1. What is Research And What is the meaning of Research according to Clifford Woody?

COLLECTING OF INFO ABOUT A PARTICULAR TOPIC

Research is a systematic and scientific inquiry or investigation into a specific topic or problem. It involves collecting, analysing, and interpreting data to answer research questions or test hypotheses.

According to Clifford Woody Research means

- Defining and redefining problems, formulating hypothesis/objectives;
- Collecting, organizing and evaluating data
- Making deductions and reaching conclusions
- Testing the conclusions to determine whether they fit the formulating hypothesis/objectives.

2. Distinguish between Research methods and Research methodology

Research method: It may be understood as all those methods/techniques that are used for the conduction of research. Research methods or techniques, thus, refer to the methods the researchers use in performing research operations.Research Methodology: It is a way to systematically solve the research problem. It

Methods	Methodology
The objective of methods is to find solution to the research problem.	The objective of methodology is to determine appropriateness of the methods applied with a view to ascertain solution.
Methods are just behavior or tools used to select a research technique.	Methodology is analysis of all the methods and procedures of the investigation.
Methods are applied during the later stage of the research study.	Methodologies are applied during the initial stage of the research process.
It comprises different investigation techniques of the study.	It is a systematic strategy to find solution to the research problem.
Methods encompasses of carrying out experiments, conducting surveys, tests, etc.	Methodology encompasses several techniques used while conducting these experiments, surveys, tests, etc.

may be understood as a science of studying how research is done scientifically. In it we study the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them.

3. Describe the different types of research

Descriptive vs. Analytical:

Descriptive Research: Definition: Descriptive research aims to describe and document the characteristics, features, or behaviors of a particular phenomenon or subject, without trying to establish cause-and-effect relationships.

Descriptive Research:

• Research Question: "What is the current literacy rate in different states of India?"

• Descriptive Approach: In this case, researchers would collect data on literacy rates in various Indian states, compile this information, and present it in a comprehensive report or chart.

• The research doesn't seek to explain why literacy rates are as they are or how they have changed over time; it simply provides an overview of the existing data.

• Analytical Research:

• Definition: Analytical research, on the other hand, goes beyond describing data.

• It involves critically examining and interpreting existing information or data to gain a deeper understanding of a specific topic or problem, often to establish cause-and-effect relationships or identify patterns and trends.

• Analytical Research:

• Research Question: "What are the key factors contributing to the regional variations in literacy rates in India?“

• Analytical Approach: In this case, researchers would not only gather data on literacy rates but also investigate factors that might explain the variations among different states.

Applied vs. Fundamental:

Definition: Applied research is focused on solving practical problems or addressing specific issues. It aims to provide practical solutions or information that can be directly applied in real□world situations.
Research Question: "How can we improve the water quality in a polluted river in a specific region of India?“
Applied Research Approach: In this case, researchers would conduct studies and experiments to find practical solutions to improve water quality in the polluted river. They might test different purification methods, study the impact of industrial discharge, and propose actionable recommendations for government or local authorities to implement.

Fundamental or Pure research

- Definition: Fundamental research, also known as basic or pure research, is driven by a search for knowledge and a deeper understanding of fundamental principles, often without immediate practical applications in mind.
- Research Question: "What is the fundamental structure of an atom?”
- Fundamental Research Approach: In this example, scientists are not aiming to develop any specific applications or solve practical problems immediately.
- Instead, they are conducting fundamental research to gain a deeper understanding of the basic building blocks of matter.

Quantitative vs. Qualitative:

Quantitative research is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. An example of quantitative research in the social sciences is a survey conducted to gather data on public opinion or attitudes toward a particular social issue. Qualitative research, on the other hand, is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind. For example, consider a convenience store looking to improve its patronage. A systematic observation concludes that more men are visiting this store. One good method to determine

why women were not visiting the store is conducting an in-depth interview method with potential customers.

Conceptual vs. Empirical:

Conceptual research is related to some abstract idea(s) or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones. The most famous example of a conceptual research is Sir Issac Newton. He observed his surroundings to conceptualize and develop theories about gravitation and motion.

Empirical research relies on experience or observation alone, often without due regard for system and theory. It is data-based research, coming up with conclusions that are capable of being verified by observation or experiment. An example of empirical analysis would be if a researcher was interested in finding out whether listening to happy music promotes prosocial behaviour. An experiment could be conducted where one group of the audience is exposed to happy music and the other is not exposed to music at all.

Other types of research

Longitudinal research:

If the research is based on either the purpose of research, or the time required to accomplish research, or on the environment in which research is done then such kind of research is called one-time research or longitudinal research.

Laboratory research:

if research is carried on over several time periods then such research is named as laboratory research or simulation research.

Clinical or diagnostic research:

if research follow case-study methods or in-depth approaches to reach the basic causal relations then its called clinical or diagnostic research

4. What do you mean by research? Explain its significance in modern times.

“All progress is born of inquiry. Doubt is often better than overconfidence, for it leads to inquiry, and inquiry leads to invention”- Hudson Maxim.

• For educationists, in studying various educational problems and in seeking solutions to the various educational problems.
• For social scientist, in studying social relationships and seeking answers to the various social problems.
• Provides the basis nearly for all government policies and our economic system.
• For solving various operational and planning problems of business and industries.
• It inculcates scientific and inductive thinking.
• It promotes the development of logical habits of thinking and organization.
• To understand the new development in one’s field in better way.

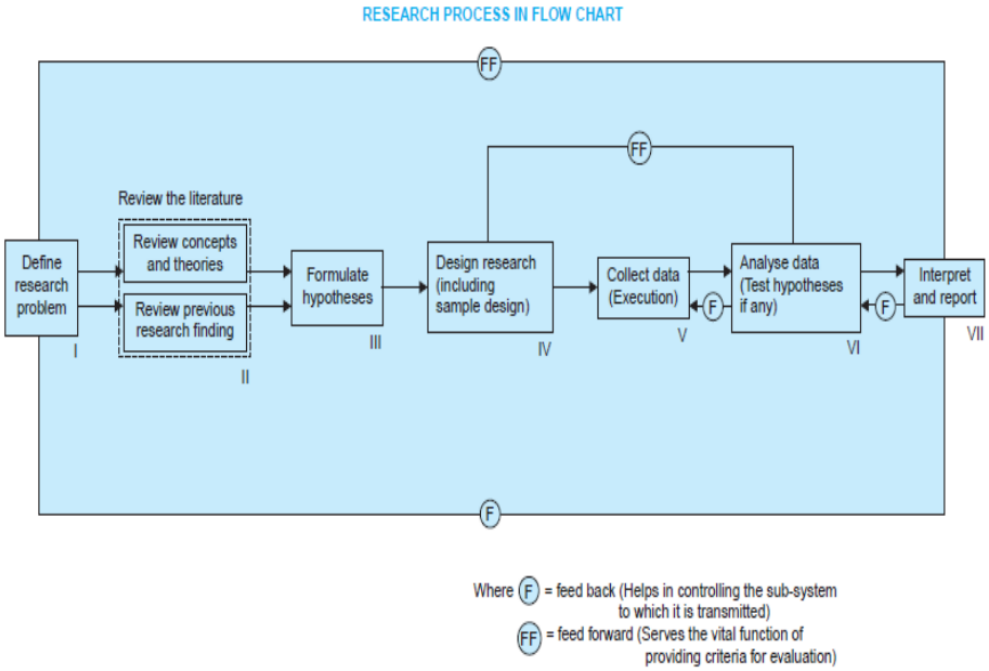
5. Discuss the objectives of research

Each research study has its own specific purpose, we may think of research objectives as falling into a number of following broad groupings:

1. To gain familiarity with a phenomenon or to achieve new insights into it (studies with this object in view are termed as exploratory or formulative research studies). For example, 'a study into the implications of COVID-19 pandemic into the global economy'
2. To portray accurately the characteristics of a particular individual, situation or a group (studies with this object in view are known as descriptive research studies). For example, in a supermarket, a researcher can from afar monitor and track the customers' selection and purchasing trends.
3. To determine the frequency with which something occurs or with which it is associated with something else (studies with this object in view are known as diagnostic research studies). For e.g., A study that aims to identify why a certain product is not selling well in the market, despite having a unique feature.
4. To test a hypothesis of a causal relationship between variables (such studies are known as hypothesis-testing research studies). E.g.:If you stay

up late, then you feel tired the next day. Turning off your phone makes it charge faster.

6. Briefly describe the different steps involved in a research process



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• Stage 1: Identifying the Research Problem • Start by selecting a research topic or problem. In the context of concrete, you could choose a specific issue like "The Impact of Different Types of Aggregates on Concrete Strength in Indian Construction.“

• Stage 2: Literature Review • Encourage students to review existing literature and research related to the chosen problem. They can learn about previous studies, theories, and findings to understand the context and identify gaps in knowledge.

• Stage 3: Formulating Hypotheses • Have students formulate research hypotheses based on their literature review. For the example, a hypothesis could be: "Concrete made with locally sourced aggregates in India will exhibit varying strengths compared to concrete made with imported aggregates."

• Stage 4: Data Collection • Teach students various methods of data collection. In this case, they could conduct experiments to test concrete samples made with different aggregates. This might involve measuring compressive strength, durability, and other relevant properties.

• Stage 5: Drawing Conclusions

• Guide students in drawing conclusions based on their data analysis. For instance, they might conclude that locally sourced aggregates have a certain advantage or disadvantage in terms of concrete strength in the Indian context.

• Stage 7: Reporting and Documentation

• Emphasize the importance of clear and comprehensive reporting. Students can create research reports or presentations to communicate their findings, methods, and conclusions effectively.

Stage 8: Presentation

•Teach students how to present their research findings to an audience. They could present their concrete research in a classroom setting, simulating a conference or seminar

7. Motivation of research

The possible motives for doing research may be either one or more of the following:

1. Desire to get a research degree along with its consequential benefits.
2. Desire to face the challenge in solving unsolved problems, i.e., concern over practical problems initiates research.
3. Desire to get the intellectual joy of doing some creative work.
4. Desire to be of service to society.
5. Desire to get respectability

8. Write short notes on Research and scientific method.

• Scientific method is a systematic step-by-step procedure following the logical processes of reasoning.

• Used to gain the knowledge of the universe.

• According to Karl Pearson “Scientific method is one and same in all branches”.

• It refers to the procedure and mode of investigation.

Basics of the scientific method

• Reliance on empirical evidence.

• Use of relevant concepts.

• Commitment to objectivity.

• Ethical neutrality

• Generalization

• Verifiability

• Logical reasoning process

9. Describe fully the techniques of defining a research problem

The techniques involved are:

• At the beginning statement of a problem should be general way,then narrow it down.

• Understanding the nature of the problem through discussions

• Surveying the available literature

• Developing ideas through discussions

• Rephrasing the research problem into a working proposition

10.How do you define a research problem?

- A research problem is a challenge that a researcher encounters in the context of seeking theoretical or practical solutions.

- It's the first and fundamental step in the research process.

- It can be a real-life situation or a set of opportunities.

Types of Research Problems:

1. Problems related to states of nature:

- Examples: The status of working children in a specific city in a particular year.

2. Problems related to relationships between variables:

- Examples: Investigating whether the lack of chemical fertilizer is the main cause of low grain food production.

Components of Research Problem:

• An individual or a group or an organization that has some difficulty or problem

• Some objective to be attained

• Alternative means for attaining the objectives

• Some doubt in the mind of a researcher with regard to the selection of alternatives

• Some environment(s) to which the difficulty pertains.

Selecting Research Problem/issues

• Subject which is overdone shall not be chosen.

• Controversial subject should not become the choice of an average researcher.

• Too narrow or too vague problems should be avoided.

• Subject selected for research should be familiar and feasible.

• Few factors to be considered are importance of the subject, the costs involved, the time factor, the qualifications and the training of a researcher

• Selection of a problem must be preceded by a preliminary study in case of new problems

Necessity of Defining Research Problem:

• To avoid deviating from the goal, the definition of a problem sets the direction of the study.

• To derive the objective

• Proper methodology and selection of study

• Selection of variables of the study

• Clarity for readers

• Definition helps the researchers to control the subjectivity or biases of the researcher

• Makes study feasible

11. Elaborate on research approaches

Mainly there are two basic approaches to research, the quantitative approach and the qualitative approach.

Quantitative approach:

• This involves the generation of data in quantitative form which can be subjected to rigorous qualitative analysis in a formal and rigid fashion.

• This approach can be further sub-classified into inferential, experimental and simulation approaches to research.

• The purpose of the inferential approach is to form a database to conclude characteristics or relationships of the population. This usually means survey research where a sample of the population is studied to determine its characteristics, and it is then inferred that the population has the same characteristics.

• Experimental approach is characterized by much greater control over the research environment and in this case some variables are manipulated to observe their effect on other variables. The simulation approach involves the construction of an artificial environment within which relevant information and data can be generated. This permits observation of the dynamic behavior of a system (or its sub□system) under controlled conditions.

Qualitative approach:

This research approach is concerned with the subjective assessment of attitudes, opinions and behavior. Research in such a situation is a function of researcher's insights and impressions. Such an approach to research generates results either in non-quantitative form or in the form which are not subjected to rigorous quantitative analysis. Generally, the techniques of focus group interviews, projective techniques and depth interviews are used.

• The most frequently used qualitative research methods are one-on-one interviews, focus groups, phenomenology, grounded theory, ethnographic research, case study research, record keeping, and qualitative observation.

• If there were a group of people in a room, qualitative data could describe how they feel, what they look like, what clothes they are wearing, or the motivations of why they're here. Whereas quantitative data about the same group may include the number of people in the group, their age, or the temperature in the room.

• Examples of phenomenological research include exploring the lived experiences of women undergoing cervical cancer treatment or the lived experiences of family members waiting for a loved one undergoing major surgery.

• Grounded theory is often used by the HR department. For instance, they might study why employees are frustrated by their work. Employees can explain what they feel is lacking. HR then gathers this data, examines the results to discover the root cause of their problems and presents solutions.

12. Discuss about Literature Review

• A literature review is the research and evaluation of the available literature in your chosen topic area. It includes a survey of scholarly sources to provide an overview of the current research and available data and knowledge.

• These sources include books, journal articles, and newspapers, that relate to your research question.

• Moreover, it not only summarizes the sources. But it also analyzes, interprets, and evaluates the relevant theories, methods, points of view, and gaps in the existing literature.

• However, this does not mean that a literature review is based on previous searches only. The writer discusses the research question and its various aspects and discusses the relevant study to support this claim

Importance of a Good Literature Review

• Some of the key reasons to add a literature review into your research paper, thesis, and dissertation include:

• It shows that the writer is familiar with the topic and the relevant literature.

• It helps to develop a theoretical framework and methodology for the research.

• It enables you to identify a research gap and contribute to filling that void by contributing to the field.

• It resolves any conflicts between the previous studies.

• Identify and highlight gaps and shortcomings in the existing body of knowledge and how things need to change.

• Convey to readers how your study is different or how it contributes to the research area.

How long should a literature review be

• Ideally, the literature review should take up 15%-40% of the total length of your manuscript. So, if you have a 10,000-word research paper, the minimum word count could be 1500.

• Your literature review format depends heavily on the kind of manuscript you are writing — an entire chapter in case of doctoral theses, a part of the introductory section in a research article, to a full-fledged review article that examines the previously published research on a topic

Types of Literature Reviews:

Different types of literature reviews All literature reviews are not the same. There are a variety of possible approaches that you can take. It all depends on the type of research you are pursuing. Here are the different types of literature reviews:

1. ### Argumentative review:

   It is called an argumentative review when you carefully present literature that only supports or counters a specific argument or premise to establish a viewpoint.

2. ### Methodological review:

This approach delves into the ''how'' and the ''what" of the research question, you cannot look at the outcome in isolation; you should also review the methodology used.

3. Systematic review:

This form consists of an overview of existing evidence pertinent to a clearly formulated research question, which uses pre-specified and standardized methods to identify and critically appraise relevant research and collect, report, and analyze data from the studies included in the review. In people with multiple sclerosis, what is the extent to which a walking intervention, compared to no intervention, improves self-report fatigue?

4. Meta-analysis review:

Meta-analysis uses statistical methods to summarize the results of independent studies. By combining information from all relevant studies, meta-analysis can provide more precise estimates of the effects than those derived from the individual studies included within a review. Examples of a meta-analysis include statistically combining the results of many different clinical trials on the cardiovascular benefits of taking daily aspirin for people at risk of heart disease

5. Historical review:

Historical literature reviews focus on examining research throughout a period, often starting with the first time an issue, concept, theory, or phenomenon emerged in the literature, then tracing its evolution within the scholarship of a discipline. The purpose to place research in a historical context to show familiarity with state-of-the-art developments and identify future research's likely directions. An example of historical research design is the study of primary and secondary sources, such as historical documents and archives (diplomatics) in researching an event from the past.

6. Scoping Review:

The Scoping Review is often used at the beginning of an article, dissertation, or research proposal. It is conducted before the research to

highlight gaps in the existing body of knowledge and explains why the project should be greenlit. 7. State-of-the-Art Review: The State-of-the-Art review is conducted periodically, focusing on the most recent research. It describes what is currently known, understood, or agreed upon regarding the research topic and highlights where there are still disagreements. It Provide a time-based overview of the current state of knowledge about a phenomenon and suggest directions for future research