampling techniques.

### **Systematic sampling**

#### **Developing a pattern to select the sample, every 4<sup>th</sup> element or every tenth element etc**

Involves drawing every  $n$ th element in the population starting with a randomly chosen element between 1 and  $n$

### **Merits**

#### **Easy to Execute and Understand**

Systematic samples are relatively easy to construct, execute, compare, and understand. This is particularly important for studies or surveys that operate with tight budget constraints.

#### **Control and Sense of Process**

A systematic method also provides researchers and statisticians with a degree of control and sense of process. This might be particularly beneficial for studies with strict parameters or a narrowly formed hypothesis, assuming the sampling is reasonably constructed to fit certain parameters.

#### **Clustered Selection Eliminated**

Clustered selection, a phenomenon in which randomly chosen samples are uncommonly close together in a population, is eliminated in systematic sampling. Random samples can only deal with this by increasing the number of samples or running more than one survey. These can be expensive alternatives.

#### **Low Risk Factor**

Perhaps the greatest strength of a systematic approach is its low risk factor. The primary potential disadvantages of the system carry a distinctly low probability of contaminating the data.

### **Demerits**

#### **Assumes Size of Population Can Be Determined**



The systematic method assumes the size of the population is available or can be reasonably approximated. For instance, suppose researchers want to study the size of rats in a given area. If they don't have any idea how many rats there are, they cannot systematically select a starting point or interval size.

### **Need for Natural Degree of Randomness**

A population needs to exhibit a natural degree of randomness along the chosen metric. If the population has a type of standardized pattern, the risk of accidentally choosing very common cases is more apparent.

For a simple hypothetical situation, consider a list of favourite dog breeds where (intentionally or by accident) every even numbered dog on the list was small and every odd dog was large. If the systematic sampler began with the fourth dog and chose an interval of six, the survey would skip the large dogs.

### **Greater Risk of Data Manipulation**

There is a greater risk of data manipulation with systematic sampling because researchers might be able to construct their systems to increase the likelihood of achieving a targeted outcome rather than letting the random data produce a representative answer. Any resulting statistics could not be trusted.

### **Stratified sampling**

- Probability sampling procedure in which simple random sub samples that are more or less equal on some characteristics are drawn from within each stratum of the population
- Each group is internally homogenous but there are comparative differences between groups.

### **Merits and Demerits**

#### **Stratified sampling offers several advantages over simple random sampling.**

- A stratified sample can provide greater precision than a simple random sample of the same size.
- Because it provides greater precision, a stratified sample often requires a smaller sample, which saves money.
- A stratified sample can guard against an "unrepresentative" sample (e.g., an all-male sample from a mixed-gender population).
- We can ensure that we obtain sufficient sample points to support a separate analysis of any subgroup.

### **Cluster sampling**

- Groups that have heterogeneous members are first identified, and then some are chosen at random.
- Each group is internally heterogeneous but, groups are homogeneous on some characteristic.
- All the members in each of the randomly chosen groups are studied.



- Target population is first divided into clusters and then random sample of clusters is drawn

### **Merits**

#### **Requires fewer resources**

Since cluster sampling selects only certain groups from the entire population, the method requires fewer resources for the sampling process. Therefore, it is generally cheaper relative to the simple random or stratified sampling as it requires fewer administrative and travel expenses.

#### **More feasible**

The division of the entire population into homogenous groups increases the feasibility of the sampling. Additionally, since each cluster represents the entire population, more subjects can be included in the study.

### **Demerits**

#### **Biased samples**

Cluster sampling is prone to biases. If the clusters that represent the entire population were formed under a biased opinion, the inferences about the entire population would be biased as well.

#### **High sampling error**

Generally, the samples drawn using the cluster sampling method are prone to higher sampling error than the samples formed using other sampling methods.

### **NON PROBABILITY SAMPLING**

- When probability of being chosen is unknown
- Cheaper but unable to generalise
- Potential for biasness

### **Types of Non-Probability Sampling**

#### **Convenience or Accidental Sampling**

This is non-probability sampling. It means selecting sample units in a just 'hit and miss' fashion, e.g., interviewing people whom we happen to meet. This sampling also means selecting whatever sampling units are conveniently available, e.g., a teacher may select students in his class.

This method is also known as accidental sampling because the respondents whom the researcher meets accidentally are included in the sample.

#### **Usefulness:**

Though convenience sampling has no status, it may be used for simple purpose such as testing ideas or gaining ideas or rough impression about a subject of interest.

It lays a ground work for a subsequent probability sampling. Sometimes it may have to be necessarily used. For example, when a population cannot be defined or a list of population is not available, there is no other alternative than to use convenient sampling.



**Merits:**

- Convenience sampling is the cheapest and simplest.
- It does not require a list of population.
- It does not require any statistical expertise.

**Demerits:**

- Convenience sampling is highly biased, because of the researcher's subjectivity, and so it does not yield a representative sample.
- It is the least reliable sampling method. There is no way of estimation the representativeness of the sample.
- The findings cannot be generalized.

**Purposive or Judgement Sampling**

This method means deliberate selection of sample units that conform to some predetermined criteria. This is also known as Judgement sampling. This involves selection of cases which we judge as the most appropriate ones for the given study. It is based on the judgement of the researcher or some expert. It does not aim at securing a cross section of a population. The chance that a particular case be selected for the sample depends on the subjective judgement of the researcher. For example, a researcher may deliberately choose industrial undertakings in which quality circles are believed to be functioning successfully and undertaking in which quality circles are believed to be a total failure.

**Application:**

The method is appropriate when what is important is the typicality and specific relevance of the sampling unit to the study and not their overall representativeness to the population.

**Advantage:**

The advantages of purposive or judgement sampling are

1. It is less costly and more convenient.
2. It guarantees inclusion of relevant elements in the sample. Probability sampling plans cannot give such guarantee.

**Disadvantage:**

The demerits of judgement sampling are

1. This does not ensure the representativeness of sample.
2. This is less efficient for generalizing when compared with random sampling.
3. This method requires more prior extensive information about the population one studies. Without such information, it is not possible to adjudge the suitability of the sample items to be selected.
4. This method does not lend itself for using inferential statistics, because, this sampling does not satisfy the underlying assumption of randomness.

**Quota Sampling**

This is a form of convenient sampling involving selection of quota groups of accessible sampling units by traits such as sex, age, social class, etc., when the population is known to



consist of various categories by sex, age, religion, social class etc., in specific proportions, each investigator may given an assignment of quota groups specified by the predetermined trait in specific proportions. He can then select accessible persons, belonging to those quota groups in the area assigned to him.

Quota Sampling is therefore a method of stratified sampling in which selection within strata is non-random. It is this Non-random element that constitutes its greatest weakness.

Quotas are stratified by such variables as sex, age, social class and religion. It is easy to classify accessible respondents under sex, age and religion, but it is very difficult to classify them into social categories, since social class usually involves a combination of factors such as occupation income and caste and the interviewer's subjective judgement and bias play some role in the social class classification of respondents.

### **Merits:**

The major advantages of quota sampling are:

- It is considerably less costly than probability sampling.
- It takes less time.
- There is no need for a list of population. Thus, quota sampling is a suitable method of sampling a population for which no suitable frame is available.
- Field work can easily be organized. Strict supervision need not be required.

### **Demerits:**

The method of quota sampling suffers from certain major shortcomings.

- It may not yield a precise representative sample, and it is impossible to estimate sampling error. The findings, therefore, are not generalizable to any significant extent.
- Interviewers may tend to choose the most accessible person; they may ignore slums or areas difficult to reach. Thus, they may fail to secure a representative sample within their quota groups.
- Strict control of field work is difficult.
- It is difficult to sample on more than three variable dimensions. This is because the number of categories to be selected is a multiplication of the number of values in each variable. For instance, if we want sample proportion at number of persons by sex, social status and age and these variables consist of two, three and three categories respectively, we have to select  $2 \times 3 \times 3 = 18$  categories of respondents.
- The quota of sampling is subject to a higher degree of classification error, because the investigators are likely to base their classification of respondents' social status and economic status mostly on their impression about them.

### **Snowball Sampling**

This is the colourful name for a technique of building up a list or a sample of a special population by using an initial set of its members as information. For example, if a researcher wants to study the problem faced by Indians through some source like Indian embassy. Then he can ask each one of them to supply names of other Indians known to them, and continue this procedure until he gets an exhaustive list from which he can draw a sample or make a census survey.



This sampling technique may also be used in socio-metric studies. For example, the members of a social group may be asked to name the persons with whom they have social contacts, each one of the persons so named may also be asked to do so, and so on. The researcher may thus get a constellation of associates and analyse it.

### **Advantages:**

The advantages of snowball sampling are:

- It is very useful in studying social groups, informal group in a formal organization, and diffusion of information among professionals of various kinds.
- It is useful for smaller populations for which no frames are readily available.

### **Disadvantages:**

- The major disadvantages of snowball sampling is that it does not allow the use of probability statistical methods. Elements included are dependent on the subjective choice of the original selected respondents.
- It is difficult to apply this method when the population is large.
- It does not ensure the inclusion of all elements in the list.

## **SAMPLING ERROR**

### **Error 1**

#### **Random Sampling Error**

This is defined as the “difference between the sample result and the result of a census conducted using identical procedures” and is the result of chance variation in the selection of sampling units

- If samples are selected properly the sample is usually deemed to be a good approximation of the population and thus capable of delivering an accurate result
- Usually, the random sampling error arising from statistical fluctuation is small, but sometimes the margin of error can be significant
- Increasing the sample size will reduce this error.

### **Error 2**

#### **Systematic (Non-Sampling) Errors**

These errors result from factors such as:

- an improper research design that causes response error ,
- errors committed in the execution of the research,
- errors in recording responses and
- non-responses from individuals who were not contacted or who refused to participate Both Random sampling errors and systematic (non-sampling) errors reduce the representativeness of a sample and consequently the value of the information which is derived by business researchers from it

## **HYPOTHESIS**

An hypothesis is a specific statement of prediction. It describes in concrete (rather than theoretical) terms what you expect will happen in your study. Not all studies have hypotheses.



Sometimes a study is designed to be exploratory (see inductive research). There is no formal hypothesis, and perhaps the purpose of the study is to explore some area more thoroughly in order to develop some specific hypothesis or prediction that can be tested in future research. A single study may have one or many hypotheses.

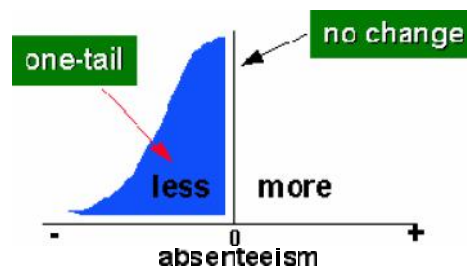
Actually, whenever I talk about an hypothesis, I am really thinking simultaneously about *two* hypotheses. Let's say that you predict that there will be a relationship between two variables in your study. The way we would formally set up the hypothesis test is to formulate two hypothesis statements, one that describes your prediction and one that describes all the other possible outcomes with respect to the hypothesized relationship. Your prediction is that variable A and variable B will be related (you don't care whether it's a positive or negative relationship). Then the only other possible outcome would be that variable A and variable B are *not* related. Usually, we call the hypothesis that you support (your prediction) the **alternative hypothesis**, and we call the hypothesis that describes the remaining possible outcomes the **null hypothesis**. Sometimes we use a notation like  $H_A$  or  $H_1$  to represent the alternative hypothesis or your prediction, and  $H_0$  or  $H_0$  to represent the null case. You have to be careful here, though. In some studies, your prediction might very well be that there will be no difference or change. In this case, you are essentially trying to find support for the null hypothesis and you are opposed to the alternative.

If your prediction specifies a direction, and the null therefore is the no difference prediction and the prediction of the opposite direction, we call this a **one-tailed hypothesis**. For instance, let's imagine that you are investigating the effects of a new employee training program and that you believe one of the outcomes will be that there will be *less* employee absenteeism. Your two hypotheses might be stated something like this:

The null hypothesis for this study is:

**$H_0$ :** As a result of the XYZ company employee training program, there will either be no significant difference in employee absenteeism or there will be a significant *increase* which is tested against the alternative hypothesis:

**$H_A$ :** As a result of the XYZ company employee training program, there will be a significant *decrease* in employee absenteeism.



In the figure on the left, we see this situation illustrated graphically. The alternative hypothesis – your prediction that the program will decrease absenteeism – is shown there. The null must



account for the other two possible conditions: no difference, or an increase in absenteeism. The figure shows a hypothetical distribution of absenteeism differences. We can see that the term “one-tailed” refers to the tail of the distribution on the outcome variable.

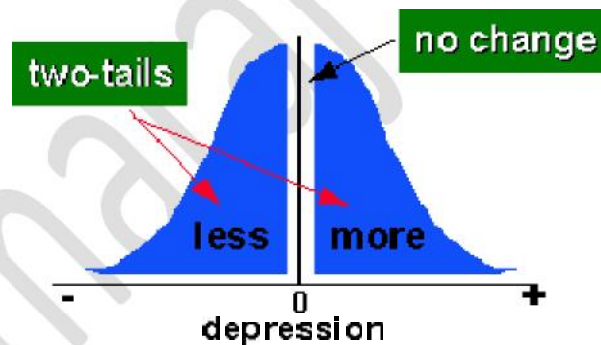
When your prediction does *not* specify a direction, we say you have a **two-tailed hypothesis**. For instance, let’s assume you are studying a new drug treatment for depression. The drug has gone through some initial animal trials, but has not yet been tested on humans. You believe (based on theory and the previous research) that the drug will have an effect, but you are not confident enough to hypothesize a direction and say the drug will reduce depression (after all, you’ve seen more than enough promising drug treatments come along that eventually were shown to have severe side effects that actually worsened symptoms). In this case, you might state the two hypotheses like this:

The null hypothesis for this study is:

**HO:** As a result of 300mg./day of the ABC drug, there will be no significant difference in depression.

which is tested against the alternative hypothesis:

**HA:** As a result of 300mg./day of the ABC drug, there will be a significant difference in depression.



The figure on the right illustrates this two-tailed prediction for this case. Again, notice that the term “two-tailed” refers to the tails of the distribution for your outcome variable.

The important thing to remember about stating hypotheses is that you formulate your prediction (directional or not), and then you formulate a second hypothesis that is mutually exclusive of the first and incorporates all possible alternative outcomes for that case. When your study analysis is completed, the idea is that you will have to choose between the two hypotheses. If your prediction was correct, then you would (usually) reject the null hypothesis and accept the alternative. If your original prediction was not supported in the data, then you will accept the null hypothesis and reject the alternative. The logic of hypothesis testing is based on these two basic principles:





- the formulation of two mutually exclusive hypothesis statements that, together, exhaust all possible outcomes
- the testing of these so that one is necessarily accepted and the other rejected

### **CHARACTERISTICS & QUALITIES OF A GOOD HYPOTHESIS**

A good hypothesis possesses the following certain attributes.

#### **Power of Prediction**

One of the valuable attribute of a good hypothesis is to predict for future. It not only clears the present problematic situation but also predict for the future that what would be happened in the coming time. So, hypothesis is a best guide of research activity due to power of prediction.

#### **Closest to observable things**

A hypothesis must have close contact with observable things. It does not believe on air castles but it is based on observation. Those things and objects which we cannot observe, for that hypothesis cannot be formulated. The verification of a hypothesis is based on observable things.

#### **Simplicity**

A hypothesis should be so dabble to every layman, P.V young says, “A hypothesis wo0uld be simple, if a researcher has more in sight towards the problem”. W-ocean stated that, “A hypothesis should be as sharp as razor’s blade”. So, a good hypothesis must be simple and have no complexity.

#### **Clarity**

A hypothesis must be conceptually clear. It should be clear from ambiguous information’s. The terminology used in it must be clear and acceptable to everyone.

#### **Testability**

A good hypothesis should be tested empirically. It should be stated and formulated after verification and deep observation. Thus testability is the primary feature of a good hypothesis.

#### **Relevant to Problem**

If a hypothesis is relevant to a particular problem, it would be considered as good one. A hypothesis is guidance for the identification and solution of the problem, so it must be accordance to the problem.

#### **Specific**

It should be formulated for a particular and specific problem. It should not include generalization. If generalization exists, then a hypothesis cannot reach to the correct conclusions.

#### **Relevant to available Techniques**

Hypothesis must be relevant to the techniques which is available for testing. A researcher must know about the workable techniques before formulating a hypothesis.



### **Fruitful for new Discoveries**

It should be able to provide new suggestions and ways of knowledge. It must create new discoveries of knowledge. J.S. Mill, one of the eminent researcher says that “Hypothesis is the best source of new knowledge it creates new ways of discoveries”.

### **Consistency & Harmony**

Internal harmony and consistency is a major characteristic of good hypothesis. It should be out of contradictions and conflicts. There must be a close relationship between variables which one is dependent on other.

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### **UNIT - III** **DATA COLLECTION**

#### **Data collection**

It is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes. The data collection component of research is common to all fields of study including physical and social sciences, humanities, business, etc. While methods vary by discipline, the emphasis on ensuring accurate and honest collection remains the same.

#### **SOURCES OF DATA**

The tools of data collection translate the research objectives into specific questions/items, the responses to which will provide the data required to achieve the research objectives. In order to achieve this purpose, each question/item must convey to the respondent the idea or group of ideas required by the research objectives, and each item must obtain a response which can be analyzed for fulfilling the research objective.

Information gathered through the tools provide descriptions of characteristics of individuals institutions or other phenomena under study. The characteristics may help to explain differences in behavioural pattern and performance of objects under study.

Information gathered through the tools serve another purpose also. It is useful for measuring the various variables pertaining to the study. The variables and their interrelationships are analysed for testing the hypothesis or for exploring the content areas set by the research objectives.

The sources of data may be classified into (a) primary sources and (b) secondary sources.

#### **PRIMARY SOURCES**

Primary sources are original sources from which the researcher directly collects data that have not been previously collected, e.g., collection of data directly by the researcher on brand awareness, brand preference, brand loyalty and other aspects of consumer behaviour from a sample of consumers by interviewing them. Primary data are first-hand information collected through various methods such as observation, interviewing, mailing etc.

#### **SECONDARY SOURCES**

These are sources containing data which have been collected and compiled for another purpose. The secondary sources consists of readily available compendia and already compiled statistical statements and reports whose data may be used by researches for their studies, e.g., census reports, annual, reports and financial statements of companies, Statistical statements, Reports of Government Departments, Annual Reports on currency and finance published by the Reserve Bank of India, Statistical Statements relating to Cooperatives and Regional Rural Banks, published by the NABARD, Reports of the National Sample Survey.



Organization, Reports of trade associations, publications of international organizations such

as UNO, IMF, World Bank, ILO, WHO, etc., Trade and Financial Journals, newspapers, etc., Secondary sources consists of not only published records and reports, but also unpublished records. The latter category includes various records and registers maintained by firms and organizations, e.g., accounting and financial records, personnel records, personnel records, register of members, minutes of meetings, inventory records, etc.

### **DATA COLLECTION METHODS**

The various methods of data gathering involve the use of appropriate recording forms. These are called tools or instruments of data collection. They consist of- Observation schedule or

- observationnaire
- Interview guide
- Interview schedule
- Mailed questionnaire
- Rating scale
- Check list
- Opinionnaire
- Document schedule/data sheet
- Schedule for institutions
- Inventories

Each of the above tools is used for a specific method of data gathering: observation schedule for observation method, interview schedule and guide for interviewing, questionnaire and option air for mail survey, and so on.

### **Observation Schedule or Observationnaire**

The is a form on which observations of a object or a phenomenon are recorded. The items to be observed are determined with reference to the nature and objectives of the study. They are grouped into appropriate categories and listed in the schedule in the order in which the observer would observe them.

The items are structured with possible alternatives. Space is provided against each unit observation for encircling or checking, or recording, as the case may be. Provision is made for the correct identification of each case observed and of the observer.

The schedule should be so constructed as to make it possible to record the observations easily and correctly, and to tabulate and analyzed effectively.

The schedule must be so devised as to provide the required verifiable and quantifiable data and to avoid selective bias and misinterpretation of observed items. The units of observation must be simple, and meticulously worded so as to facilitate precise and uniform recording.



### **Interview Guide**

This is used for non-directive and depth interviews. It does not contain a complete list of items on which information has to be elicited from a respondent; it just contains only the broad topics or areas to be covered in the interview.

Interview guide serves as a suggestive reference or prompter during interview. It aids in focusing attention on salient points relating to the study and in securing comparable data in different interview by the same or different interviewers.

There is considerable flexibility as to the manner, order and language in which the interviewer asks the questions. If the interviewer has to refer the guide very often, it would defeat its own purpose. The interviewer cannot listen closely and analytically if his attention rests on the guide. He may fail to respond to the use and implications of the interviewee's remarks.

### **Interview Schedule and Mailed Questionnaire**

Both these tools are widely used in surveys. Both are complete list of questions on which information is elicited from the respondents. The basic difference between them lies in recording responses. While a schedule is filled out by the interviewer, a questionnaire is completed by the respondent.

### **Check List**

This is the simplest of all the devices. It consists of a prepared list of items pertinent to an object or a particular task. The presence or absence of each item may be indicated by checking 'yes' or 'no' the object, act or task. A check list contains terms which the respondent understands and which more briefly and succinctly express his views than answers to open-ended question. It is a crude device, but careful pre-test can make it less so. It is at best when used to test specific hypothesis. It may be used as an independent tool or as a part of a schedule/questionnaire. Its main drawback is that items may be responded in different ways. They may try to create a favourable impression of themselves by checking those qualities that they regard as socially desirable.

### **Opinionnaire**

This is a list of questions or statements pertaining to an issues or program. It is used for studying the opinions of people. It is commonly used in opinion polls. People are asked to express their responses to the listed questions or reactions to the listed statements.

### **Documents Schedule/Data Sheet**

This is a list of items of information to be obtained from documents, records and other materials. In order to secure measurable data, the items included in the schedule are limited to those that can be uniformly secured from a large number of case histories or other records.

For example, a study of annual returns and financial statements filed by joint-stock companies with the register of joint-capital employed, net worth, volume of business, income and expenditure, gross profit, net profit before tax and net profit after tax.



### Schedule for Institutions

This is used for survey of organizations like business enterprises, educational institutions, social or cultural organizations and the like. It will include various categories of data relating to their profile, functions and performance. These data are gathered from their records, annual reports and financial statements.

### Inventories

An inventory is essentially a list that the respondent is asked to mark or check in a particular way. Some example of inventories are

1. **Lists of interest:** the respondents are asked to check those things that interest them a lot.
2. **List of personality traits:** people are asked to check which of these apply to them.
3. **List of spare-time activities:** one has to check the activity engaged most often.
4. **Perceived effects of T.V (Stimulation of Activities):** The respondents may be asked to check true or untrue the following items:
  - a. I have copied the way the people dress on TV.
  - b. I have made things after they have been shown on TV.
  - c. I have purchased a particular brand after seeing its advertisement on TV.
  - d. I have gone to an art gallery after seeing it on TV. And so on.

	Good For Assessing	Advantages	Disadvantages
<b>Surveys</b>	Knowledge Attitudes Intentions Behaviors	A quick and inexpensive way to get information from a large number of people  It's easy to be consistent in how you administer the surveys  Analyzing surveys is relatively straight forward	Writing a good survey is harder than many people realize  It's easy to get flooded with surveys and for inputting data to take longer than expected  Behaviors are self-reported (and maybe biased)
<b>Focus Groups</b>	Attitudes Opinions Interpretations	In-depth information  Discussion among a diverse group of people can lead to insights that you would not get from individuals  Relatively low-cost and low-time investment	Results will be influenced by group dynamics; requires skill in group facilitation  Interpreting the group discussions can be challenging
<b>Interviews</b>	Attitudes Opinions Interpretations Motives Experiences	In-depth information  Participants may disclose information and details that they would not write about on a survey or talk about in a focus group	Time intensive  Being consistent across interviews is challenging  Requires good interviewing skills  Interpreting the interviews can be challenging
<b>Archival Data</b>	Service Utilization Fidelity to Protocols Behaviors	Monitor actual behaviors and patient care  Little or no scheduling issues; consent not usually required	Missing data is problematic  Record keeping practices may change over time
<b>Observations</b>	Fidelity to Protocols Behaviors Environments	Record actual behaviors versus self-reports  Gives insight into interactions between individuals and their physical and social settings	Need to have clear definitions of what you are looking for  Requires good observation skills and consistency across observations



## SCALING TECHNIQUES

### Introduction

In research we quite often face measurement problem (since we want a valid measurement but may not obtain it), specially when the concepts to be measured are complex and abstract and we do not possess the standardised measurement tools. Alternatively, we can say that while measuring attitudes and opinions, we face the problem of their valid measurement. Similar problem may be faced by a researcher, of course in a lesser degree, while measuring physical or institutional concepts. As such we should study some procedures which may enable us to measure abstract concepts more accurately. This brings us to the study of scaling techniques.

### Meaning of Scaling

Scaling describes the procedures of assigning numbers to various degrees of opinion, attitude and other concepts. This can be done in two ways viz., (i) making a judgement about some characteristic of an individual and then placing him directly on a scale that has been defined in terms of that characteristic and (ii) constructing questionnaires in such a way that the score of individual's responses assigns him a place on a scale. It may be stated here that a scale is a continuum, consisting of the highest point (in terms of some characteristic e.g., preference, favourableness, etc.) and the lowest point along with several intermediate points between these two extreme points. These scale-point positions are so related to each other that when the first point happens to be the highest point, the second point indicates a higher degree in terms of a given characteristic as compared to the third point and the third point indicates a higher degree as compared to the fourth and so on. Numbers for measuring the distinctions of degree in the attitudes/opinions are, thus, assigned to individuals corresponding to their scale-positions. All this is better understood when we talk about scaling technique(s). Hence the term 'scaling' is applied to the procedures for attempting to determine quantitative measures of subjective abstract concepts. Scaling has been defined as a procedure for the assignment of numbers (or other symbols) to a property of objects in order to impart some of the characteristics of numbers to the properties in question.

### Scale construction techniques

Following are the five main techniques by which scales can be developed.

- i. **Arbitrary approach:** It is an approach where scale is developed on ad hoc basis. This is the most widely used approach. It is presumed that such scales measure the concepts for which they have been designed, although there is little evidence to support such an assumption.
- ii. **Consensus approach:** Here a panel of judges evaluate the items chosen for inclusion in the instrument in terms of whether they are relevant to the topic area and unambiguous in implication.
- iii. **Item analysis approach:** Under it a number of individual items are developed into a test which is given to a group of respondents. After administering the test, the total scores are calculated for everyone. Individual items are then analysed to determine which items discriminate between persons or objects with high total scores and those with low scores.



- iv. **Cumulative scales** are chosen on the basis of their conforming to some ranking of items with ascending and descending discriminating power. For instance, in such a scale the endorsement of an item representing an extreme position should also result in the endorsement of all items indicating a less extreme position.
- v. **Factor scales** may be constructed on the basis of inter correlations of items which indicate that a common factor accounts for the relationship between items. This relationship is typically measured through factor analysis method.

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## UNIT - IV DATA ANALYSIS

### **Introduction**

Processing of data is the most important step in research. Lot of statistical treatment is done on the data. After such analysis, an interpretation of the statistics is made to draw inferences about the population.

### **Meaning of procession and analysis of data**

The data collected needs to be processed and analyzed. processing of data implies editing, coding, classification, tabulation, charting and diagrammatic presentation of data. The analysis of the data means computing appropriate statistical measures such as measures of central tendency, measures of dispersion, measures of association, computing test statistics and drawing inferences from all the above.

### **Importance of data processing and analysis**

To distil the essence of information from the mass of data, processing and analysis of data are essential. Data processing and analysis are the culmination of the long process of research design, survey and data collection. From the mass of data meaning must be churned out. This needs editing I the first place to do away with unnecessary and irrelevant data. Thus some data reduction is effected. Furth reduction of data is done through coding which replaces similar ones by a standard code. After coding, classification is done which groups data according to common features found or established. This is another data reduction purpose. Tabulation then follows which involves presenting classified data in the form of tables. Each table provides a summary data on an issues or related issues. A table present essential data on a particular topic and helps to mke sense out of the figures. All these are certain aspect of data processing. The purpose is to figure out the essential fact from a vast mass of data. This facilitates analysis.

- I. Analysis involves computing
- II. descriptive statistics or parameters like measures of central tendency,
- III. associative statistics such as correlation and regression,
- IV. test statistics such as Z values, 't' values, 'F' values, chi-square values, 'U' values, and so on, and
- V. finding out clusters, principal components, etc. Without these analyses, no inference, no conclusion and no recommendation can be offered.

So, description, association, hypotheses testing and inference are possible only when the basics of processing and relevant analyses are done. The overall understanding of the problems, issues, phenomenon and events studies is facilitated by data processing.

Description, implantation and prediction of phenomena, problems and issues studied are facilitated only by processing and analysis. A major part of the main body of any research work has its bases in processing and analysis-hence the importance of data processing and analysis.



## **CODING**

Coding is necessary for efficient analysis and through it, the several replies may be reduced to a small number of classes which contain the critical information required for analysis. Coding decisions should usually be taken at the designing stage of the questionnaire. This makes it possible to pre-code the questionnaire choices, which in turn, is helpful for computer tabulation as one can straightaway enter from the original questionnaires.

But in the case of hand-coding, some standard method may be used. One such standard method is to code in the margin with a coloured pencil. The other method can be to transcribe the data from the questionnaire to a coding sheet. Whatever method is adopted, one should see that coding errors are altogether eliminated or reduced to the minimum level.

Coding is the process/operation by which data/responses are organized into classes/categories, and numerals or other symbols are given to each item according to the class in which it falls. In other words, coding involves two important operations:

- deciding the categories to be used and
- allocating individual answers to them.

These categories should be appropriate to the research problem, exhaustive of the data, mutually exclusive and uni-directional. Since coding eliminates much of the information in the raw data, it is important that researchers design category sets carefully, in order to utilize the available data more fully.

The study of the responses is the first step in coding. In the case of processing-coded questions, coding begins at the preparation of the interview schedules. Secondly, the coding frame the indicators used for coding is developed by listing the possible answers to each question and assigning code numbers or symbols to each of them. The coding frame is an outline of what is coded and how it is to be coded. That is, a coding frame is a set of explicit rules and conventions that are used to base classification of variable observations into values which are transformed into numbers. Thirdly, after preparing the sample frame, the gradual process of fitting the answers to the questions must begin. Lastly, transcription is undertaken, i.e., transferring of the information from the schedules to a separate sheet called transcription sheet. A transcription sheet is a large summary sheet which contains the answer/codes of all the respondents. Transcription may not be necessary when only simple tables are required and the number of respondents is few.

## **DATA ENTRY**

Data entry is the act connected with transcribing some type of information into another medium, usually through input right into a computer program. Forms connected with data that people might transcribe include handwritten documents, in sequence off spreadsheets, and sequences of numbers, as well as computer code and in many cases names and addresses. Where as Web Research or Internet Research means to collect the specified information through web. It truly is nothing although knowing the most recent updating about online, relevant to your industry or your interest. Which means, Google may be indexed everything about which



means company to individual person information and you should separate whatever you need. Both these types of terms are generally related together. In truth, though “Data Entry & Web Research”

### **ANALYSIS AND INTERPRETATION OF DATA**

Data analysis and interpretation is the process of assigning meaning to the collected information and determining the conclusions, significance and implications of the findings. It is an important and exciting step in the process of research. In all research studies, analysis follows data collection.

According to C.R.Kothari (1989), “The term analysis refers to the computation of measures along with searching for patterns of relationship that exist among data-groups”. Analysis involves estimating the values of unknown parameters of the population and testing of hypotheses for drawing inferences. The aim of present study is to find out the “Attitude of Engineering College English Lecturers towards Technical English with Communication Skills Laboratory in Engineering Curriculum and the Barriers in Implementation.” The investigator collected data from 300 English lectures of 57 Engineering Colleges from 4 southern districts. The collected data are arranged properly, analyzed systematically and interpreted precisely.

### **TABULATION**

Tabulation is the process of summarizing raw data and displaying it in compact form for further analysis. Therefore, preparing tables is a very important step. Tabulation may be by hand, mechanical, or electronic. The choice is made largely on the basis of the size and type of study, alternative costs, time pressures, and the availability of computers, and computer programmes. If the number of questionnaires is small and their length short, hand tabulation is quite satisfactory.

A table may be divided into:

- (i) Frequency tables,
- (ii) Response tables,
- (iii) Contingency tables,
- (iv) Uni-variate tables,
- (v) Bi-variate tables,
- (vi) Statistical tables and
- (vii) Time series tables.

Generally a research table has the following parts: (a) table number, (b) title of the table, (c) caption, (d) stub (row heading), (e) body, (f) headnote (g) footnote.

As a general rule the following steps are necessary in the preparation of a table:

- i. **Title of table:** The table should be first given a brief, simple and clear title which may express the basis of classification
- ii. **Columns and rows:** Each table should be prepared in an adequate number of columns and rows.



- iii. **Captions and stubs:** The columns and rows should be given simple and clear captions and stubs.
- iv. **Ruling:** columns and rows should be divided by means of thin or thick rulings.
- v. **Arrangement of items:** Comparable figures should be arranged side by side.
- vi. **Deviations:** These should be arranged in the column near the original data so that their presence may be easily noted.
- vii. **Size of columns:** This should be according to the requirement.
- viii. **Arrangements of items:** This should be according to the problem.
- ix. **Special emphasis:** This can be done by writing important detail bold or special letters.
- x. **Unit of measurement:** The unit should be noted below the lines.
- xi. **Approximation:** This should also be noted below the title.
- xii. **Footnotes:** These may be given below the table.
- xiii. **Total:** totals of each column and grand total should be in one line.
- xiv. **Source:** source of data must be given. For primary data, write primary data.

It is always necessary to present fact in a tabular for if they can be presented more simply in the body of the text. Tabular presentation enables the reader to follow it more quickly than textual presentation. A table should not merely repeat information covered in the text. The same information should not, of course, be presented in tabular form and graphical form. Smaller and simpler tables may be presented in the text, while the large and complex tables may be placed at the end of the chapter or report.

## TOOLS FOR ANALYSIS

### CHI SQUARE TEST

Chi square test is applied in statistics to test the goodness of fit to. verify the distribution of observed data with assumed theoretical distribution. Therefore, it is a measure to study the divergence of actual and expected frequencies. It has great use in statistics, specially in sampling studies, where we expect a doubted coincidence between actual and expected frequencies, and the extend to which the difference can be ignored, because of fluctuations in sampling. If there is no difference between the actual and expected frequencies,  $\chi^2$  is zero. Thus, the Chi square test describes the discrepancy between theory and observation.

#### Characteristics of $\chi^2$ test

- Test is based on events of frequencies,- where as in theoretical distribution, the test is based on mean and standard deviation.
- To draw inferences, this test is applied, specially testing the hypothesis but not useful for estimation.
- The test can be used between the entire set of observed and expected frequencies.
- For every increase in the number of degree of freedom, a new  $\chi^2$  distribution is formed.
- It is a general purpose test and as such is highly useful in research.

#### Assumptions

1. All the observations must be independent.



2. All the events must be mutually exclusive.
3. There must be large observations.
4. For comparison purposes, the data must be in original units.

### Degree of Freedom

When we compare the computed value of  $\chi^2$  with the table value the degree of freedom is evident. The degree of freedom means the number of classes to which values can be assigned at will, without violating restrictions. For e.g., we choose any four numbers, whose total is 50. Here we have a choice to select any three numbers, say 10, 15, 20 and the fourth number is 5, [50 – (10 + 15 + 20)]. Thus our choice of freedom is reduced by one, on the condition that the total be 50. Therefore the restriction placed on the freedom is one and degree of freedom is three. As the restrictions increase, the freedom is reduced. Thus,

$$V - n - K$$

V : (nu) = Degree of freedom

K : Number of independent constraints

n : Number of frequency classes.

For a contingency table,  $2 \times 2$ , table, the degree of freedom is

$$V = (C-1) (r-1)$$

$$= (2-1) (2-1)$$

$$= 1.$$

### Uses

$\chi^2$  test of goodness of fit. Through the test we can find out the deviations between the observed values and expected values. Here we are not concerned with the parameters but concerned with the form of distribution. Karl Pearson has developed a method to test the difference between the theoretical value (hypothesis) and the observed value. The test is done by comparing the computed value with the table value of  $\chi^2$  for the desired degree of freedom. A greek letter  $\chi^2$  is used to describe the magnitude of difference between the fact and theory.

The  $\chi^2$  may be defined as

$$\chi^2 = \sum \left\{ \frac{(O - E)^2}{E} \right\}$$

O = observed frequencies

E = Expected frequencies.

### Steps

- A hypothesis is established along with the significance level.
- Compute deviations between observed value and expected value (O-E).
- Square the deviations calculated (O-E)<sup>2</sup>.
- Divide the (O-E)<sup>2</sup> by its expected frequency.
- Add all the values obtained in step 4.
- Find the value of  $\chi^2$ , from  $\chi^2$  table at certain level of significance, usually 5% level.



If the calculated value of  $\chi^2$  is greater than the tabled value of  $\chi^2$ , at certain level of significance, we reject the hypothesis. If the computed value of  $\chi^2$  value is zero then, the observed value and expected values completely coincide. If the computed value of  $\chi^2$  is less than the table value, at a certain degree of level of significance, it is said to be non significant. This implies that the discrepancy, between the observed and expected frequencies in simple sampling.

### $\chi^2$ as a test of independence

$\chi^2$  test can be used to find out whether one or more attributes are associated or not. For example, coaching class and successful candidate, marriage and failure, etc; we can find out whether they are related or independent we take a hypothesis that the attributes are independent. If the calculated value of  $\chi^2$  is less than the tabled value at a certain level of significance, the hypothesis is correct and vice versa.

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Expected value =  $\frac{\text{Row Total (R.T)} \times \text{Column Total (C.T)}}{\text{Grand Total (G.T)}}$



## UNIT – V INTERPRETATION

### **REPORT WRITING AND ITS SIGNIFICANCE**

Research report is considered a major component of the research study for the research task remains incomplete till the report has been presented and/or written. As a matter of fact, even the most brilliant hypothesis, highly well designed and conducted research study, and the most striking generalizations and findings are of little value unless they are effectively communicated to others. The purpose of research is not well served unless the findings are made known to others. Research results must invariably enter the general store of knowledge. All this explains the significance of writing research report. There are people who do not consider writing of report as an integral part of the research process. But the general opinion is in favour of treating the presentation of research results or the writing of report as part and parcel of the research project. Writing of report is the last step in a research study and requires a set of skills somewhat different from those called for in respect of the earlier stages of research. This task should be accomplished by the researcher with utmost care; he may seek the assistance and guidance of experts for the purpose.

### **STEPS IN WRITING REPORT**

Research reports are the product of slow, painstaking, accurate inductive work. The usual steps involved in writing report are: (a) logical analysis of the subject-matter; (b) preparation of the final outline; (c) preparation of the rough draft; (d) rewriting and polishing; (e) preparation of the final bibliography; and (f) writing the final draft. Though all these steps are self explanatory, yet a brief mention of each one of these will be appropriate for better understanding.

#### **Logical analysis of the subject matter:**

It is the first step which is primarily concerned with the development of a subject. There are two ways in which to develop a subject (a) logically and (b) chronologically. The logical development is made on the basis of mental connections and associations between the one thing and another by means of analysis. Logical treatment often consists in developing the material from the simple possible to the most complex structures. Chronological development is based on a connection or sequence in time or occurrence. The directions for doing or making something usually follow the chronological order.

#### **Preparation of the final outline:**

It is the next step in writing the research report. Outlines are the framework upon which long written works are constructed. They are an aid to the logical organisation of the material and a reminder of the points to be stressed in the report.

#### **Preparation of the rough draft:**

This follows the logical analysis of the subject and the preparation of the final outline. Such a step is of utmost importance for the researcher now sits to write down what he has done in the context of his research study. He will write down the procedure adopted by him in collecting the material for his study along with various limitations faced by him, the technique of



analysis adopted by him, the broad findings and generalizations and the various suggestions he wants to offer regarding the problem concerned.

### **Rewriting and polishing of the rough draft:**

This step happens to be most difficult part of all formal writing. Usually this step requires more time than the writing of the rough draft. The careful revision makes the difference between a mediocre and a good piece of writing. While rewriting and polishing, one should check the report for weaknesses in logical development or presentation. The researcher should also see whether or not the material, as it is presented, has unity and cohesion; does the report stand upright and firm and exhibit a definite pattern, like a marble arch? Or does it resemble an old wall of moldering cement and loose brick. In addition the researcher should give due attention to the fact that in his rough draft he has been consistent or not. He should check the mechanics of writing—grammar, spelling and usage.

Preparation of the final bibliography: Next in order comes the task of the preparation of the final bibliography. The bibliography, which is generally appended to the research report, is a list of books in some way pertinent to the research which has been done. It should contain all those works which the researcher has consulted. The bibliography should be arranged alphabetically and may be divided into two parts; the first part may contain the names of books and pamphlets, and the second part may contain the names of magazine and newspaper articles. Generally, this pattern of bibliography is considered convenient and satisfactory from the point of view of reader, though it is not the only way of presenting bibliography. The entries in bibliography should be made adopting the following order:

For books and pamphlets the order may be as under:

1. Name of author, last name first.
2. Title, underlined to indicate italics.
3. Place, publisher, and date of publication.
4. Number of volumes.

### **Example**

Kothari, C.R., *Quantitative Techniques*, New Delhi, Vikas Publishing House Pvt. Ltd., 1978.

For magazines and newspapers the order may be as under:

- 1) Name of the author, last name first.
- 2) Title of article, in quotation marks.
- 3) Name of periodical, underlined to indicate italics.
- 4) The volume or volume and number.
- 5) The date of the issue.
- 6) The pagination.

### **Example**

Robert V. Roosa, *Coping with Short-term International Money Flows*, The Banker, London, September, 1971, p. 995.





The above examples are just the samples for bibliography entries and may be used, but one should also remember that they are not the only acceptable forms. The only thing important is that, whatever method one selects, it must remain consistent.

Writing the final draft: This constitutes the last step. The final draft should be written in a concise and objective style and in simple language, avoiding vague expressions such as it seems, there may be, and the like ones. While writing the final draft, the researcher must avoid abstract terminology and technical jargon. Illustrations and examples based on common experiences must be incorporated in the final draft as they happen to be most effective in communicating the research findings to others. A research report should not be dull, but must enthuse people and maintain interest and must show originality. It must be remembered that every report should be an attempt to solve some intellectual problem and must contribute to the solution of a problem and must add to the knowledge of both the researcher and the reader.

### **TYPES OF REPORTS**

Research reports vary greatly in length and type. In each individual case, both the length and the form are largely dictated by the problems at hand. For instance, business firms prefer reports in the letter form, just one or two pages in length. Banks, insurance organisations and financial institutions are generally fond of the short balance-sheet type of tabulation for their annual reports to their customers and shareholders. Mathematicians prefer to write the results of their investigations in the form of algebraic notations. Chemists report their results in symbols and formula. Students of literature usually write long reports presenting the critical analysis of some writer or period or the like with a liberal use of quotations from the works of the author under discussion. In the field of education and psychology, the favourite form is the report on the results of experimentation accompanied by the detailed statistical tabulations. Clinical psychologists and social pathologists frequently find it necessary to make use of the case-history form.

News items in the daily papers are also forms of report writing. They represent firsthand on-the scene accounts of the events described or compilations of interviews with persons who were on the scene. In such reports the first paragraph usually contains the important information in detail and the succeeding paragraphs contain material which is progressively less and less important.

Book-reviews which analyze the content of the book and report on the author's intentions, his success or failure in achieving his aims, his language, his style, scholarship, bias or his point of view. Such reviews also happen to be a kind of short report. The reports prepared by governmental bureaus, special commissions, and similar other organisations are generally very comprehensive reports on the issues involved. Such reports are usually considered as important research products. Similarly, Ph.D. theses and dissertations are also a form of report-writing, usually completed by students in academic institutions.

The above narration throws light on the fact that the results of a research investigation can be presented in a number of ways viz., a technical report, a popular report, an article, a monograph or at times even in the form of oral presentation. Which method(s) of presentation to be used in a particular study depends on the circumstances under which the study arose and



the nature of the results. A **technical report** is used whenever a full written report of the study is required whether for record keeping or for public dissemination. A **popular report** is used if the research results have policy implications. We give below a few details about the said two types of reports:

#### A. Technical Report

In the technical report the main emphasis is on (i) the methods employed, (ii) assumptions made in the course of the study, (iii) the detailed presentation of the findings including their limitations and supporting data.

A general outline of a technical report can be as follows:

1. **Summary of results:** A brief review of the main findings just in two or three pages.
2. **Nature of the study:** Description of the general objectives of study, formulation of the problem in operational terms, the working hypothesis, the type of analysis and data required, etc.,
3. **Methods employed:** Specific methods used in the study and their limitations. For instance, in sampling studies we should give details of sample design viz., sample size, sample selection, etc.,
4. **Data:** Discussion of data collected, their sources, characteristics and limitations. If secondary data are used, their suitability to the problem at hand be fully assessed. In case of a survey, the manner in which data were collected should be fully described.
5. **Analysis of data and presentation of findings:** The analysis of data and presentation of the findings of the study with supporting data in the form of tables and charts be fully narrated. This, in fact, happens to be the main body of the report usually extending over several chapters.
6. **Conclusions:** A detailed summary of the findings and the policy implications drawn from the results be explained.
7. **Bibliography:** Bibliography of various sources consulted be prepared and attached.
8. **Technical appendices:** Appendices be given for all technical matters relating to questionnaire, mathematical derivations, elaboration on particular technique of analysis and the like ones.
9. **Index:** Index must be prepared and be given invariably in the report at the end. The order presented above only gives a general idea of the nature of a technical report; the order of presentation may not necessarily be the same in all the technical reports.
10. This, in other words, means that the presentation may vary in different reports; even the different sections outlined above will not always be the same, nor will all these sections appear in any particular report.
11. It should, however, be remembered that even in a technical report, simple presentation and ready availability of the findings remain an important consideration and as such the liberal use of charts and diagrams is considered desirable.

#### B. Popular Report



The popular report is one which gives emphasis on simplicity and attractiveness. The simplification should be sought through clear writing, minimization of technical, particularly mathematical, details and liberal use of charts and diagrams. Attractive layout along with large print, many subheadings, even an occasional cartoon now and then is another characteristic feature of the popular report. Besides, in such a report emphasis is given on practical aspects and policy implications.

We give below a general outline of a popular report.

1. **The findings and their implications:** Emphasis in the report is given on the findings of most practical interest and on the implications of these findings.
2. **Recommendations for action:** Recommendations for action on the basis of the findings of the study is made in this section of the report.
3. **Objective of the study:** A general review of how the problem arise is presented along with the specific objectives of the project under study.
4. **Methods employed:** A brief and non-technical description of the methods and techniques used, including a short review of the data on which the study is based, is given in this part of the report.
5. **Results:** This section constitutes the main body of the report wherein the results of the study are presented in clear and non-technical terms with liberal use of all sorts of illustrations such as charts, diagrams and the like ones.
6. **Technical appendices:** More detailed information on methods used, forms, etc. is presented in the form of appendices. But the appendices are often not detailed if the report is entirely meant for general public.

There can be several variations of the form in which a popular report can be prepared. The only important thing about such a report is that it gives emphasis on simplicity and policy implications from the operational point of view, avoiding the technical details of all sorts to the extent possible.

## **CONTENTS OF REPORT**

### **I. Introduction:**

The research report should ordinarily start with a statement of the problem selected for investigation. The reporter should introduce the background and nature of the problem under investigation.

Although quite a few times the study might be posing a simple empirical question about human behaviour or might be directed toward a practical problem or some policy-issue, the researcher must place the question or the issue into a larger, theoretical or practical context. This helps the readers to appreciate why the problem is of a general significance and theoretic import.

If the enquiry was planned with a view to making some contribution to certain aspects of social theory, the reporter should summarise the theory or conceptual scheme within which the reporter/researcher is working. Regardless of the nature of the study, it is important that an



intelligent but, may be, a non-professional person would be able to understand the nature of problem and appreciate its larger relevance.

The report should not contain a lot of jargon except when there is no feasible alternative to it, certain constraints warranting its use. The reader is not always prepared to intelligibly appreciate the problem of research, he is often not conversant with the relevant theoretic structure.

Hence, it is important that the general reader is gradually led up to the formal theoretic statement of the problem. Intelligible examples are necessary for illustrating theoretic ideas and the technical terms.

It is extremely desirable that a summary of the current state of knowledge in the area of investigation is presented, once the problem of the study is explained. The summary should comprise allusions to the previous researches conducted in the problem-area, and pertinent theories relating to the phenomena (if any).

A researcher must have familiarized himself with the previous work in the field before designing the study. Most of the literature search should have been done by the time the researcher is ready to write the report.

If the researcher was required to recast his study in a somewhat different framework than his initial problem would warrant, he would need to give references he had not previously consulted.

That is, he will be obliged to go back to the literature which in the light of the above shift has become relevant. Review of previous work should comprise only the pertinent findings and insights relating to the issue the researcher is dealing with.

If such a review article already exists, the researcher will do well to simply address his readers to the review article and present only the bare highlights in the report. Books and articles need to be cited with the author's last name and year of publication.

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Towards the end of the section on introduction, it is desirable that the researcher introduces his own study in a brief overview. This affords a smooth transition into the method section which follows the introductory section.

## **II. Method (Design of Study):**

The readers of the report do like to know in detail how the research was carried out and what its basic design was like. Suppose the research involved experimentation, the readers would like to know the nature of experimental manipulation; the method and points at which measurements were taken and so on.

The readers also need to know, in case of the descriptive and exploratory studies, how the data were collected, the nature of questions asked, the strategies adopted by interviewers during the collection of data, the training they had and the recording procedure adopted for recording of responses.

The readers also need to know how the observations or replies to questions were translated into measures of the variables with which the enquiry was concerned, in the main, e.g., what questions were asked to estimate the degree of 'commitment' or alienation.

In regard to the sample covered by the study with a view to arriving at general conclusions about the population which the sample supposedly represents, the readers are expected to be told about the general character of the subjects, the number of them covered by the sample, mode of selection etc.

Information on these points is crucial for understanding the probable limits of generalizability of the findings, i.e., whether there is any justifiable basis for extending the sample findings to the population.

This information can betray the biases of the researcher in selecting the subjects for the study. Thus, the claim of the researcher as to generalizability of findings to population at large could be evaluated.

Although meaningful studies based on a small number of cases barely representing a specifiable population are possible, nevertheless, the number of characteristics of the respondent on which the findings are based must be plainly reported so that readers are enabled to arrive at their own verdict regarding the applicability of the given findings to other groups similarly placed in the social structure.

If the researcher has conducted a complex experiment, the report should include some description of the study as it was seen from the viewpoint of the subjects.



This would involve a description of the subjects, the experimental setting, and the variables assessed. The sequence of events in a chronological order also needs to be presented to the reader, who, in a sense, is carried through the experience as though he was a subject.

Even if the reporter customarily reproduces the complete questionnaire/schedule or testing scales in the appendix to the report, a summary of stimulus items, a sample of questionnaire items and scale-items should be included in this section of the report. All this goes a long way toward giving the reader a feel of what it would have been like to be a subject.

This has an important bearing on the interpretation of study results, and understandably, the reader is placed thereby in a position to judge the worth of the study results. In quite a few studies the subject/participants are called upon to cooperate actively in the research enterprise.

The report should advisedly make a mention of how the participants in the research were compensated for their time and effort and if there was deception practiced on them in the course of the study. Such unethical practices like deception or misinformation about the procedure cannot unfortunately be dispensed with in certain studies.

The readers need to be told how these human participants were told about these practices afterwards, the amount of freedom afforded to subjects in the matter of withdrawing their participation, subjection to threats, concealed observations of them, strategies for protecting their anonymity etc., should also be faithfully reported.

### **III. Results of the Study:**

The section is closed generally with statement that informs the conclusions reached as also the qualifications imposed upon them by the conceptual and practical difficulties faced by the researcher in executing the study-design in a manner he would ideally have desired.

But if the researcher wishes to present different kinds of results before he is able to integrate them or draw any inferences based on them or if he wants to discuss certain matters in the final discussion then the discussion section is better presented separately.

Of course, even here there cannot be a pure results section without an attendant discussion. Before the researcher can present his main results there are, in the main, 'two preliminary things that must concern him. Firstly, he needs to present proof that his study has ensured the conditions for testing the hypotheses and/or for answering the research questions.

For example, if the study required of the researcher that he produce two groups radically differing from each other in the character of their emotions, the report must demonstrate that the ratings on the two groups were conclusively different and it was not that the difference occasioned as a matter of chance.



In case the investigation required observers to record behaviour of the judges entrusted with rating the responses, the report should present quantitative proof of reliability of the recordings or ratings.

The result section should usually begin with a discussion on the safeguards and strategies adopted by the researcher to negate bias and unreliability in the course of the study. It is quite possible that some of these matters would have already found a place in the method section.

It is equally likely that in some studies discussion on these matters is rightly postponed to the final discussion section, where researcher tries to adduce alternative explanations of the study results.

What should be included at the beginning of the results section so that the readers are satisfied that the stage was successfully set for testing the research hypotheses, is a decision which would be governed by an understanding of the overall state of study results. No hard and fast rules lead to this decision.

Secondly, the method of data-analysis is a matter to be dealt with at the beginning of the results section. The researcher needs to describe the procedure adopted by him in converting his observations into data that may be readily analysed and the procedure adopted for coding and articulation of different observer's ratings.

The readers must be told next, about the statistical analysis itself. If this analysis was unconventional or unorthodox and warranted certain statistical assumptions, a detailed discussion giving out the rationale for it, is called for. This could be the place in the report to afford the readers an overview of the results section, if it is fairly complicated.

The general rule of reporting research findings is to commence with the central findings and then move on to the more peripheral ones. This rule is also applicable to the sub-sections and it is advisable that the basic findings are stated first, followed by elaborations of them, as needed.

**IV. If the beginning is made with the most central results, the progress in reporting should follow the line suggested below:**

The researcher should remind the readers in a conceptual mould, about the question he is asking. For example, is democratic classroom atmosphere more conducive to learning by students as compared to the authoritarian atmosphere?

1. Secondly, the reporter should remind the readers of the actual operations performed or the actual behaviour measured (which was assumed to be the empirical referent of learning or democratic atmosphere, in our example).
2. The answer to the question which surfaced as a result of the study should be made known to the readers immediately and unequivocally.
3. Relevant supporting numbers or figures, substantiating the study result should be given out. For example,  $x^2 = 11.2$ ,  $df = 2$ . This should be followed by an elaboration of the overall



conclusions. Limitations imposed upon these conclusions by certain factors which might have operated to produce results that may not be expected in a larger class of such situations should be honestly spelt out.

4. It is necessary that every finding involving a comparison, e.g., between democratic and authoritarian classroom atmospheres, between certain groups or relationship between variables should be accompanied by its statistical level of significance. Failing this, the readers would have no basis of knowing whether or not the findings may be attributed to the chance factor.

The inferential statistics though important, do not constitute the core of the narrative and should be subordinated to the substantive results. The real purpose of descriptive statistics or indices should be to present to the readers the behaviour of people as vividly as possible. Effective reporting aims at giving to the readers a 'feel' of the observed behaviour.

5. Ordinarily, in a detailed research report intended for a knowledgeable readership, every finding considered sufficiently important as to merit some emphasis should be accompanied by a table or graph or figure showing the relevant data. Thus, the reader is in a position to grasp the findings by reading the narration or by looking at the tables or figures, embodying result of interest.

As the writing on the section on results progresses, the reporter should continually keep summarizing and updating the readers' fund of information lest they should be required to look back time and again, to keep in touch with the major points of the researcher's thesis.

Towards the end of this section, is demonstrated the statistical reliability of the results. It is often useful to illustrate how particular individuals covered by the study behaved. Besides the illustrative function, this adds richness to the study-findings.

#### **6. Discussion:**

Especially for the more complex studies having more abstract and extensive implications, discussion constitutes a separate section. The section on discussion forms a coherent narration with the introductory section of the report.

Concerns of central importance to the researcher in view of his problem and hence embodied in the introduction section should appear again in the discussion for the discussion proceeds from the specific matters about the study through the more abiding and general concerns to the most inclusive generalization the researcher wishes to make.

Each of the new statements made in the discussion section should contribute something fresh to the reader's understanding of the problem. The inferences that may be drawn from the findings should be clearly presented. These may often be at a high level of abstraction. If this be the case, the conceptual or theoretic linkages would need to be explicated.

Let us take an example. If the investigator has found better performance in terms of learning on the part of students, in classroom situations characterized by a 'democratic' atmosphere (democratic atmosphere in the classroom may be said to be characterized





tentatively by the freedom allowed to students in respect of choosing the problems for discussion, electing the discussion leader, counter questioning the teacher, etc.), the investigator may conclude that in other situations where such freedom is allowed to participants, i.e., of choosing their problems for discussion or electing their own discussion leader, etc., similar effects will be seen.

However, the researcher may wish to carry his inference to a higher level of abstraction, especially if there is some partially developed theory to which it may be possible to link his finding or if there have been other studies in which the specific phenomena are different but these can be understood in terms of the same abstract principle.

For example, the investigator may find that the teachers in general feel dissatisfied or unhappy despite the improvement in their salary scales because the ‘others’ in comparable jobs whose salary scales too were subjected to an upward revision appear to them to have benefitted more by this scale revision.

The investigator may treat this state of affairs (characterized by dissatisfaction among teachers despite improvement in salary scales) as an instance of the more abstract concept of ‘relative’ deprivation.

On the basis of this abstract concept, the researcher may be able to link up the finding of his study to those of some other study which reported that in a community hit by a natural disaster some people who had themselves suffered loss of property and bereavement went out to help certain other families because the loss and bereavement suffered by these families as viewed by those who went out to help, was much greater compared to their own.

This phenomenon though different from the earlier one in concrete content, can be understood in terms of the same abstract principle which explains the dissatisfaction among teachers despite the increased objective gain.

The people who had incurred loss and bereavement in the second example compared their losses to those of the ‘significant others’ in the community and found that their own losses were much less or that they were much better compared to the ‘others’, and hence developed sympathy for these ‘others’ although objectively viewed, they themselves needed to be sympathized with.

The questions that still lie unanswered may also be alluded to. It is quite in order at this point to compare the results of the study with those reported by other investigators. The possible short-comings of the study should be honestly brought out.

The readers must be told about the conditions that might have limited the extent of legitimate generalization. Here, the readers should be reminded of the characteristics of the sample studied as also about the possibility that it might differ from the ‘population’ or ‘universe’ to which the researcher might want to generalize.



The specific characteristics of the method employed by the researcher which might have influenced the results or some factors that might have led to atypical results merit mention. The researcher should not, however, try to invest long involved long involved theories to explain away every 'bump' in the data.

On the contrary, if the study results suggest the beginnings of a new theory which injects amazing clarity into the data and affords a very meaningful view of the problem- area, it would be advisable to rewrite the entire report beginning with the new theory. The aim of scientific reporting is to provide the most informative, instructive and compelling framework for the study right from the first sentence.

#### **5. Summary or Abstract:**

In a way, the title of research report itself serve as part of the summary or abstract. Ideally, it conveys the content of the study as accurately and clearly as possible. A potential reader can on this basis decide whether or not to go ahead to read it. Those titles that mention both the dependent and independent variables are obviously the most informative ones.

#### **6. References:**

The section on references comprises a list of all books and articles cited in the text of the research report. These books and articles are arranged alphabetically according to the author's last name, a format that corresponds to the way in which they are cited in a book.

The reference should clearly indicate the name of the author, the title of the book or article, the journal in which it appears, the publisher, place of publication and the year of publication.

#### **7. Appendix:**

The appendix to a report consists of copies of materials used in the study, like questionnaire, attitude scale, stimulus materials, drawings of apparatuses, etc. This is expected to help a person who would like to replicate the study.

A second appendix might contain tables of data which are too extensive and seemingly too marginal to be included in the body of the report. This is in the nature of a good turn done to the potential researchers, for this enables them to explore the researcher's data in fine detail and to answer certain questions about the results that might not have occurred to the researcher.

### **DRAFTING A REPORT**

#### **Step 1: Decide on the 'Terms of reference'**

To decide on the terms of reference for your report, read your instructions and any other information you've been given about the report, and think about the purpose of the report:

- What is it about?
- What exactly is needed?
- Why is it needed?
- When do I need to do it?
- Who is it for, or who is it aimed at?



This will help you draft your Terms of reference.

#### Step 2: Decide on the procedure

This means planning your investigation or research, and how you'll write the report. Ask yourself:

- What information do I need?
- Do I need to do any background reading?
- What articles or documents do I need?
- Do I need to contact the library for assistance?
- Do I need to interview or observe people?
- Do I have to record data?
- How will I go about this?

Answering these questions will help you draft the procedure section of your report, which outlines the steps you've taken to carry out the investigation.

#### Step 3: Find the information

The next step is to find the information you need for your report. To do this you may need to read written material, observe people or activities, and/or talk to people.

Make sure the information you find is relevant and appropriate. Check the assessment requirements and guidelines and the marking schedule to make sure you're on the right track. If you're not sure how the marks will be assigned contact your lecturer. What you find out will form the basis, or main body, of your report – the findings.

#### Step 4: Decide on the structure

Reports generally have a similar structure, but some details may differ. How they differ usually depends on:

- The type of report – if it is a research report, laboratory report, business report, investigative report, etc.
- How formal the report has to be.
- The length of the report.

Depending on the type of report, the structure can include:

- A title page.
- Executive summary.
- Contents.
- An introduction.
- Terms of reference.
- Procedure.
- Findings.
- Conclusions.



- Recommendations.
- References/Bibliography.
- Appendices.
- The sections, of a report usually have headings and subheadings, which are usually numbered

### **Step 5: Draft the first part of your report**

Once you have your structure, write down the headings and start to fill these in with the information you have gathered so far. By now you should be able to draft the terms of reference, procedure and findings, and start to work out what will go in the report's appendix. Findings

The findings are result of your reading, observations, interviews and investigation. They form the basis of your report. Depending on the type of report you are writing, you may also wish to include photos, tables or graphs to make your report more readable and/or easier to follow. Appendices

As you are writing your draft decide what information will go in the appendix. These are used for information that:

- is too long to include in the body of the report, or
- supplements or complements the information in the report. For example, brochures, spreadsheets or large tables.

### **Step 6: Analyse your findings and draw conclusions**

The conclusion is where you analyse your findings and interpret what you have found. To do this, read through your findings and ask yourself:

- What have I found?
- What's significant or important about my findings?
- What do my findings suggest?

For example, your conclusion may describe how the information you collected explains why the situation occurred, what this means for the organisation, and what will happen if the situation continues (or doesn't continue).

Don't include any new information in the conclusion.

### **Step 7: Make recommendations**

Recommendations are what you think the solution to the problem is and/or what you think should happen next. To help you decide what to recommend:

- Reread your findings and conclusions.
- Think about what you want the person who asked for the report should to do or not do; what actions should they carry out?
- Check that your recommendations are practical and are based logically on your conclusions.



- Ensure you include enough detail for the reader to know what needs to be done and who should do it.

Your recommendations should be written as a numbered list, and ordered from most to least important.

### **Step 8: Draft the executive summary and table of contents**

Some reports require an executive summary and/or list of contents. Even though these two sections come near the beginning of the report you won't be able to do them until you have finished it, and have your structure and recommendations finalised.

An executive summary is usually about 100 words long. It tells the readers what the report is about, and summarise the recommendations.

### **Step 9: Compile a reference list**

This is a list of all the sources you've referred to in the report and uses APA referencing.

### **Step 10: Revise your draft report**

It is always important to revise your work. Things you need to check include:

- If you have done what you were asked to do. Check the assignment question, the instructions/guidelines and the marking schedule to make sure.
- That the required sections are included, and are in the correct order.
- That your information is accurate, with no gaps.
- If your argument is logical. Does the information you present support your conclusions and recommendations?
- That all terms, symbols and abbreviations used have been explained.
- That any diagrams, tables, graphs and illustrations are numbered and labelled.
- That the formatting is correct, including your numbering, headings, are consistent throughout the report.
- That the report reads well, and your writing is as clear and effective as possible