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Research in Education Notes
by

Mukesh Singh
(ICT 5th batch, 2073)

Sukuna Multiple Campus
Sundarharainch 12, Morang

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Unit-1

Introduction to Educational Research

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1.1 Meaning of Research and Educational Research

Meaning of Research:

The word "research" originated from the old French word "rechercher" meaning to search and search again. It literally implies repeating a search for something and implicitly assumes that the earlier search was not exhaustive and complete in the sense that there is still scope for improvement. Research in common parlance refers to a search for knowledge. It may be defined as a scientific and systematic search for pertinent information on a ~~topic~~ specific topic/area. In fact, research is an art of scientific investigation. Some people consider research as a movement, a movement from known to unknown.

Definitions of research:

"Research is a careful investigation or enquiry especially through search for new facts in any branch of knowledge."

- (Advanced Learner's Dictionary of Current English)

"Research is a systematized effort to gain new knowledge"

- (Redman and Mory)

"Research is a systematic, critical and self critical enquiring which aims to contribute towards the advancement of knowledge and wisdom."

-(Barssy)

"Research is a systematic investigation (i.e. the gathering and analysis of information) designed to develop or contribute to generalizable knowledge".
-(Code of Federal Regulations)

"Research is a process of steps used to collect and analyze information to increase our understanding of a topic or issue".
-(John W. Creswell)

"Research is defined as the creation of new knowledge and the use of existing knowledge in a new and creative way so as to generate new concepts, methodologies and understandings. This could include synthesis and analysis of previous research to the extent that it leads to new and creative outcomes".
-(The Department of Education and Training)

Meaning of Educational Research

Educational research refers to a systematic attempt to gain a better understanding of the educational process, generally with a view to improving its efficiency. It is an application of scientific method to the study of educational problems.

Definitions of Educational Research

"Educational research is the study of and investigation in the field of education."
— (Good)

"Any systematic study designed to promote the development of education as a science can be considered educational research".
— (Mulay)

"Educational research is that activity which is directed towards the development of science of behaviour in educational situations".
— (W.M. Traverse)

"Educational research is a systematic process of and refined technique of thinking, using special tools in order to obtain a more adequate solution of a problem".
— (Crawford)

1.2 Research issues and problems in educational field

Research is done with the aim of gathering more information on a particular subject or topic. However, in the process of conducting the research, researchers encounter numerous challenges and today; we will be taking a look at the top major issues and challenges in research:

1. Lack of proper research ethics

Ethics in research means the usage of basic ethical guidelines to a wide range of issues involving research such as scientific research. Many researchers ignore the appropriate ethical applications, methods and usage when carrying out their study to guarantee credibility.

2. Ineffective Research Methodology

Methodology aids in the identification of the system to be adopted by the researcher for thorough study. However, many researchers adopt the wrong methods for their research work which inadvertently affects the result that will be gotten.

3. Ineffective Education System

The most important tool needed to surmount the challenges of research is adequate training. How do you train researchers adequately when the educational system itself is inadequate. Most of the courses in our country are taught theoretically even when there is a need for practical to make the students understand better.

4. Ineffective Library System

Following the broken educational system, it is only normal to expect a library system that is not functioning well. Most of the libraries in universities in Nepal provide minimal research materials (books, journals, newspapers etc.). Most of the libraries well equipped in Nepal are private-owned libraries.

5. Poor Infrastructural Management

The poor state of infrastructure in Nepal is a substantial contributing factor to the underdevelopment of research. In many schools in the country, laboratories are under-equipped, mismanaged and not maintained properly.

6. Low Accessibility of Data and Information

Although there is numerous information on the internet, getting valid information is not cheap in Nepal, which is aided by the ineffective educational and library systems. Hence, the difficulty in accessing information poses a serious challenge for researchers when carrying out a study.

In addition to this, the lack of database for information and rewards that can be easily accessed from anywhere poses a serious barrier for researchers.

7. Insecurity

Another major challenge for researcher in Nepal is insecurity. Researchers' inability to move freely within the country while carrying out research affects many researchers in Nepal.

8. Lack of funds for Research

Lack of fund is the major problem for most of the researchers. To use research facilities that are well equipped, one must be prepared to spend a lot. From the purchase of research equipment, transportation, books, etc. one would spend a lot.

9. Poor Technological Advancement

The majority of researchers in Nepal have not evolved with technology. What do we mean by this?

Most researchers in Nepal are only well versed with pen and paper which is a challenge of research in the country. This is because most of the materials needed to carry out a study are now stored on a technological database. A lack of understanding of how this database works can lead to spending a lot of time surfing the internet for information without results to show for it.

10. Political Uncertainty

The political instability in Nepal also affects the research development in Nepal. The researchers who should be undertaking various studies in Nepal are busy trying to patch up the polity and thus give little time to research.

From the above it is evident that the problems facing researchers in Nepal are enormous; however, they can be surmounted over time. There is a need for a collaborative effort from the government, corporate

organizations, and international organizations to aid researchers work through regular training and financial assistance.

1.3 Steps in educational research

Research, as a tool for progress, satisfies mankind's curiosity to lots of questions. Whether you are a high school or college student, you have to take research subject for you to be able to receive your diploma. To ease your burden in doing research, here are the seven steps in the research process:

1.3.1 Selecting a Problem

A good research always starts with a good problem. You can observe people or things, visit places and, read printed materials or consult experts to find research problem that is right for you. The research problem guides you in formulating the hypothesis and interpretation of your findings so that you can formulate the right conclusion. A good research problem is important because it is the basis of all subsequent research activities you are going to undertake. Factors like area of interest, availability of fund, socio-economic significance of the study, and the safety measures to be undertaken should be considered in finding a good research problem.

Sources of selection of problem:

- Experience and personal interest
- Reviewed literature
- Deduction from theory
- Replication study
- Contemporary issues

1.3.2 Reviewing the literature

A literature review is a summary of journal articles, books and other documents that describes the past and current state of information on the topic of the research study. This step provides foundational knowledge about the problem area. The review of literature also educates the researcher about what studies have been conducted in the past, how these studies were conducted and the conclusions in the problem area.

A literature review creates a "landscape" for the reader, giving him/her a full understanding of the development in the field. The landscape informs the reader that the author has indeed assimilated all previous significant work in the field into his/her research.

In writing the literature ~~review~~ review, the purpose is to convey to the reader what knowledge and ideas have been established on a topic, and what their strengths and weaknesses are. The literature review must be defined guided by a guiding concept (e.g. your research objective, the problem or issues you are discussing, or your argumentative thesis).

The literature review informs the researcher on how other research studies have been conducted and help locate models relevant to the study. The review of related literature can be taken from science books, magazines, journals, newspapers or even in the internet.

1.3.3 Designing the research

Research design is the framework of research methods and techniques chosen by a researcher. A research design is the blueprint of the research you are going to undertake. It serves as the work plan of the whole study not only because it entails the resources needed in conducting the research but also the ways these resources are utilized.

The function of a research design is to ensure that the evidence obtained enables you to effectively address the research problem logically and as unambiguously as possible.

The research design is usually incorporated into the introduction. You can get an overall sense of what to do by reviewing the literature of studies that have utilized the same research design. They can provide help you develop an outline of to follow for your own paper.

Type of research design:

- 1) Qualitative / Quantitative research ~~class~~ design
- 2) Descriptive research design
- 3) Experimental research design
- 4) Correlational research design
- 5) Diagnostic research design
- 6) Explanatory research design

1.3.4 Collecting the data

The actual study begins with the collection of data. The collection of data is a critical step in providing the information needed to answer the research question. Every study includes the collection of same type of data - whether it is from the literature or from subjects - to answer the research question. Data can be collected in the form of words on a survey, with a questionnaire, through observations, or from the literature.

Regardless of the field of study or preference for defining data (qualitative, quantitative), accurate data collection is essential for maintaining the integrity of research. Both the selection of data collection instruments and clearly delineated instructions for their correct use reduce the likelihood of errors occurring.

There are two methods of data collection:

i) Primary method → This is original, first-hand data collected by the data researcher. Primary data results are highly accurate provided the researcher collects the information.

ii) Secondary method → Secondary data is second-hand data collected by other parties and already having undergone statistical analysis. This data is either information that the researcher has talked other people to collect or information the researcher has looked up. Although it is easier and cheaper than to obtain than primary data/information, secondary information raises concerns regarding accuracy and authenticity.

1.3.5 Analyzing the data

After collecting ~~the~~ enough data and information for the research study, it is time for data analysis. The researcher finally has the data for analysis so that the research question can be answered. In operational planning, the researcher specifies how the data would be analyzed. The researcher now analyzes the data according to the plan. The results of the analysis are then reviewed and summarized in a manner directly relating to answering the research question. Then two or more data sets of data will be analyzed to determine if there are any differences between the first measure and the second measure for each individual in the program. The collected data will be analyzed to determine if the differences are statistically significant. If the differences are statistically significant, then the study validates the theory that was focus of the study.

1.3.6 Interpreting the findings

Interpretation of data refers to the task of drawing inferences from the collected facts after an analytical and/or experimental study.

Many people are unsure about what the discussion is and what it should contain. This is especially true of the interpretation of the finding section, which is the core of the discussion chapter. People often simply summarize their results because they do not know how to interpret their findings. Summary, however, is not interpretation. Interpreting your findings is about seeing

Whether what you found confirms or does not confirm the findings of previous studies in your literature review. Your findings may also offer novel or insights or information.

1.3.7 Drawing Conclusions

Conclusion is a statement where you will present the solution to the proposed problem based on the findings of the investigation. They are tied upto the questions investigated. Your conclusion will show whether or not your experiment worked. It should answer your hypothesis and research problem.

While writing conclusion of research, one should always address at least the following three questions:

- i) What is the concrete answer to each of the research questions?
- ii) What does this mean for the general objectives (contribution, policy and practice)?
- iii) What are the strengths and limitations of the study?

Characteristics of Good Research:

1. Good research originates with a question or problem.
2. Good research follows a systematic, appropriate research methodology.
3. Good research often divides main problem into sub-problems.
4. Good research acknowledges previous research on the topic.
5. Good research uses relevant, empirical data and proper data analysis methods.
6. Good research is representative and generalizable.
7. Good research is guided by logic.
8. Good research has external validity.
9. Good research is replicable, reproducible, and transparent.
10. Good research acknowledges its limitations and provides suggestions for future research.
- 11.

Unit 2

Quantitative Research

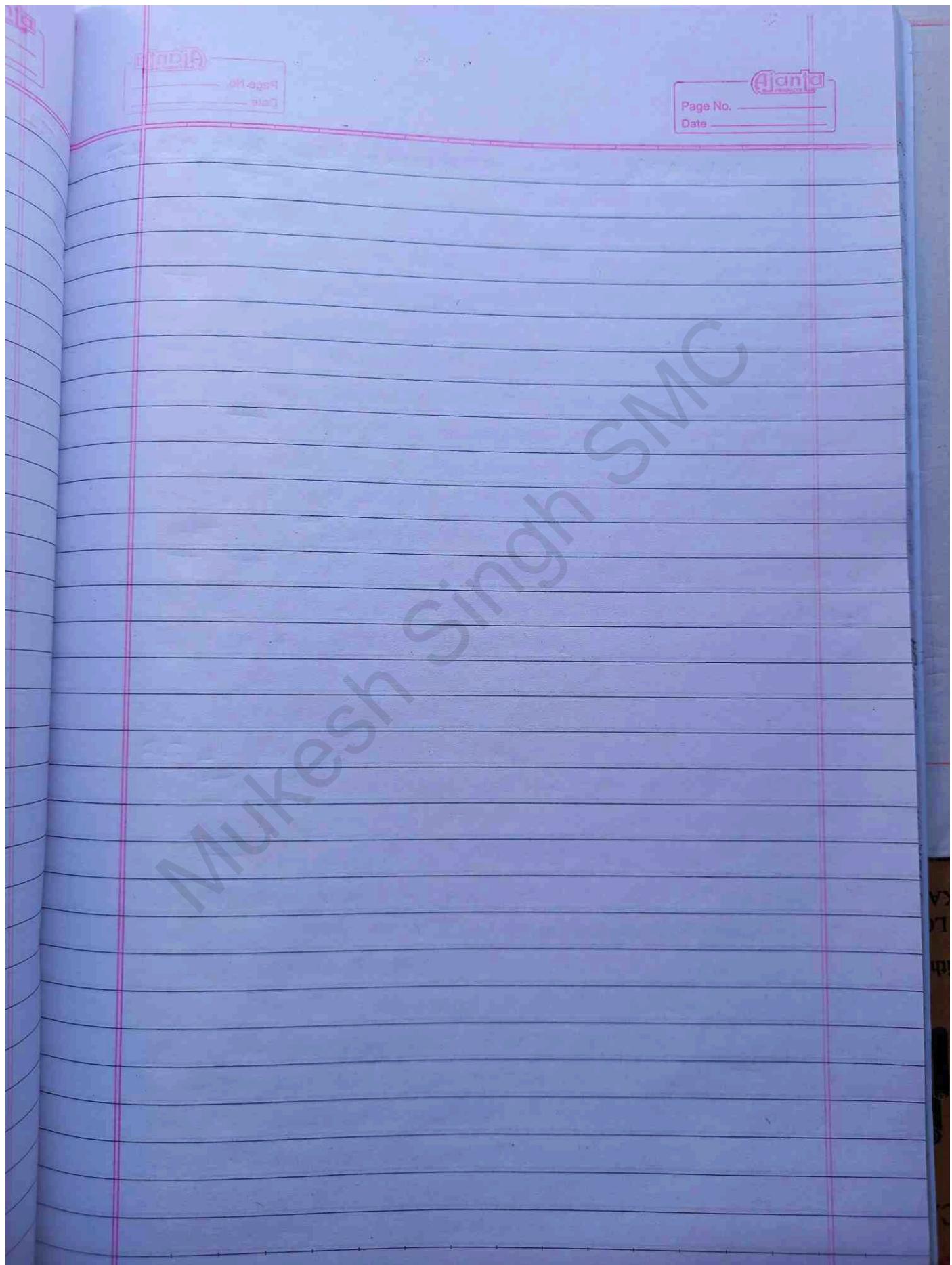
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Characteristics of educational research:

1. Educational research is directed towards the solution of a problem in the field of education.
2. It emphasizes the development of generalizations, principles or theories that will be helpful in predicting future occurrences.
3. Educational research involves getting new data from primary or first hand sources or using existing data for a new purpose.
4. It deals with educational problems regarding students and teachers as well.
5. It is precise, objective, scientific and systematic process of investigation.
6. It attempts to organize data quantitatively and qualitatively to arrive at statistical inferences.
7. It discovers new facts in new perspective i.e. it generates new knowledge.
8. It depends on the researchers ability, creativity and experience for its interpretation and conclusions.



Unit-2

Quantitative Research

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2.1 Meaning and Characteristics of quantitative research

Quantitative research is the process of collecting and analyzing numerical data. It is a systematic investigation of collecting quantifiable data through statistical, computational or mathematical techniques, such as surveys, polls and questionnaires.

Quantitative research methods focus on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon. The result can be depicted in the numerical form. These numbers are necessary for future prediction of a service or a product and make changes according to the data. The final written report has a set structure consisting of introduction, literature & theory, method, results and discussion.

The main objective of this research is to employ and develop theories, hypotheses, and mathematical models. Moreover, it is commonly applied in economics, sociology, health, human development, political science, history and many more. It is also used to verify which of the hypothesis is correct among several.

For example, a survey is conducted to study how much time a doctor takes to attend a patient when he/she walks into the hospital. A template for the study can be implemented to ask different questions like "how much a doctor takes to see a patient?" or "how many patients are visited by the hospital per day?"

Characteristics of Quantitative Research:

1. Large Sample size → Quantitative research is done on a large number of audiences to ensure reliability. The sample size used in quantitative research represents the whole target market.
2. Structured Research methods → Structural research methods like questionnaires, polls and surveys are used to conduct quantitative research. You can pay to run your survey ad on various social media platforms such as Facebook, YouTube, etc. and can collect the opinion of a large population.
3. High Reliable Outcome → The outcome of quantitative research methods is quite reliable, as participants of the research face close-ended questions. Therefore, there are fewer chances of getting vague or wrong information from the participant.
4. Reusable Outcome → The outcome of quantitative research can be used multiple times. Data collected for one research purpose can be used for the prior study of another research problem.
5. Close-ended questions → Close-ended questions' answers are more specific and right to the question than their open-ended questions. Response to close-ended questions are more reliable than the answers to questions of open-ended questions.

6. Numerical Outcome → The outcome of quantitative research is always in numerical form. For example, the result of research can be represented in percentage, range of numbers.

A numerical output is easy to read and understand, and it is easy to deduce a conclusion from the numerical outcome than a detailed result.

7. Generalization of Outcome → The outcome of quantitative research can be generalised easily for the whole population. The reason behind this is that quantitative research is conducted on a large sample of the population.

A decision can be taken for the entire population based on the outcome of the sample population.

8. Prior Study → The outcome of quantitative research can be used for a previous study of another research. Many scholars and researchers study and analyze the outcome of previous research to establish their research hypothesis or research problem.

2.2 Random Sampling : Simple and stratified

Random Sampling :

Random sampling is a part of the sampling technique in which each sample has an equal probability of being chosen. A sample chosen randomly is meant to be an unbiased representation of the total population. If for some reasons, the sample does not represent the population, the variation is called Sampling error.

Random sampling is one of the simplest forms of collecting data from the total population. Under random sampling, each member of the subject carries an equal opportunity of being chosen as a part of the sampling process.

For example, the total workforce in organization is 300 and to conduct a survey, a sample of 30 employees is selected to do the survey. In this case, the population is the total number of employees in the Company and the sample group of 30 employees is the sample.

Types of random Sampling :

There are four primary random sampling methods. They are:

1. Simple random sampling
2. Stratified random sampling
3. Systematic random sampling
4. Cluster random sampling

We discuss only (1) Simple & (2) Stratified random sampling here.

1. Simple Random Sampling

Simple random sampling is the randomized selection of a small segment of individuals or members from a whole population. It provides each individual or member of a population with an equal and fair probability of being chosen. The simple random sampling method is one of the most convenient and simple sample selection techniques.

The simple random sample is often used when there is very little information available about the data population, when the data population has far too many differences to divide into various subsets, or when there is only one distinct characteristic among the data population.

^(process) Example of Simple Random Sampling

Follow these steps to extract a simple random sample of 100 employees out of 500.

1. Make a list of all the employees working in the organization. (As mentioned above there are 500 employees in the organization, the record must contain 500 names)
2. Assign a random sequential number to each employee (1, 2, 3, ..., n). This is your sampling frame (the list from which you draw your simple random sample).
3. Figure out what your sample size is going to be. (In this case, the sample size is 100).
4. Select your sample by running a random number

generator to provide 100 randomly generated numbers from between 1 and 500.

2. Stratified Random Sampling

Stratified random sampling starts off by dividing a population into groups with similar attributes. Then a random sample is taken from each group. This method is used to ensure that different segments in a population are equally represented.

To use stratified sampling, you need to be able to divide your population into mutually exclusive and exhaustive sub-groups. That means every member of the population can be clearly classified into exactly one sub-group.

Researchers rely on stratified sampling when a population's characteristics are diverse and they want to ensure that every characteristic is properly represented in the sample.

Age, Socioeconomic division, nationality, religion, educational achievement and other such classifications fall under stratified random sampling.

Example / Steps of Stratified Random Sampling:

Steps

i) Define the Population

The population is 10,000 students at the University of Bath.

ii) Choose the relevant stratification (range)

Let's take gender (male/female) as our strata.

iii) List the population

We need to identify/list all 10,000 students at the University of Bath.

iv) List the population according to chosen stratification

We need to assign a consecutive number from 1 to 10,000 to each of the students in each stratum.

v) Choose your sample size

Let's imagine that we choose a sample size of 100 students.

vi) Calculate a proportionate stratification

Imagine that of 10,000 students, 60% are female and 40% are male. To calculate number of female students required in our sample, we multiply 100 by 0.60, which gives us a total of 60 female students. Similarly, we get 40 total male students. This means that we need to select 60 female students and 40 male students.

vii) Use a simple random or systematic sample to select your sample

Now, we have chosen to sample 40 male and 60 female students, we still need to select these students from our two lists of male and female students.

2.3

Data Collection tools: Questionnaire, test, scales and check list

Data Collection is the process of gathering and measuring information on targeted variables in an established system, which then enables one to answer relevant questions and evaluate outcomes.

OR

Data Collection is the process of gathering, measuring and analyzing accurate data from a variety of relevant sources to find answers to research problems, answer questions and evaluate outcomes.

Data Collection tools:

Data Collection tools refer to the devices / instruments used to collect data, such as paper questionnaire or computer-assisted interviewing system. Case studies, Checklists, Interviews, Surveys or questionnaires are all tools used to collect data.

Some data collection tools are explained below:

A) Questionnaires

A questionnaire is a research instrument consisting of a series of questions for the purpose of gathering information from respondents.

Questionnaires are designed to collect data from a group. For clarity, it is important to note that a questionnaire isn't a survey, rather it forms a part of it. A survey is a process of data

gathering involving a variety of data collection methods, including a questionnaire.

On a questionnaire, there are three kinds of questions used. They are: fixed alternative, scale and open-ended.

Advantages of questionnaire:

- Can be administered in large numbers and is cost-effective.
- It can be used to compare and contrast previous research to measure change.
- Easy to visualize and analyze.
- Questionnaire offers actionable data.
- Respondent identity is protected.
- It can cover all areas of a topic.
- Relatively inexpensive.

Disadvantages of questionnaire:

- Answering may be dishonest or the respondent may lose interest midway.
- Questionnaires can't produce qualitative data.
- Questions might be left unanswered.
- Respondents may have a hidden agenda.
- Not all questions can be analyzed easily.

Types of questionnaires:

1) Structured Questionnaire

Structured questionnaire collects quantitative

data. The questionnaire is planned and designed to gather precise information.

2) Unstructured Questionnaire

Unstructured questionnaires collect qualitative data. They use a basic structure and some branching questions but nothing that limits the responses of a respondent. The questions are more open-ended to collect specific data from ~~particular~~ participants.

Types of questions in a questionnaire

- 1) Open-ended questions → Open-ended questions help collect qualitative data in a questionnaire where the respondent can answer in a free form with little to no restrictions.
- 2) Dichotomous questions → The dichotomous question is generally a "yes/no" close-ended question.
- 3) Multiple-choice questions → Multiple choice questions are close-ended question type in which a respondent has to select one or many responses from a given list of options.
- 4) Scaling questions → These questions are based on the principles of the four measurement scales
 - Nominal, ordinal, interval and ratio.
- 5) Pictorial questions → In this, respondents are

asked a question and choices are images.

Steps involved in Questionnaire design:

- 1) Identify the scope of your research → Think about what your questionnaire is going to include before you start designing the look of it.
- 2) Keep it Simple → The words or phrases you use while writing Questionnaire must be easy to understand.
- 3) Ask only one question at a time → At times, a researcher may be tempted to add two similar questions. If any of your questions contain the word "and" take another look.
4. Be flexible with your options → While designing, the Survey Creator needs to be flexible in terms of "option choice" for the respondents.
5. The open-ended or closed-ended question is a tough choice → If the questionnaire requires the respondents to elaborate on their thoughts, an open-ended question is the best choice. If the surveyor wants a specific response, then close-ended questions should be their primary choice.
6. It is essential to know your audience → A researcher should know their target audience. For example, if the target audience speaks mostly Spanish, sending the questionnaire in any other language would

lower the response rate and accuracy of data.

7) Choosing the right tool is essential → Question Pro
is a simple yet advanced survey software
platform that the Surveyor can use to create
a questionnaire or choose from the already
existing 300+ questionnaire templates.

B) Test

A test can be considered as an
observation or experiment that determines one or
more characteristics of a given sample, product, process
or service.

Tests are very useful in different phase of research.
As a data collection method, testing is essential in
the experimental research. Basically, in the educational
research, student achievement and proficiency need
to be assessed.

Type of test:

i) Achievement test

Achievement tests attempt to measure what
an individual has learned his present level of
performance. Achievement tests ~~are~~ scores are used
in placing, advancing or retaining students at particular
grade levels.

ii) Aptitude test

Aptitude test seek to assess the level of

achievement that an individual can attain in some particular academic or vocational field. In other words, aptitude tests attempt to predict an individual's capacity to require improved performance with additional training.

iii) Personality test

It is concerned with non-intellectual aspect of human behaviour. Personality scales are usually self-report instruments. The individual check responses to certain questions or statements. These instruments yield scores, which are assumed or have been shown to measure certain personality traits or tendencies.

Qualities of a good test:

- 1) Reliability → It refers to the extent to which the obtained results are consistent or reliable. A test is considered to be reliable if the same results are yielded each time the test is administered.
- 2) Validity → It refers to the extent to which the test measures what it intends to measure. For example, in an intelligence test, to assess the level of intelligence, it should assess the intelligence of the person, not other factors.
- 3) Objectivity → A test is objective, if ~~the~~ using the same scoring key whoever scores the test will arrive at the same score assuming no clerical error.
- 4) Usability → Usability means the degree to which the tests are used without ~~the~~ much expenditure of time, money

and effort.

C) Scales

A scale is an instrument on which the characteristics are measured. It can be quantitatively calibrated in the usual sense, or can be qualitative also.

Scales of measurement in research and statistics are different ways in which variables are defined and grouped into different categories.

There are four different scales of measurement used in research:

Type of Scale

1) Nominal Scale

A scale in which numbers serve as labels rather than have numeric values (e.g. 1=male, 2=female). Can be used for determining mode, percentage, values or the chi-square.

2) Ordinal Scale

A scale that measures in terms of such values as "more" or "less", "larger" or "smaller" but without specifying the size of intervals between them. (re 78th lies or fifth place) - it can be used for determining the mode, percentage, chi-square, median, rank correlation.

3) Interval Scale

A scale in which the difference/interval between two variable & meaningful is interval scale.

In other words, the variables are measured on an exact manner, not as on a relative way in which the presence of zero is arbitrary. Ex: time.

It can be used for determining the ~~frequency~~ mode, mean, standard deviation, etc.

4) Ratio Scale

A scale that measures in terms of equal intervals and has an absolute zero point of origin (i.e. 72 inches fall). It can be used for determining the geometric mean, the harmonic mean, the percentage variation and all other statistical determinations.

D) Check list

Check list is a selected list of words, phrases, sentences and paragraphs, following which an observer records a check mark to denote a presence or absence of whatever is being observed. A basic example is "to do list".

Checklists are used to encourage or verify that a number of specific lines of enquiry, steps, or actions are being taken or have been taken, by a researcher.

Checklists help to ensure consistency and completeness in carrying out the task.

Construction of Checklists

- i) Express each items in simple clear simple language.
- ii) The list of items in the checklist may be continuous or divided into groups of related items.

- iii) Items should be arranged in categories and the categories in a logical or psychological order.
- iv) Terms used in the items should be clearly defined.
- v) Avoid negative sentences whenever possible.
- vi) Ensure that each item has clear responses: yes/no, true or false, and the like.
- vii) Review the items independently.
- viii) Checklist must have the quality of completeness and comprehensiveness.

2.

2.4 Statistical analysis : frequency, percentage, mean and standard deviation

Statistical analysis means investigating trends, patterns, and relationships using quantitative data.

It is an important research tool used by scientists, governments, and other organizations.

To draw valid conclusions, statistical analysis requires careful planning from the very start of the research process.

Aspect / tool of statistical analysis:

Frequency

A frequency is the number of times a data value occurs.

or It is the number of times the event occurs in an experiment or study.

Frequency is often represented by the letter 'f':

For example, If four people have an I.Q. of between 118 and 125 then If a person has a frequency of 4.

I.Q (X)	f
118-125	4
126-133	6
134-142	4
143-152	1

Frequency is important to analyze the data quantitatively. It is essential for calculating other statistical measures.

Percentage

One of the most frequent ways to represent statistics is by percentage.

Percentage is a number or ratio which can be represented as a fraction of hundred. It is a relative value indicating hundredth parts of any quantity. It is denoted by "%" symbol.

In statistics, percentage is calculated by taking the frequency in the category divided by the total number of participants and multiplying by 100%.

Gender	Frequency	Percentage
Male	80	40%
Female	130	55%
Others	10	5%
Total	200	100%

Mean

Mean is an average of given numbers; a calculated central value of a set of numbers. In simple words, it is the average of set of values.

The mean is very common and highly useful statistical tool for analyzing the quantitative data, particularly in educational research field. The research requires the mean value of student scores and responses. It lies between the two extreme categories, that means the largest and the smallest one.

Mean can be calculated by following ways:

1) Individual Series

If the data in the distribution are individual series (or ungrouped data) then mean can be calculated by following formula:

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

Where, \bar{X} = Mean

$\sum x$ = Sum of all items or scores

N = No. of scores

Example

Calculate the mean from the following test scores:

40, 48, 52, 56, 60

Soln:

$$\sum x = 40 + 48 + 52 + 56 + 60 = 255$$

$$N = 5$$

$$\therefore \text{Mean } (\bar{X}) = \frac{\sum x}{N} = \frac{255}{5} = 51$$

Hence, the mean is 51.

2) Discrete Series

In discrete series, frequency of variables (scores) are given without class intervals.

It is calculated as:

$$\bar{X} = \frac{\sum fx}{N} \quad \text{where, } \bar{X} = \text{Mean}, f = \text{frequency}$$

X = Scores, $\sum f$ = sum of frequencies

N = no. of scores

Exam.

Example:

Calculate the mean from the following data:

Mark(x)	frequency (f)	fx
5	4	20
7	5	35
9	3	27
11	7	77
13	6	102
	$N=25$	$\sum fx = 261$

By formula:

$$\bar{x} = \frac{\sum fx}{N} = \frac{261}{25} = 10.44.$$

∴ Mean score is 10.44.

3) Continuous Series

The data is given based on ranges (class intervals) along with their frequencies.

It is calculated as:

$$\bar{x} = \frac{\sum fm}{N} \quad \text{where, } \bar{x} = \text{mean}, m = \text{midpoint}$$

 $f = \text{frequency}, N = \sum f = \text{no. of scores}$

Example:

Calculate mean score from the following test data:

Score (x)	frequency (f)	midvalue (m)	fm
0-10	1	5	5
10-20	2	15	30
20-30	3	25	75
30-40	3	35	105
40-50	7	45	315
50-60	9	55	495
	$N=25$		$\sum fm = 1025$

By formula:

$$\bar{x} = \frac{\sum f_m}{N} = \frac{1025}{25} = 41$$

∴ Mean score is 41

~~# Standard Deviation~~

Use of mean

- ① When the scores are distributed symmetrically.
- ② To measure central tendency with greatest stability.
- ③ To compute other statistics.

~~# Standard deviation (SD)~~

In statistics, the standard deviation is the measure of the amount of variation or dispersion of a set of values.

The standard deviation is the most important measure of dispersion, giving us the information in the extent to which a set of score varies in relation to the mean.

When the mean alone is not suitable to analyze and interpret the quantitative data, we need to calculate standard deviation. It shows the way the scores, or items are dispersed in a distribution. It is called the best measure of dispersion. It is denoted by greek letter 'σ' (small sigma).

It is calculated by following ways:

- 1) Individual Series: Deviation can be taken from actual mean and following formula is used.

for actual mean (direct method)

$$S.D(\sigma) = \sqrt{\frac{\sum x^2}{N}} \quad \text{where, } \sum x^2 = \text{sum of variance} \\ N = \text{no. of score}$$

For Assumed Mean

$$S.D(\sigma) = \sqrt{\frac{\sum x^2}{N} - \left(\frac{\sum x}{N}\right)^2}$$

Where,

$\sum x^2$ = Sum of square of each

Square

$\sum x$ = Sum of each score

N = No. of Scores

Example

Calculate S.D of the following scores by:
2, 3, 4, 5, 6, 7

Using direct method:

Mark (x)	x^2
2	4
3	9
4	16
5	25
6	36
7	49
$\sum x = 27$	$\sum x^2 = 139$

By formula:

$$S.D = \sqrt{\frac{\sum x^2}{N} - \left(\frac{\sum x}{N}\right)^2}$$

$$= \sqrt{\frac{139}{6} - \left(\frac{27}{6}\right)^2}$$

$$= \sqrt{2.92} = 1.71$$

$$\therefore S.D = 1.71$$

2) Discrete Series : Here also deviation can be taken from Actual or assumed mean:

Formula is:

$$\sigma = \sqrt{\frac{\sum f d^2}{N} - \left(\frac{\sum f d}{N}\right)^2} \text{ where } f = \text{frequency}$$

$d = x - A$

(A = Assumed or Actual Mean)

Example:

Calculate S.D. from the following data:

x	5	10	15	20	25	30
f	2	3	7	4	2	2

Soln:

Let Assumed mean, $A = 20$

X	f	$d = x - A$	fd	d^2	fd^2
5	2	-15	-30	225	450
10	3	-10	-30	100	300
15	7	-5	-35	25	175
20	4	0	0	0	0
25	2	5	10	25	50
30	8	10	20	100	200
$N = 20$		$\sum fd = -65$		$\sum fd^2 = 1175$	

By formula,

$$\begin{aligned}\sigma &= \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2} \\ &= \sqrt{\frac{1175}{20} - \left(\frac{-65}{20}\right)^2} \\ &= \sqrt{48.75} = 6.94 \\ \therefore S.D &= 6.94\end{aligned}$$

3) Continuous Series : Here we take deviation from actual or assumed mean by deviated from the mid-point of class-interval.

$$\sigma = \sqrt{\left[\frac{\sum fdil}{N} - \left(\frac{\sum fd}{N}\right)^2\right] \times i}$$

where,

$$d' = \frac{m - A}{i}, \quad i = \text{size of class interval}$$

m = mid-point, A = Assumed mean

Example: Calculate S.D from following data:

Mark (X)	Frequency (f)	mid-value (m)	$d = \frac{m - A}{\sigma}$	d^2	fd'	fd'^2
0-10	7	5	-2	4	-14	28
10-20	9	15	-1	1	-2	2
20-30	4	25	0	0	0	0
30-40	5	35	1	1	9	9
40-50	8	45	2	4	16	32
	$\Sigma f = 30$				$\Sigma fd' = 9$	$\Sigma fd'^2 = 71$

By formula,

$$\sigma = \sqrt{\left[\frac{\sum fd'^2}{N} - \left(\frac{\sum fd'}{N} \right)^2 \right] \times 10}$$

$$= \sqrt{\left[\frac{71}{30} - \left(\frac{9}{30} \right)^2 \right]} \times 10$$

$$= \sqrt{2.37 - 0.09} \times 10$$

$$= 1.51 \times 10$$

$$= 15.1$$

$$\therefore S.D = 15.1$$

Uses of S.D.

- i) To interpret normal distribution.
- ii) To identify the nature of the group.
- iii) To compute different statistics.
- iv) To measure dispersion accurately and in reliable way.

2.5 Types of Quantitative Research

There are multiple types of primary quantitative research. They can be distinguished into the following distinctive method which are:

- i) Experimental Research
- ii) Survey Research
- iii) Correlational Research

2.5.1 Experimental Research

Experimental research, often called true experimentation, uses the scientific method to establish the cause-effect relationship among 2 groups of variables that make up a study. A true experiment is any study where an effort is made to identify and impose control over all other variables except one.

Experimental research, as the name suggests, is usually based on one or more theories. Multiple theories can be used to conduct this research. The components of the experimental research design are prescribed below:

- A comparison group of participants who are randomly selected and assigned to experimental and control groups.
- An independent variable, which can be referred to as the experimental variable that can be applied to the experimental group.
- An independent variable, which can be referred to as the effect or posttest variable that can be measured in an identical manner for all groups.

Steps of Experimental research:

1. Identifying the research problem
2. Planning an experimental research study
3. Conducting the experiment
4. Analyzing the data
5. Writing the paper / presentation describing the findings as follows:
 - Abstract
 - Introduction
 - Review of literature
 - Statement of Purpose
 - Participants
 - Materials and Procedure
 - Results
 - Discussion
 - Limitations
 - Conclusion
 - Reference

2.5.2 Survey Research

Survey research is the most elementary tool for all sorts of quantitative research techniques. The very most important purpose of the research is to widely explain the characteristics of a particular group or a bunch of population. This analysis is most typically employed by both small and large organizations for a proper understanding of their customers and to understand the merchandise and product views.

A survey is a research method used for → collecting data from predetermined group of respondents to gain information and insights into various topics of interests.

The data is usually obtained through the use of standardized procedure to ensure that each respondent can answer the questions at a level to avoid biased opinions that could influence the outcome of the study or research. The process involves asking people for information through a questionnaire which can be either online or offline. However, with the arrival of new technologies, it is common to distribute them using digital media such as social networks, email, QR codes or URLs.

There are 3 types of Survey research methods:

- i) Online /email
- ii) Phone
- iii) face-to-face

Steps of Survey Research:

1. Determine who will participate in the survey
2. Decide the type of survey (online, mail, or in person)
3. Design the survey questions and layout
4. Distribute the survey/questions
5. Analyze the responses
6. Present the results
7. Write a report

2.5.3 Correlational Research

Correlational research is a non-experimental research method used to identify a relationship between two variables with no influence from any extraneous variable.

The correlation between two variables will reflect the direction and strength of their relationship. The direction of correlation can be either positive or negative. A positive correlation denotes that both variables change in the same direction. A negative correlation denotes that the variables can change in opposite directions. A zero correlation denotes that there is no relationship between the variables being studied.

Examples of Correlational Research:

- i) Example of correlational research includes the relationship between the type of activities of mathematics classrooms and the achievement of students. ~~the relation~~
- ii) The relationship between diet and anxiety.
- iii) Consider ~~the~~ hypothetically; a researcher is studying a correlation between cancer and marriage. In this study there are two variables: disease and marriage. Let us say marriage has a negative association with cancer. This means that married people are less likely to develop cancer.

However, this doesn't necessarily mean that marriage directly avoids cancer.

Steps of Correlational Research:

- 1) Make a claim or a create a hypothesis.
- 2) Choose a data collection method
- 3) Collect your data
- 4) Analyze the results
- 5) Conduct additional research

OR

- 1) Problem selection
- 2) Choosing a sample
- 3) Selecting proper instruments
- 4) Determining design and procedure
- 5) Collecting and analyzing data
- 6) Interpreting the results

Unit-3

Qualitative Research

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3.1 Meaning and characteristics of qualitative research

Qualitative research is the process of collecting, analyzing and interpreting non-numerical data such as language. It often involves words or language but may also use pictures or photographs and observations.

Qualitative research involves non-numerical data (e.g. text, video or audio) to understand concepts, opinions, or experiences. It can be used to gather in-depth insights into a problem or generate new ideas for research.

Qualitative researchers study things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them.

It focuses on "why" and "how" rather than "what" of social phenomena and relies on the direct experiences of human beings.

Rather than by logical and statistical procedures, qualitative researchers use multiple systems of inquiry for the study of human phenomena including biography, case study, historical analysis, discourse analysis, ethnography, grounded theory and phenomenology.

Qualitative research question examples:

- How does social media shape body image in teenagers?
- How do children and adults interpret healthy eating in the UK?
- What factors influence employee retention in a large

organization?

- How is anxiety experienced around the world?
- How can teenagers integrate social issues into science curriculums?

Characteristics of Qualitative Research

1. Natural environment (Real-world setting)

Qualitative research is conducted in natural settings to get real information. Qualitative researchers do not change environmental settings and activities of the participants. Qualitative researchers collect field data at the locations where participants experience the problem or issue to be studied.

2. Researcher as a key instrument

Qualitative researchers generally collect their own research data through participant observation, documentation or direct interview with participants. These researchers do not use instruments or questionnaires made by other researchers because they are only key to the study.

3. Multiple Source of data (Different research methods)

Qualitative researchers generally choose to collect the required data from various sources such as interviews, documentation and observations rather than relying ~~on~~ only on one source data.

4. Complex reasoning

Sometimes, there are research situations which are

required to have complex reasoning to get right result rather than direct statistical answers.

5. Participants meanings

During the whole research process, the ~~re~~ focus of a researcher is to understand and determine the meaning that a participant brings to the research rather than ~~is~~ the meaning conveyed by other author or researchers in certain literature reviews.

6. Flexible

Qualitative research is flexible. It can change at any stage of the research and based on the change, the course of research might also get changed.

7. Reflexivity

In qualitative research, the researcher shares everything about themselves like their background and their purpose of research with the participants. Reflexivity also makes them participate in the research openly and willingly.

8. Holistic Account

Qualitative researchers usually try to make a complex picture of a research issue or a problem. Researcher describes the perspectives and factors associated with the problem as a whole.

9. Ongoing data analysis

The analysis of data in qualitative research does not take place at the end of the completion of the

research process. Data analysis is on-going process in the qualitative research method.

10. Emergent Design

A unique characteristic of qualitative research is its new design. That means a qualitative research method can remain the same as decided by the researcher at the beginning of the research process.

3.2

Purposive Sampling

A purposive sampling is a sampling technique that qualitative researchers use to recruit participants who can provide in-depth and detailed information about the phenomenon under investigation.

Purposive sampling is a form of non-probability sampling in which researchers rely on their own judgement when choosing members of the population to participant in their survey.

Purposive sampling is also known judgemental, selective or subjective sampling.

This survey sampling requires researchers to have prior knowledge about the purpose of their study so that they can properly choose and approach eligible participants for surveys conducted using online survey platforms like Alchemer.

Researchers use purposive sampling when they want to access a particular subset of people, as all participants of a survey are selected because they fit a particular profile.

The findings from the purposive sampling do not always have to be statistically representative of the greater population of interest, they are qualitatively generalizable.

How is Purposive Sampling Conducted?

The method for performing purposive sampling is straightforward. All a researcher has to do is reject the individuals who do not fit a particular profile when creating the sample.

However researchers can use various techniques

during purposive sampling, depending on the goal of their studies.

Type of Purposive Sampling

There are a wide range of purposive sampling techniques that you can use. Each of these types of purposive sampling are discussed below:

1. Typical case sampling

Explain cases that are average and normal. It allows the researcher to develop a profile about what is normal or average for a particular phenomenon.

2. Extreme (or deviant) case sampling

This technique focuses on participants with unique or special characteristics. It is a type of purposive sampling that focus on cases that are special or unusual, typically in the sense that the cases highlight notable outcomes, failures or successes.

3. Critical Case Sampling

It is collecting cases that are likely to give you the most information about the phenomenon you are studying. It focuses on specific cases that are dramatic or very important.

4. Heterogeneous or maximum variation sampling

It is collecting a wide range of participants

with different viewpoints to study a certain phenomenon. It relies on researchers' judgment to select participants with diverse characteristics. This is done to ensure the presence of maximum variability within the primary data.

5. Homogeneous Sampling

It focuses on one particular subgroup in which all the sample members are similar, such as a particular occupation or level in an organization's hierarchy. For example: age 20-25, educated, male.

6. Total Population Sampling

Total population sampling is a type of purposive sampling technique where you choose to examine the entire population that have a particular set of characteristics.

7. Expert Sampling

It is a sampling technique that is used when your research needs to obtain knowledge from individuals that have particular expertise.

Advantages of Purposive Sampling

- i) It is cost-effective and time-effective sampling method.
- ii) Opportunity to create generalizations from the data.
- iii) It can involve multiple phases.
- iv) It has lower margin of error.

Disadvantages of Purposive Sampling:

- i) Vulnerability (threat) to errors in judgement by researcher.
- ii) Low level of reliability and high levels of bias.
- iii) Inability to generalize research findings.
- iv) Not effective for large population.

3.3 Data Collection Strategies: semi-structured and unstructured interview, Participant Observation, focus group discussion

Following are the qualitative research strategies that are frequently used. They are discussed below:

1. Interview

An interview is generally a qualitative research technique which involves asking open-ended questions to converse with respondents and collect elicit data about a subject. Interviews are conducted with a sample from a population and the key characteristic they exhibit is their conversation tone.

There are 3 fundamental types of interviews in Research:

i) Structured Interviews

Structured interviews are defined as research tools that are extremely rigid (fixed, unchangeable) in their operations and allows very little or no scope of prompting the participants to obtain and analyze results. Questions in this interview are pre-decided according to the required detail of information. They can be closed-ended as well as open-ended according to the type of target population.

ii) Semi-Structured Interview

The semi-structured interview is a qualitative data collection strategy in which the researcher asks the respondents (informants) a series of pre-determined but open-ended questions. Keeping the

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structure in mind, the researcher can follow any idea or take care creative advantage of entire interview. ~~Addit:~~ The best application of semi-structured interview is when the researcher doesn't have time to conduct research and require detailed information about the topic.

(iii) Unstructured Interviews

Also called as in-depth interviews, unstructured interviews are usually described as conversations held with a purpose in mind - to gather data about the research study. These interviews have the least number of questions as they lean more towards a normal conversation but with an underlying subject.

The main objective of most researchers using unstructured interviews is to build a bond with the respondents due to which there are high chances that the respondents will be 100% truthful with their answers. There are no guidelines for the researcher to follow and so, they can approach the participants in any ethical manner to gain as much as they possibly can for their research topic.

2. Participant Observation

Participant observation (or simply observation) is one of the traditional qualitative data collection methods used by researchers to gather descriptive text data by observing people ^{and their} behaviour of events or in their natural setting. In this method, the researcher is completely engaged

In watching or seeing people by taking a participatory stance to take down notes. Aside from taking notes, different techniques such as videos, photographs, audio recordings, tangible items like artefacts and souvenirs are also used.

There are two types of observation:

i) Covert → In this method, the observation is concealed without letting anyone know that they are being observed.

ii) Overt → In this method, everyone is aware that they are being watched.

3. Focus Group Discussion

Focus group discussion can also be considered as a type of interview, but it is conducted in a group discussion setting. Usually, focus group consists of 8-10 people (the size may vary depending on the researcher's requirement). The researchers ensure appropriate space is given to the participants to discuss a topic or issue in a context. The participants are allowed to either agree or disagree with each other's comments.

With a focused group discussion, researchers know a particular group of participants perceive the topic.

The participants of focused group discussions are selected based on the topic or issues for which the researcher wants actionable insights. For example, if the research is about the recovery of college students from drug addiction, the participants have to be a college student, studying and recovering from the drug addiction.

3.4

Coding and thematic analysis

#Coding Analysis

Coding is the process of labelling and organizing your qualitative data to identify different themes and the relationships between them.

In qualitative research, coding is "how you define what the data you are analysing are about". Coding is a process of identifying a passage in the text or other data items (photograph, image), searching and identifying code and concept and finding relationship between them. Therefore, coding is not just labeling; it is linking of data to the research idea and back to other data.

The codes which are applied enable you to organise data so you can examine and analyse them in a structured way, e.g. by examining relationships between codes.

Types of Coding:

1. Deductive Coding

With deductive coding, we make use of pre-established codes, which are developed before you interact with the present data. They usually involve drawing up a set of codes based on a research question or previous research. You could also use a code set from the codebook of a previous study.

For example, if you were studying the

Eating habits of college students, you might have a research question along the lines of:
"What food habit do college students eat the most?"

As a result of this research question, you might develop a code set that includes codes such as "sushi", "pizza", and "burgers".

2. Inductive Coding

Inductive coding on the other hand, works in reverse, as you create the set of codes based on the data itself - in other words, the codes emerge from the data. This type of coding involves jumping right into the data and then developing the codes based on what you find within the data.

For example, if you were to analyse a set of open-ended interviews, you wouldn't necessarily know which direction the conversation would flow. If a conversation begins with ~~the flow of cat~~ a discussion of cats, it may go on to include other animals too, and so you'd add these codes as you progress with your analysis.

Thematic Analysis (a Thematic Coding)

Thematic analysis, also called thematic coding, is a type of qualitative data analysis that finds themes in text by analyzing the meaning of words and sentence structure.

Thematic analysis is a qualitative data analysis method that involves reading through a data set and identifying patterns in meaning across the data.

The researcher closely examines the data to identify common themes - topics, ideas, and patterns of meaning that come up repeatedly.

When should I use thematic analysis?

You should consider using thematic analysis in the following scenarios:

- You want to identify patterns in data.
- You are new to qualitative analysis.
- You want to involve research participants in the analysis process.

Steps of thematic analysis process:

There are various ~~steps~~ approaches to conducting thematic analysis, but the most common form follows a six-step process: familiarization, coding, generating themes, reviewing themes, defining and naming themes, and writing up report.

1. Familiarization

The first step is to familiarize/know our data. It's important to get a thorough & thorough

(in depth, detail) overview of all the data we collected before we start analyzing individual items.

2. Coding

Next up, we need to code the data. Coding means highlighting sections of our text - usually phrases or sentences - and coming up with shorthand labels or "codes" to describe their content.

3. Generating themes

Next we look over the code we've created, identify patterns among them, and start coming up with themes.

4. Reviewing themes

Now we have to make sure that our themes are useful and accurate representations of data. Here, we return to the data set and compare our themes against it. Are we missing anything? Are these themes really present in the data?

5. Defining and naming themes

Now that you have a final list of themes, it's time to name and define each of them.

Defining themes involves formulating exactly what we mean by each theme and figuring out how it helps us understand the data.

Naming themes involves coming up with a succinct and (brief, short) and easily understandable name for each theme.

6. Writing up report

Finally, we'll write up our analysis of the data. Like all academic texts, writing up a thematic analysis requires an introduction to establish our research question, aims and approach. We should also include methodology and conclusion section.

3.5 Types of qualitative research

There are several types of qualitative research. Among the few are discussed below:

3.5.1. Ethnography

Ethnographic research is probably the most familiar and applicable type of qualitative method. In ethnography, you immerse (involve, employ) yourself in the target participants' environment to understand the goals, cultures, challenges, motivations and themes that emerge. Ethnography has its roots in cultural anthropology where researchers employ themselves within a culture, often for years. Rather than relying on interviews or surveys, you experience the environment first hand, and sometimes as a "participant observer".

This method of research aims to study individuals in their own habitat through the usage of methods like observations, interviews, etc. This method is useful for studying both remote cultures as well as smaller communities within any particular region. Detailed ethnographic research may require the researcher to spend a long time doing field work in the particular area of study, often for extending to several months or even years.

3.5.2 Narrative Study

The narrative study in qualitative research allows people to narrate stories about their life and experiences around the world. Narrative research provides an option to explore personal experiences beyond the boundaries of a typical questionnaire. As a result, we get hand information about their own life, experiences and happenings in their daily lives.

These data are usually gathered in the form of interviews or sometimes in the form of personal diaries, letter writing, email or video diaries artefacts. All of these things tell the researcher the story of an individual and some sequence of events. In many disciplines, this approach has been used to learn the culture, historic experiences, identity and the narrator's lifestyle.

Data collection and Source for Narrative Research Method:

Data for narrative study can be collected through field notes, interviews, transcripts, journal records, own personal observations and others' observations, Storytelling, letter writing and autobiographical writing.

Characteristics of Narrative Research:

1. Individual Experiences

Understanding an individual's history or past experiences will help explain the impact on their present and future experiences.

2. Chronology of the experience

A time sequence or chronology of events helps readers understand and follow the research.

3. Collecting individual stories

Stories can be acquired throughout various means including interviews, informal observations, conversations, journals, letters or memory boxes.

4. Restorying

Also known as remapping or retelling. It is the process of gathering stories, reviewing them for key elements and rewriting the story in a chronological sequence.

5. Coding for themes

Data can be coded into themes or categories. About five to seven themes are identified and can be interpreted into passages of the story or in a separate section.

6. Context or Setting

Described in detail, the place where the story physically occurs.

Steps in narrative research:

- Step 1. Identify ~~the~~ a phenomenon: that addresses an educational problem.
- Step 2: Purposefully select an individual: to learn about the phenomenon.
- Step 3: Collected stories from the individual that reflect personal experiences.
- Step 4: Retell or retell the individual's story.
- Step 5: Collaborate with participant storyteller in all phases of research.
- Step 6: Write a story about the participant's personal and social experiences.

Type of Narrative Research:

- 1) Autobiography
- 2) Biography
- 3) Personal account
- 4) Personal narrative
- 5) Narrative interviews
- 6) Personal documents

Remaining of Ethnography (3.5.1)

Key Characteristics of Ethnographic Study (research).

- i) Usually focuses on very few cases, may be just one, but in detail.
- ii) Often involve working with previously unstudied phenomenon.
- iii) Uses inductive, interactive and repetitive collection of unstructured data.
- iv) Data is primarily collected via fieldwork.
- v) Uses multiple methods (interview, observation, artifact collection).
- vi) A holistic approach to study of cultural systems.
- vii) Requires the daily and continuous recording of field notes.
- viii) Tries to earn trust of the respondents.

Steps/stages in Ethnographic research:

Step 1: Identify the purpose of the research.

Step 2: Pose initial research questions.

Step 3: Describe the overall approach and rationale for the study.

Step 4: Describe the site and sample selection.

Step 5: Describe the researcher's role.

Step 6: Describe data collection methods.

Step 7: Describe gathering and recording information.

Step 8: Write the research report.

Types / methods of Ethnographic research:

- 1) Live and work
- 2) Participant observation
- 3) Interview
- 4) Surveys
- 5) Archival Research

Ethnographic Study (research)	Narrative study (research)
1. Describes and interprets a culture sharing group.	1. Explores the life of an individual.
2. Studies a group that shares the same culture.	2. Studies one or more individuals.
3. Describes and interprets the shared patterns of culture of a group.	3. Needing to tell stories of individual experiences.
4. Drawing from anthropology and sociology.	4. Drawing from humanities including anthropology, literature, history, psychology and sociology.
5. Example: Understanding the organizational culture.	5. Example: Biography of a great leader.

Qualitative Research

1. Concerned with understanding human behaviour from the informant's perspective.
2. Assumes a dynamic and negotiated study.
3. Data are collected through participant observation and interviews.
4. It is text-based.
5. Unstructured or semi-structured response options.
6. No statistical tests.
7. Less generalizable.
8. Examples/methods :
 - focus groups
 - in-depth interviews
 - reviews of documents etc.

Quantitative Research

Concerned with discovering facts about social phenomena.

2. Assumes a fixed and measurable reality.

3. Data are collected through measuring things.

4. It is number based.

5. Fixed response options.

6. Statistical tests are used for analysis.

7. More generalizable.

8. Examples/methods :

- Survey
- Structured interviews
- review of records for numerical information etc.

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Action Research

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4.1. Meaning and Characteristics of Action Research

Meaning of Action Research

"Action research is any systematic enquiry conducted by teachers, researchers, principals, school counselors, or other stakeholders in the teaching/learning environment to gather information about how their particular schools operate, how they teach and how well their students learn. This information is gathered with the goals of gaining insight, developing reflective practice, effecting positive changes in the school environment and improving student outcomes and the lives of those involved." Action research is a process in which participants examine their own educational practice systematically and carefully, using the techniques of research."

Action research is a method of systematic enquiry that teachers undertake as researchers of their own practice. The enquiry involved in action research is often visualized as a cyclical process.

Action research can be defined as "an approach in which the action researcher and a client collaborate in the diagnosis of the problem and in the development of a solution based on the diagnosis". Action study

Definitions of Action Research:

1) Action research is an inquiry which is carried out in order to understand, to evaluate and then to change, in order to improve educational practice."
— Bassey (1998 p. 193).

2) Action research is a fancy way of saying let's study what's happening at our school and decide how to make it a better place.
— Emily Cathoun (1994)

Examples of Action Research Topics:

- Flexible seating in 4th grade classroom to increase effective collaborative learning.
- Structured homework protocols for increasing student achievement.
- Using music to simulate creative writing.

Types of Action Research:

- 1) Individual action research - involves working independently on a project, such as an elementary school teacher conducting her own, in-class research project with her students.
- 2) Collaborative Action Research - involves a group of teachers or researchers working together to explore a problem that might be present beyond a single classroom, perhaps at the departmental level or an entire grade level.

3) School-wide action research - generally focuses on issues present throughout an entire school or across the district.

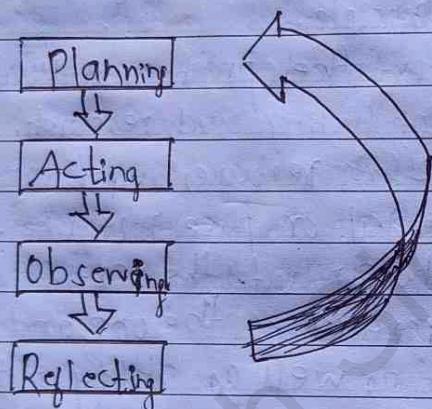
Characteristics of Action Research:

- i) It is focused on the immediate problems, and their solutions within the available resources.
- ii) It does not concern with the building of theories, broad generalization and principles.
- iii) It aims to improve the practices or work conditions of the people, while conducting such research.
- iv) It involves little effort, resources and finances in comparison to fundamental or pure research.
- v) Here, the person who conducts the research and applies the findings of the research is the one and same.
- vi) It includes a spirit as well as ability in the practitioners to improve their practices.
- vii) Action research is refutation and context-based.
- viii) Knowledge is created through action and application.

4.2 Action research cycle

Action research is a widely used approach in educational area. It has an extensive scope when researchers adopt this approach. That is to say people can use this approach in any situation such as teaching methods, learning strategies as well as other educational fields in order to solve problems.

Action research cycle is presented in figure below:



4.2.1 Planning

The first phase of action research is planning. It refers to the process of identifying the research problem and making different logics or hypotheses about the solution to the identified problem. This phase includes 3 specific steps:

- a) Initiation → involves determining the topic or problem of research.
- b) Preliminary investigation → involves finding out the existing situation of the problem.
- c) Hypothesis → After reviewing the existing condition, the research makes a hypothesis about the solution to

the identified problem.

4.2.2 Acting

To act means to introduce an effective action. According to the hypothesis made, the researcher develops specific activities and materials to improve the situation. He or she carefully uses the activities and materials aiming at solving the identified problem. This attempt is also known as intervention. So, acting is a kind of intervention to or treatment to the class. For example, teaching speaking by using the group work techniques is an action or treatment.

4.2.3 Observing

The next phase to intervention/action is to observe the effectiveness of the action. After certain period of time, e.g. ~~three~~ three weeks, two months or so, the researcher observes the effectiveness of the intervention. This process is also called evaluation. It is similar to 'post-test' or 'after-observation'. The researcher may record the classroom interaction, or if necessary he/she may administer test for students. In this phase, observation and interview may also be used. A comparison is made between this evaluation and preliminary investigation. If changes are effective solution to the identified problem, they are shared with others practitioners. They are implemented in the actual classroom situations. But if the changes are not effective solution to the identified problem, the researcher need to revise the 'planning' and 'acting' phase.

4.2.4. Reflecting

Reflecting is very important in action research. The researcher needs to reflect whole process of investigation from planning to evaluation. It helps to bring effective changes in the existing practice. New actions can be more effectively implemented in the actual work places such as classrooms. For action, the two steps may be crucial:

a) Dissemination → It refers to the process of sharing the findings of the action research. These are new actions or strategies used for the improvement of existing situation.

b) Follow-up → The researcher makes effective follow up of the new actions suggested by the research.

According to their usefulness further changes are regularly made. If needed, the action research is done once again in the same issue by starting from the 'planning' phase. Thus, action research is a cyclic process, but not merely linear.

These seven steps, which become an endless cycle for the inquiring teacher, are the following:

1. Selecting a focus / topic
2. Clarifying theories
3. Identifying research questions
4. Collecting data
5. Analyzing data
6. Reporting results
7. Taking informed action

Advantages of Action Research:

- High level of practical relevance of the educational research.
- Can be used with quantitative, as well as, qualitative data.
- Possibility to gain in-depth knowledge about the problem.

Disadvantages of Action Research:

- Difficulties in distinguishing between action and research and ensure the application of both.
- Delays in completion of action research due to a wide range of reasons are not rare occurrence.
- Lack of repeatability and rigour.

Some questions related to Action Research:

Q1. What is the purpose of action research?

→ Action research is used for various purposes: school based curriculum development, professional development, systems planning, school restructuring, and as an evaluative tool.

Q2. How can teachers become researchers?

→ A teacher can take a decide to tackle a problem alone or join with others to learn more how children learn. They can meet after school or during common time to discuss the nature of a problem and decide on a strategy based on an analysis of data.

Q3. How can I use action research in my classroom?

→ You can use it to chart the effective implementation of a curriculum or strategy, to study student learning and

responses) or to profile individual students.

Q4. How does an action research benefit benefit students in the classroom?

→ Action research can improve the teachers teaching and learning process by reinforcing, modifying, or changing perceptions based on informal data and non-systematic observations.

Q5. How does action research benefit teachers?

→ Teachers learn what & if is that they are able to influence and they make changes that produce results that show change.

4.3 Preparing action research report

The list below is not prescriptive but aims to provide an example of how a piece of action research could be structured.

- Abstract
- Introduction
- Literature Review
- Methodology
- Participants and setting
- Interventions
- Data Sources and Analysis
- Findings and Results
- Discussion and Conclusions
- References

Writing a report of Action Research / Teacher Research

1. Introduction

What was the focus of my study? What was the basis of my interest in this topic or focus? What was I trying to learn about and understand? What were my overall goals? What factors in my own history and experiences led me to be interested in this inquiry? What are my specific research questions for this study?

2. Literature Review / Background for the ~~study~~ study

What is the background of this topic or focus and why is that background important to understand? What is the context of previous work that has been done on this topic? To what else does the topic relate?

How can I situate my study within related

professional literature? What are related professional references (research, theory or practice) that informed me?

3. Description of the research Context.

Where was the study conducted and the data gathered? What is the specific context in which the study was conducted (e.g. school population, the classroom environment, curriculum, etc.)? What did I do in the classroom setting to create a context from which I collected data? Where there certain engagements that I did with my students?

Who were the participants in this research? How did I select the participants?

4. Data Collection and Analysis

What is my general approach to research design (teacher research, experimental case study, qualitative, etc.)? How and why did I choose this approach?

What important kinds of data did I collect? What specific methods of data collection did I use? (e.g. field notes, teaching journal, interviewing, taping, etc.)?

How did I analyze the data? What did I do to organize and analyze data as I collected it? What kind of more intensive analysis did I do once the data was collected?

What was my research timeline?

5. Findings

What did I learn? What are the major findings of the study? What examples from the study support these findings?

In this section, you are reporting the findings of the study and so must stay close to the data in the statements that you make. Don't make broad statements / interpretations that extend beyond the participants in the research.

6. Discussion / Implications

So what? What are the possible implications of these findings for your own participants, other students, teachers, researchers? What sense do you make of this study? What are you taking away for yourself and for others?

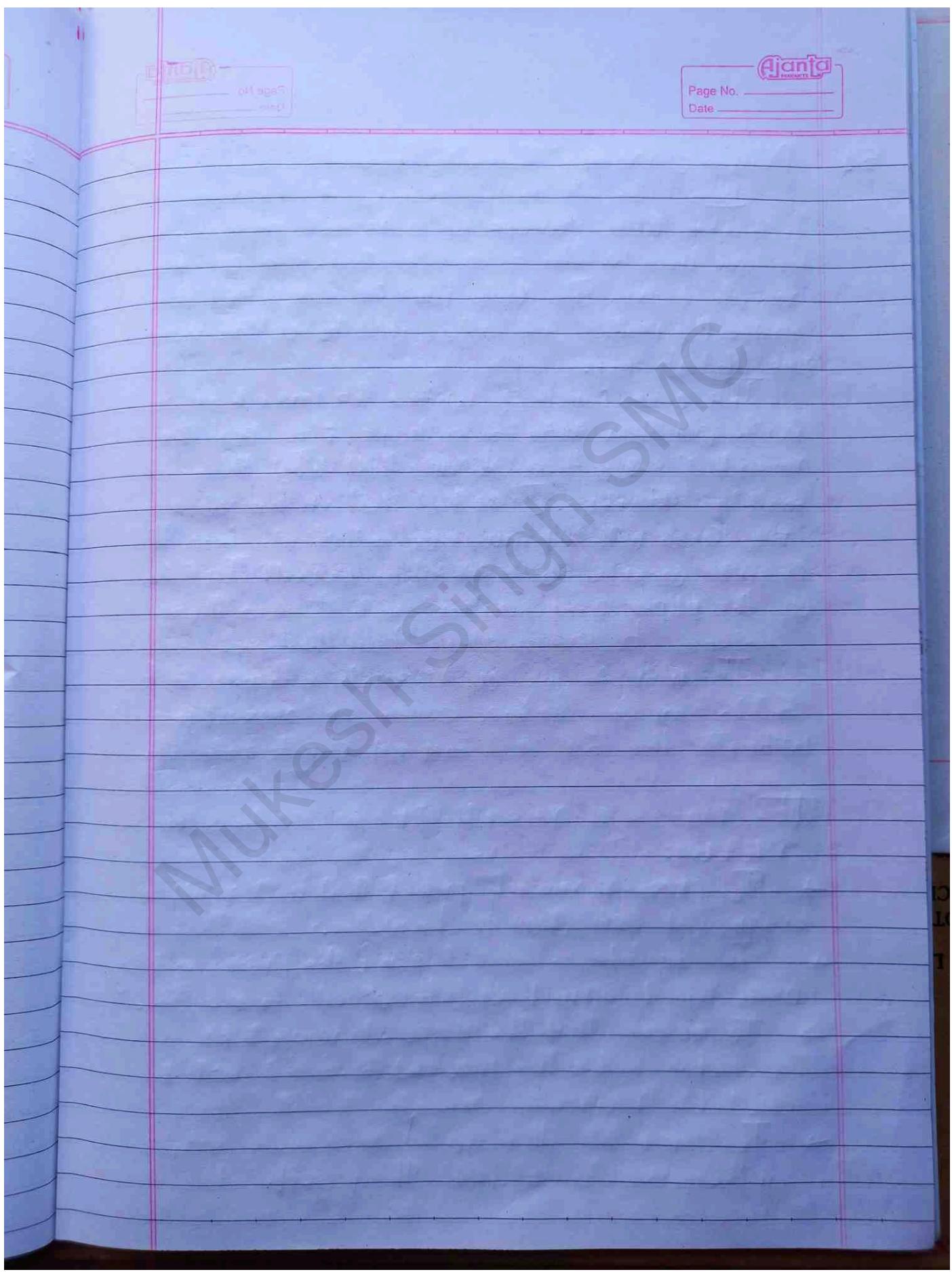
Whose interests were served by this research? Who benefited?

7. Conclusions

Summary of study and concluding remarks that highlight thoughts you want to leave the reader with - the major insights or wonderings you are taking from the study.

8. Appendices / References

Copies of research permission form, written survey, interview questions, etc. (forms used in the research or as part of the curricular engagement).



Unit-5

Writing Research Proposal and Research Report

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Page No. _____
Date _____

A research proposal describes what you will investigate, why it's important, and how you will do the research. A research proposal is an important document that covers your specific portion of the study and the feasible research design. It covers the complete outline of your research objective or the hypothesis. The research materials cover a brief description of your previous research on your subject or topic. Research proposal contains the proposed design and some detail of your research as well. Research proposal writing means you are having the guidelines for your theory that may reach your desired success.

A research proposal is generally a document which proposes the various facts of a research project, usually magnifying topics based on science or academics.

5.1 Purpose of Writing Research Proposal

The main "purpose" of a research proposal is to give your mentor a clear cut idea of your research paper. It should have an explicit and narrow subject matter and allow you to outline your research strategy.

The main purpose of writing the research proposal is to give the instructor a basic idea about the research paper of their student that what they are exactly attempting. It is not a short form of your paper with a narrow and particular topic that is quite original and interesting as well. The statements of the paper may construct with two or three sentences to give an idea about the topic.

The ultimate goal of research or theory is to find success in academic career and research proposal writing is the first and foremost step towards it.

The purpose of research proposal can be summarized as follows:

- To propose a research project that will result in a significant contribution to knowledge.
- To formulate a detailed plan of the project including methodological approach and theoretical framework.
- To ensure that the proposed research is achievable within the required time and with the available resources.
- To demonstrate that you have adequate expertise and experience to undertake the project.

5.2 Components of research proposal

The format of a research proposal vary between fields, but most proposals should contain at least these elements:

- Cover page
- Introduction
- Literature review
- Research design
- Reference list

According to the syllabus, the components of research proposal are discussed below:

5.2.1 Introduction : background, research problem, objective, delimitation

The first part of your proposal is the initial pitch for your project, so make sure it succinctly explains what you want to do and why? It should:

- Introduce the topic
- Give background and context.
- Outline your problem statement and research questions.

i) Background → It is a component of the introduction section. It makes the sense of topic clear by elaborating the topic with examples, definitions, histories, facts, etc.

ii) Research problem → It is another component of the introduction section. It makes clear about what researcher want to find out. This component of proposal shows the real problem in the particular field and the need of research about this problem or issue.

iii) Objectives → The research purpose (or goal or aim) gives a broad indication of what the researcher wishes to achieve in the research. The hypotheses to be tested can be the aim of the study. Objectives must be clear and the verbs which are used must be measurable (e.g. to find out, to explore, to identify, but not to know to understand, to feel etc.)

iv) Delimitation → Delimitation are the choices made by the researcher which should be mentioned. They describe the boundaries that you have set for the study. Delimitation factors include the choice of objectives, the research questions, variables of interest, theoretical perspectives you adopt and the population you choose to investigate.

5.2.2 Literature Review

This is a separate section of the research proposal, that follows introduction. It presents the theory and previously established knowledge of the study area. It is the review of the books, article, and previous research. It elaborates the area of the study, it justifies the rational of the research that are going to be carry out.

A literature review is not only to take the notes from different books, journals, or on your specific topic. The key reason is to understand identify and understand the previous research about the topic and identify the gaps in the literature.

Literature should include supporting data, disagreement and controversy. Five C's may be kept.

in mind while writing a literature review. Is including the five C's (Cite, Compare, Contrast, Critique and Connect) really important in writing a literature review of your research project?

5.2.3 Methodology : design, sampling, data collection tools and data analysis

The methodology includes various procedure of the research. e.g. Sampling the population, making research tools, collecting data and analyzing the data. There is discussion in the third chapter of the proposal. It gives clear guidelines about how to carry out the research.

It includes various sectors:

i) Research design → The research design or methodology section should describe the overall approach and practical steps you will take to answer your research questions. The objective here is to convince the reader that the overall research design and methods of analysis will correctly address the research problem and to impress upon the reader that the methodology / source chosen are appropriate for the specific topic.

For methods:

- What tools and procedures will you use (e.g. surveys, interviews, observations, experiments?)
- Why are these the best methods to answer your research questions?

ii) ~~Sample~~ Sampling → The people who are selected by the researcher to elicit the information are known as samples, and the process of selecting the samples is known as sampling. The sampling and sampling procedures are determined in the research proposal.

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iii) Data Collection Tools

The tools which are used to collect for the research are known as data collection tools. For example, questionnaire and interview are the tools of data collection. Researchers have to decide proper tools before we start the research. The researcher is expected to give a detailed account of the methodology adopted for collection of data, which include the time frame required for the research.

If the researcher is planning to acquire data through interviews or Questionnaires, copy of the questions used for the same should be attached as an annexure with the proposal.

iv) Data Analysis

This component of proposal presents the specific processes of analysis and interpretation of the results.

The data can be analysed using descriptions, tables, figures, charts, etc. This section deals with the reduction and reconstruction of data and its analysis including sample size calculation.

5.3 Components of research report

Writing the report is a crucial step in the process of research. It is ultimate process in which the problem, methodology and findings of the research are communicated to the audience.

The report presents the entire work and effort made by the researcher in the process of research. In this section we are going to present the various components of the research reports.

5.3.1 Introduction

The introduction provides the key question that the researcher is attempting to answer and a review of any literature that is relevant. In addition, the researcher will provide a rationale for why the research is important and will present a hypothesis that attempts to answer the key question. Lastly, the introduction should summarize the state of the key question following the completion of the research.

The general format for an introduction is as follows:

- (i) Statement of the topic area, covering the problem background in a broad scope written in a single paragraph.
- (ii) Specific problems to be studied, reasons why it was important to study (e.g. by showing gap in research). And how it was applied to the larger field of research written in two or three paragraphs.
- (iii) Clear statements of objectives and research questions.

The length of an introduction depends on the journal's policy, but it typically occupies 10-15% of the paper. It is generally around 400-600 words.

5.3.2 Literature Review

A literature review is a research, summary and evaluation of the available past and current literature related to the research problem.

The literature review can include articles, abstracts, reviews, monographs, text books, electronic media etc. First, and this is the major purpose of reviewing the literature, it defines what has already been done concerning your research topic.

Secondly, literature review also offers you the prospect to discern research strategies and specific data collection approaches that have or have not been made in the studies of topics related to yours.

The third significance of literature review is that your understanding with previous research helps you interpret your study results.

Finally, literature review also shows your readers that you have an in-depth grasp of your subject.

Types of literature review:

- i) Narrative literature review
- ii) Integrative literature review
- iii) Methodological literature review
- iv) Systematic literature review

5.3.3 Methodology

The methodology section includes a description of the research sample, data collection method, measurement instruments, and data analysis procedures.

The description of sample/subjects includes not only the sample size and statistics regarding the subjects but also a definition and description of the population from which the sample was selected.

The description of instruments should identify and briefly describe all instruments used to collect data pertinent to the study, be they tests, questionnaires, interviews or observation forms.

The methodology section is usually concluded with a few statements about the analysis procedures utilized to test the study's hypotheses.

5.3.4 Analysis and findings

In the analysis section, you describe what you did with your data. If it is a quantitative paper, this will include details of statistical procedures. If it is a qualitative paper, it may include a SWOT analysis, which looks at the strengths, weaknesses, opportunities and threats of the statistical data.

In the findings or results section, you report what the analysis revealed but only the factual matter of the results, not their implication or meaning. The findings are the research questions that you found answers for during your research.

5.3.5 Summary, Conclusion and Implications

This section is very similar to the abstract section except that it appears at the end of the report (preceding the Reference section). It summarizes the study's findings in an easy to understand manner. It also explains the practical implications of those findings, and points to recommended directions for future research in that area.

5.3.6 References

The references section or bibliography, lists all the sources, alphabetically by authors' last names, that were directly used in writing the report. Every source cited in the paper must be included in the references section and every entry listed in the references must appear in the paper.

Style manuals such as APA (American Psychological Association) manual, will give you the correct procedure for all in-text and reference citations.

It is recommended that you use the APA style.

5.3.7 Appendices

Appendices include information and data pertinent to the study that either are not important enough to be included in the main body of the report or are too lengthy. Appendices contains such entries as materials specially developed for the study (e.g. tests, questionnaires and cover letters), coding scheme, print out of raw data, and the computer print-out of statistical analyses.