-The study of Research methodology gives the student the necessary training and gathering material and arranging or card indexing them participation in the field work when required and also training in techniques for the collection of data appropriate to particular problems.

-Importance of knowing the methodology of research or how research is done stems from the following consideration:

1. For one who is preparing himself for a career of caring out research, the importance of knowing the research methodology and research techniques is obvious since the same constitutes the tools of his trade.

-The knowledge of methodology provides good training especially to the new research worker and enable him to do better research.

-It helps him to develop disciplined thinking to observe the field objectively

1. Knowledge of how to do research inculcate the ability to evaluate and use research results with reasonable confidence.

-In other words the knowledge of research methodology is helpful in various fields such as govt or business administration, community development & social work where persons are increasingly call upon to evaluate and use research results for action.

1. One may have the satisfaction of acquiring a new intellectual tool which can become a way of looking at the world and of judging everyday experience.

-Accordingly, It enables us to make intelligent decision concerning problem facing us in practical life at different point of time. Thus, the knowledge of research methodology provides tools to look at things in life objectively.

1. In this scientific age all of us in many ways consume us of research results and we can use it intelligently provided we are able to judge the adequacy of the method by which they have been obtained.

-The knowledge of methodology helps the consumer of the research results evaluate them and enables him to take rational decisions.

**RESEARCH PROCESS**

-It consist of series of actions or steps necessary to a effectively carry out research and the desired sequence of these step;

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Formulation hypothesis

Define research

Problem

Review concepts & theories

Review previous research finding

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Analyze Data

(Test hypothesis)

Design research

(Including sample design)

Collect Data

(Execution)

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Interpret and report

**1) FORMULATION OF THE RESEARCH PROBLEM**

-There are 2 types of research problems i.e. Those which relates to the state of nature and those which relates to the r/ship btw variables.

-At the every outset the researcher must single out the problem he wants to study.

-He must decide the general area of interest or aspect of a subject matter that he will like to inquire into.

-Initially the problem may be stated in abroad general way and then the ambiguities relating to the problems if any be solved.

-The feasibility of a particular solution has to be considered before a working Formulation of the problem can be set up.

**2).EXTENSIVE LITERATURE SURVEY**

Once a problem is formulated, a brief summary of it should be written down.

-At this young juncture the researcher should undertake extensive literature survey connected to the problem.

-In this process it should be remembered that one process would lead to the other.

-The earlier study, if any, which are similar to the study in hand should be carefully studied.

-A good library would be of a great help to the researcher at this stage.

3)**DEVELOPMENT OF A WORKING HYPOTHESIS**

-After extensive literature survey researcher should set clear terms of hypothesis/hypotheses.

-The working hypothesis are assumption made in order to draw out and test its logical and imperical consequences.

-As such the manner in which research hypothesis are developed is particularly important since they provide the focal (beginning) point for the research.

-They also affect the manner in which test must be conducted in the analysis of data and indirectly the quality of data which is required for analysis.

-The role of hypothesis is to guide the researcher by delimiting the area of research and to keep him on the right track.

-It sharpens his thinking and focuses attention on the more important facets of the problem.

-It also indicates the type of data required and the type of methods of data analysis to be used.

-**How does one go about developing a working hypothesis?**

1) Discussion with colleagues and experts about the problem, its origin and the objectives in seeking a solution.

2) Examination of data records, if available, concerning the problem for possible trends, peculiarity and other clues.

3) Review of similar studies in the area or of the study on similar problems.

4)Exploratory personal investigation which involves original field interview for a limited scale with interested parties and individuals with a view to secure a greater insight in to the practical aspect of the problem.

NB: Working hypothesis arise as a result of priori-thinking about the subject, examination of the available data and material including related studies and the council of experts and interested parties.

-Working hypothesis are useful when stated in precise and clearly defined terms.

**4. PREPARING THE RESEARCH DESIGN**

* The research problem having been formulated in clear cut terms the researcher will be required to prepare a research design i.e. He will have to state the conceptual structure within which research will be conducted.
* The prepared of such a design facilitate research to be as efficient as possible yielding maximum information. In other words the function of a research design is to facilitate/provide for the collection of relevant evidence with minimal expenditure of effort, time & money.
* There are several research design such as experimental and non - experimental hypothesis testing.
* Experimental design can be either in formal design (such as before and after without control, after only with control, before and after with control) Or formal design (such as completely randomized design, randomized block design, Latin square design, Simple and complex Factorial design), Out of which the researcher must select one for his own project.

1. **DETERMINING A SAMPLE DESIGN.**

-All the items under consideration in any field of inquiry constitutes a universe or a “population”.

-A complete enumeration of all items in the population is known as a census inquiry.

-It can be presumed that in such an inquiry when all the items are covered element of chance is left and highest accuracy is obtained but in practice this may not be true. Even the slightest element of buyers in such an inquiry will get a larger and larger as the number of observation increases.

-Moreover, there is no way of checking the element of buyers or its extent except through resurvey or sample check.

-Besides, This type of inquiry involves a great deal of time, money & Energy.

-The researcher must design a way of selecting a sample or what is popularly known as Sample Design.

-Samples can either be probability or non-probability samples.

-With probability samples each element has a known probability of being included in the sample but the non-probability samples do not allow the researcher to determine this probability.

-Probability samples are those based on simple random sampling, Systematic sampling, Stratified sampling, Cluster/Area sampling whereas non-probability samples are those based on convenience sampling,Judgement sampling & Quota Sampling techniques.

**TYPES OF SAMPLE DESIGN**

1. Deliberate Sampling
2. Simple Random Sampling
3. Systematic Sampling
4. Stratified Sampling
5. Quota Sampling
6. Cluster and Area Sampling
7. Multi – Stage sampling
8. Sequential sampling

1) **DELIBERATE SAMPLING**

-It also known as purposive or non – probability sampling.

-The sampling method involves deliberate/purposive selection of particular units of the universe for constituting a sample which represents the universe. When population element are selected for inclusion in the samples based on the ease of access it is known as convenience sample.

-If a researcher wishes to secure data from, say, Gasoline buyer he may select a fixed number of petrol station and may conduct interviews in this stations, this will be an example of convenience samples of gasoline buyers.

-At a times, such a procedure may give very biased results particularly when the population is not homogenous.

-On the other hand in judgmental sampling, the researchers’ judgment is used for selecting items which he considers as representative of population.

-Judgement sampling is used quite frequently in qualitative research where the desire happens to be to develop hypothesis rather than to generalize to large population.

1. **SIMPLE RANDOM SAMPLING**

-This type of sampling is also known as chance sampling or probability sampling where each and every item in the population has an equal chance of inclusion in the sample and each one of the possible sample, in case of finite universe has the same probability of being selected e.g. If we have to select a sample of 300 items from a universe of 15000 items then we can put the names or numbers of all the 15000 items on slips of paper and conduct a lottery.

-When a number exceeds the limit of the numbers in the frame, in our case over 15000,it simply passed over and the next number selected that does not fall within the relevant range.

**3. SYSTEMATIC SAMPLING**

-In some instance the most practical way of sampling is to select every 15th name on a list, every 10th house on one side of a street and so on.

-Sampling of this type is known as systematic sampling.

-An element of randomness is usually introduced into this kind of sampling by using random numbers to pick up the unit with which to start. This procedure is useful when sampling frame is available in the form of a list.

-In such a design, the selection process starts by picking some random points in the list and then every nth element is selected until the desired number is secured.

**4. STRATIFIED SAMPLING.**

-If the population from which a sample is to be drawn, does not constitute a homogeneous group then stratified sampling technique is applied so as to obtain representative sampling.

-In this technique, the population is stratified into a number of a non-overlapping sub-population or strata and sample items are selected are selected from each stratum.

-If the items selected from each stratum is based on simple random sampling the entire procedure, first stratification and then simple random sampling is known as stratified random sampling.

**5. QUOTA SAMPLING**

-In stratified sampling the cost of taking random samples from individual strata is often so expensive such that interviewers are simply given quota to be filled from different strata.

-The actual selection of items being left to the interviewers’ judgement.

-The size of the quota for each stratum is generally proportionate to the size of that stratum in the population.

-Quota sampling is thus an important form of non-probability sampling.

-Quota samples generally happen to be judgement samples rather than random samples.

**6. CLUSTER AND AREA SAMPLING**

-This involves grouping the population and then selecting the groups or the clusters rather than individual elements for inclusion in sampling.

-Suppose a departmental store wishes to sample its credit card holders, it has issued its card to 15000 customers, the sample size is to be kept say 450, for cluster sampling this list is of 15000 cards holders could be formed into 100 cluster of 150 card each.3 clusters might then be selected for the sample randomly.

-The sample size must often be larger than the simple random sample to ensure the same level of accuracy because is cluster sampling procedural potential for order buyers and other source of error is usually accentuated.

**AREA SAMPLING-**it is quite close to cluster sampling and is often talked about when the total geographical area of interest happens to be big one.

**-**in area sampling, we first divide the total area into a number of smaller non – overlapping areas,Generrally called geographical cluster, then a number of this smaller areas are randomly selected and all units in the small areas are included in the sample.

**-**Area sampling is speciously helpful where we do not have the list of population concerned. It also makes the field interviewing more efficient since interviewers can do many interviews at each location.

**7. MULTI – STAGE SAMPLING**

-This technique is meant for big enquires extending to a considerably large geographical area like an entire country.

-At 1st stage, a large primary sampling unit such as a state may be selected, then districts, then towns & finally certain families within the town.

**8. SEQUENTIAL SAMPLING**

-This design is usually adopted under acceptance sampling plan in the context of statistical quality control.

-It is a complex sample design where the ultimate size of the sample is not fixed in advance but is determined according to mathematical decisions on the basis of information yielded as survey progresses.

-The sample design to be used must be decided by the researcher taking into consideration the nature of the inquiry and other related factors

(6)**COLLECTION OF DATA**

-There are several ways of collecting appropriate data which differs considerably in context of money costs, time and other resources at the disposal of the researcher.

-Primary Data can be collected either through survey or experiment.

-If the researcher conducts an experiment, He observes some quantitative measurements or the Data with the help of which he examines the truth contained in his hypothesis.

-The following are ways of collecting data:

1. Observation
2. Mailed questionnaire
3. Questionnaires
4. Telephone interviews
5. Through schedules.
6. **OBSERVATION**

-Here the investigator do his own observation without interviewing his respondents.

-The information obtained relates to what is currently happening and is not complicated by either the past behavior or future intensions or attitudes of respondents.

-This method is not an expensive method and information provided is also very limited.

-As such this method is not suitable in enquiries where large samples are concerned.

**b. PERSONAL INTERVIEW**

-The investigator follows a rigid procedure and 6 answers to a set of pre-conceived questions through personal interviews.

-This method is usually carried out in a structured way where output depends upon the ability of the interviewer to large extent.

**c. THROUGH TELEPHONE INTERVIEWS**

-This method involves conducting the respondent on telephone himself.

-This is not a very widely used method but it plays an important role in industrial surveys in developed regions particularly when the survey has to be accomplished in a very limited time.

**d. MAILED QUESTIONNAIRRES**

**-**The researcher and the respondent do come in conduct with each other if this method of survey is to be adopted.

-Questionnaires are mailed to the respondents with a request to return after completing the same.

-It is the most extensively used method in various economic and business service.

-Before applying this method usually a pilot study for testing the questionnaires is conduced which reveals the weaknesses if any of the questionnaires.

-Questionnaires to be used must be prepared very carefully so that it may prove to be effective in collecting relevant information.

**e. Through schedules.**

-under this method enumerator are pointed and given training.

-They are provided with schedules containing relevant questions.

-This enumerators go to respondent with this schedule.

-Data collected by filling up the schedules by enumerators on the basis of replies given by respondents.

NB. The researcher should select one of this method of collecting data taking into consideration the nature of investigation, objective and scope of inquiry, financial resources, available time & desired degree of accuracy.

**(7). EXECUTION OF THE PROJECT**

-If the execution of the project proceeds on correct lines the data to be collected should be adequate and dependable.

-The researcher should see that the project is executed in a systematic manner and in time.

-If survey is to be conducted by means of structured questionnaires data can be readily or machine processed.

-In such a situation question as well as possible answers may be coded.

-If the data is to be collected through interviewers arrangement should be met for proper selection and training of interviewers.

**(8) ANALYSIS OF DATA**

-After the data has been collected the researcher turns to the task of analyzing them.

-The analyzing of data requires a number of closely related operating such as establishment of categories, the application of this categories to raw data through coding, tabulation & drawing statistical/interviews

-**Coding** operation is usually done at this stage through which the categories of data are transformed into symbols that may be tabulated and counted.

-Editing is the procedure used to improve the quality of the data for coding.

-**Tabulation** –it is a part of technical procedure where in the classified data are put in the form of tables.

-The mechanical devices can be used at this juncture.

**(9) HYPOTHESIS TESTING**

-Various tests such as chi-square,t-test & F-test have been developed by the statistician for the purpose.

-The hypothesis may be tested through the use of one or more of such test depending upon the nature and objective of research inquiry.

-If the researcher had hypothesis to start with generalization established on the basis of data may be stated as hypothesis to be tested by sub-sequent researches by time to come

**(10). GENERALIZATION & INTERPRETATION.**

-If a hypothesis is tested and upheld several times it may be possible for the researcher to arrive at generalization.ie to build a theory.

-If the researcher had no hypothesis to start with, he might seek to explain his findings in the basis of some theory, it is known as interpretation.

**(11).PREPARATION OF REPORT & BASIS**

-Writing a report must be done with great care keeping in view the following:

1. The layout of the report should be as follows:

* The preliminary pages
* The main text
* The end matter

-In its preliminary pages the report should carry title and date followed by forewords.

-The main text of the report should have the following:

* Introduction
* Summary findings
* Main report
* Conclusion.

1. Report should be written in a concise & objective style in simple language avoiding vague expressions such as “it seems, “there may be” and the like.
2. Charts and illustrations in the main report should be used only if they present information more clearly and forcibly.
3. Calculated “confidence limit” must be mentioned and the various constraints expressed in conducting research operations as well be stated.

**CRITERIA OF A GOOD RESEARCH**

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

-The validity and reliability of the data should be checked carefully

6. Conclusions should be confined to those justified by the data of the research and limited to those of which the data provide an adequate basis,

7. Greater confidence in research is warranted if the researcher is experienced, has a good reputation in research and is a person of integrity.

**QUALITIES OF A GOOD RESEARCH**

* A good research is systematic i.e. it is structured with specified steps to be taken in a specified sequence in accordance with a well-defined set of rules.
* A good research is logical. This implies that research is guided by the rules of logic reasoning and the logical process of induction and deduction are of great values in carrying out research.

Induction-it is the process of reasoning from a part to the whole while Deduction is the process of reasoning from some premise to a conclusion which follows from that premise.

* A good research is empirical i.e. it is related one or more aspects of real situation and deals with concrete data that provides bases for external validity to research results.
* Good research is replicable i.e. it allows the research results to be verified by replicating the study and there by building a sound bases for decision.

**PROBLEMS ENCOUNTERED BY RESEARCHERS IN INDIA.**

1. The lack of scientific training in the methodology research.

-This is a great impediment for researchers in our country there is paucity of competent researchers.

-Many researchers take a leap in the dark without knowing research methods.

-Most of the work which goes in the name of research is not methodologically sound.

-Research to many researchers and even to their guides is mostly a scissor and paste job without any insights shed in the collated material.

-As such, efforts should be made to provide short duration intensive courses from meeting this requirement.

2. There is insufficient interaction between the university research department on one side and business establishments, govt departments and the research institutions on the other side.

-A great deal of primary data of non-confidential nature remain un-touched by the researcher for wants of proper contacts.

-Efforts should be made to develop satisfactory liaison among the concerned for better and realistic researchers.

3. Most of the business units in our country do not have the confidence that the material supplied by them to researchers would not be misused and their often reluctant in supplying the needed information to researchers.

4. Research studies overlapping one another are undertaken quite often for want of adequate information this leads to duplication and fritters away resources.

-This problem can be solved by proper compilation and revision at regular intervals of a lists of subject on which and the places where the research is going on.

5. There does not exist a code of contact for researchers and inter-universities & inter-departmental rivalries are quite common hence there is need to develop a code of contact for researchers which if adhered sincerely can win over this problem.

6. Many researchers in our country also face the difficulty of adequate & secretarial computance including computarial assistance. This cause unnecessary delays in the completion of research studies.

7. Library management is not satisfactory at many places and much of the time and energy of researchers are spent in tracing out the books, journals, reports, books etc.

8. There also the problem that many of our libraries are not able to get copies of old/new acts/rules, reports & other govt publication in time.

9. Difficulty of time availability of published data from various govt and other agencies doing this job in or country.

10. There may at a times take place the problem of conceptualization and also problem relating to process of data collection and related things.

**CHAPTER TWO**

***DEFINING A RESEARCH PROBLEM***

**-**A research problem in general refers to some difficulties which a researcher experiences in the context of either theoretical or practical situation or want to obtain a solution for the same.

**-The following are some of the condition that should be met for a research problem to exist:**

1. There must be an individual (group or organization),lets initialize it as ‘I’ to whom the problem can be attributed.

-The individual or the organization may occupy an environment say ‘N’ which is defined by values of uncontrolled variables ‘Y’

1. There must be at least two course of actions say ‘C1’ & ‘C2’ to be pursued.

-A course of action is defined by one or more values of variables controlled.

1. There must be at least two possible outcomes say ‘O1’ & ‘O2’ of the course of action which one should be preferable to the other i.e. an objective.
2. The course of action available must provide some chances of obtaining the objectives but they can’t provide the same chance otherwise the choice would not matter.

Components of a research problem

1. There must be an individual or group which has some difficulty or the problem.
2. There must be an objectives to be attained.

-If one wants nothing, one cannot have a problem.

1. There must be an alternative means or the course of action for obtaining the objectives one wishes to attain this means that there must be at least two means available to a researcher for if he has no choice of means, he cannot have a problem.
2. There must remain some doubts in the mind of a researcher with regard to the selection of alternatives.

-This means that research must answer the questions concerning the relevant efficiency of possible alternatives.

1. There must be environments to which the difficulty pertains.

CONCLUSION

-Thus a research problem is one that requires a researcher to find out the best solution for given problem i.e. to find out by which course of action the objective can be obtained optimally in the context of a given environment.

**SELECTING THE PROBLEM**

-The research problem undertaken for study must be carefully selected.

-The task is difficult one although it may not appear to be so.

-Help may be taken from a research guide in this connection.

-Every researcher must find out his own salvation for research problems for research problems cannot be borrowed.

-A problem must spring from the researchers mind like a plant springing from its own seed.

However the following points maybe observed by the researcher in selecting a research problem or a subject for research:

1. Subject which is overdone should not be normally chosen for it will be a difficult task to throw any new light in such a case.
2. Controvetial subjects should not become the choice of an average researcher.
3. Two narrow or two vague problems should be avoided.
4. The subject selected for research should be familiar and feasible so that the related research materials or sources of research are within one’s reach.
5. The importance of the subject, qualifications and training of a researcher the cost involved, the time factor are few other criteria that must be considered in selecting the problem.
6. The selection of a problem must be preceded by a priminilary study, This may not be necessary when the problem requires the conduct closely similar to one that has already been done but when the fields of inquiry is relatively new and does not have available a set of well-developed techniques a brief feasibility study must always be undertaken.

**NECESSITY OF DEFINING THE PROBLEM**

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