

Assignment No.1

Q.1 Define briefly each source of knowledge. Explain the one that inspires you the most and why?

Human body needs nutritious food for its healthy existence. Human mind also need nutritious food for their healthy and brilliant functioning. Hence Knowledge is considered as the food of mind. The definition of knowledge is ongoing debate among the philosophers in the field of epistemology. According to Plato Knowledge is justified true belief. Knowledge can be defined as a familiarity awareness or understanding of someone or something such as facts, information, descriptions or skills, which is acquired through experiences or education by perceiving, discovering or learning. Any new information acquired by an organism through formal, informal or non-formal way of inquiry can be termed as knowledge. Knowledge make individuals more strength and confident in their activity. The activity of research builds new knowledge, theory or formulates generalization.

Ways/Source of Acquiring Knowledge

Curious to know about new things is the main motivating factor for searching new knowledge. When a person feel disequilibrium regarding any matter of content, s/he start search for reaching valid conclusion regarding the matter of doubt. The process of clarification leads them to equilibration in their cognition. For the purpose of getting new information the human beings are using following ways to accumulate new knowledge.

Sensory Perception

Senses are the gate ways of knowledge. Five senses help an individual to get primary information regarding any object, individual or events and so forth. For example, students can see an experiment conducted by the teacher, hear the explanation, touch the object or product, smell the output, taste the product etc. Through this five activity (five sense organs) or any one activity (single sense organ) students are able to construct and verify information regarding the experiment conducted. Hence sensory perceptions are the one important source or means of acquiring knowledge. In the case of a researcher, the sensory perceptions are important to them to collect information and verify the authenticity and originality of acquired knowledge.

Logical Reasoning

Logical reasoning is another way of acquiring Knowledge. It is related to brainy functioning. Ignorance and blind believes made man as a sleeping brains, later, curiosity and search for cause and effect relationship paved the way of unfolding natural truths and facts. People become modern and developed by the way they approached the matters through logical reasoning. Deductive as well as inductive reasoning are emerged by the time as methods of logical reasoning. Individuals may infer things through deductive reasoning, abstract thinking, finding relationship between events and variables and so forth. For example a competent person can make valid conclusion regarding the nature and consequences of certain events by observing behavior of individuals or analyzing chain of events, statement and attitude of national leaders and so forth. Through the logical reasoning a researcher can deduct and infer information regarding the research problem.

Deductive Reasoning

It is the earlier philosophical method of Logical Reasoning. Categorical syllogism is considered as the old systematic method of logical reasoning. The famous philosopher Aristotle developed it as Deductive method of problem solving. Moving from General assumptions to specific application, that means the general to particular principle (DGP). It can be understood by the explanation of categorical syllogism given below.

Categorical Syllogism

Syllogistic reasoning is a kind of logical argument that applies deductive reasoning for drawing a valid conclusion based on two or more propositions. Categorical syllogism consists of three components; such as Major premise, Minor Premise, Conclusion. It establishes a logical relationship between them.

Major Premise: it is a self evident assumption, previously established by metaphysical truth or dogmas. For example all men are mortal

Minor Premise: it is a particular case related to the major premise. For example, Socrates is a man

Conclusion: based on both premises conclusion and inference could be surely possible. For example Socrates is mortal

Form the above example we can observe the general assumption in major premise; that is all men are mortal. Then leads to particular observation in minor premise that Socrates is a man and concludes that that's why he is a mortal.

Inductive Reasoning

Later much creative criticism had been raised regarding the process drawing conclusion from general phenomenon. Because of the reason that there might be some dogmas and myths, baseless beliefs which had not been empirically proved but believed that, they are true and as well as had impacted the conclusion. So it leads to creating unreliable and error information to the people. Hence many centuries later Francis Bacon advocated the inductive method of reasoning or problem solving which had kicked back the limitation of the deductive method. It is the process of specific observations of phenomenon which leads to generalization. Here individuals arrive to conclusions after the empirical verification of many individual observations of a common phenomenon. Hence there is no possibility to adopt any dogmas or myth as a foundation of knowledge. Here the problem solver ensures the mortality of the human beings or any organism in particular case. For example a person analyzing the life history of great personalities, such as Mahatma Gandhi, Nehru, Maulana Abul Kalam Azad, Abraham Lincoln and so forth. S/he could reach a conclusion that even though these personalities had a strong back up of the political power they could not overcome the death. And there is no organism can be found on earth alive after a reasonable length of period. Hence it is concluded that every organism with soul or life should breathe its last after a while.

Authority

There are several occasions where a researcher needs authoritative knowledge. All official information can be termed as authoritative knowledge. One can get information from concern authority regarding their concerned.

Right to information act is a good example for the same. If any individual need authentic information regarding any authority s/he can file a query regarding his information concerned through RTI to concerned authority. This process ensures an information seeker to get authentic knowledge from authority. For example if a researcher needs information regarding the enrollment, dropout rate, literacy rate, budget allocation to different educational sector, s/he can be collect information from the concern authority regarding the above. The information provided by the concerned authority would be the knowledge from authority or authoritative knowledge.

Traditions

Traditions are another important source of knowledge. Much social related knowledge are preserved and transmitted through traditions. For example social skills, values, social functions are entirely routed in traditions of the society. Traditions have local as well as national impact. A researcher can get information regarding the indigenous treatment system, folklore arts, skilled based traditional social class are available from social traditions. There much information which is largely depends on traditions.

Experience

Personal as well as professional experience of an individual contributes much in his knowledge. Personal experience in family, society, and neighborhood taught humans many lessons regarding the behavior, adjustment, social dealings, patience and so forth. Professional experiences make an individual perfectly professional. Knowledge of matters regarding to be performed or not to be do in personal as well as professional situation create through experiences. Learning by doing is also come under this category.

Naturalistic Inquiry

Thirst for knowledge is the uniqueness of human being. When s/he wants to solve a certain problem or confront a curious situation. S/he starts searching for the solution of the problem in naturalistic way. The final solution will be found out by getting new information regarding the problem through the inquiry. For example a researcher felt a problem of why the students of backward areas are less enrolled in higher education. The researcher may formulate possible reasons and possibilities of the problem. Empirically collect information from the original sources, s/he may go to the community location and approach the concerned subject of the study and their social situation. Through this inquiry process the researcher get much valuable information and thereby infer the solution of the problem. The knowledge construction through this process can be termed as naturalistic Inquiry.

Trial and Error

Trial and error is one of the ways of acquiring new knowledge. The term trial and error is contributed by famous psychologist E.L. Thorndike. Individuals learn more things through trial and error process. Knowledge related to practical, professional, skilled and semi skilled professions are largely depends on this source of knowledge. For example knowledge of use of computer, smart phone, driving, playing cricket, football, teaching etc can be acquired through trial and error.

Scientific approach

Knowledge can be created or accumulated through various means. Scientific approach is very important means of knowledge acquisition. Scientific approach ensures the reliability and rationality of the information or knowledge acquired. The knowledge constructed through scientific approach has following features.

1. Body of Knowledge
2. Universal application
3. Empirically proved
4. Experimental
5. Measurable
6. Observable
7. Trustworthiness
8. Objectivity
9. Validity
10. Reliability
11. Predictability

Scientific Method in Developing Knowledge

Scientific method ensures the reliability and validity of the knowledge constructed through its process. The adoption of the scientific method eliminates the biasness as well as the fake information regarding the matter of concern. John Dewey (1938) identified the following steps for scientific method which constitute the elements of deductive and inductive reasoning.

1. Identification and definition of problems
2. Formulation of hypotheses
3. Collection, organization and Analysis of data
4. Formulation of conclusion
5. Verification, Rejection, or Modification of hypotheses

Intuition

Knowledge revealed from insight is another means of knowledge acquisition. Archimedes' Principles, Lord Buddha are the living examples of acquired knowledge through intuitions. Many of the life situations we also had experienced intuitive knowledge to solve our life problems. Intuitive knowledge can be acquired through following process.

1. Preparation

In this step all available information regarding the problem to be solved must be assembled and analyzed in depth. Continuous attempts are made to found out solutions and the process is set aside.

2. Incubation

No intentional attempt made to solve the problem. It come to mind while playing, cooking or at bathroom and so forth.

3. Illumination

Illumination is the process of intuiting many ideas in the mind of the problem solver unexpectedly. It may be the result of preparation as well as the relaxed mood of incubation period. The script writers, poets, writers, scientist are getting ideas or knowledge in this manner.

4. Verification

After receiving the idea the problem solver should verify or test the validity and reliability of the information empirically. The level of attaining knowledge through intuition must be depends on the motivation as well as the intelligence level of problem solver.

Learning

Learning from the original sources is another method of acquiring knowledge. In modern era Lot of information are available at finger tips. Learning can be done through online as well as off line mode. One can depend the formal classroom as well as non-formal way of learning for acquiring knowledge. Stream wise systematic knowledge are disseminating in formal classrooms. For example, the subjects like engineering, medicine, education, psychology, statistics and so forth are studying in formal classrooms. If an individual is not able to attend the regular classroom for his educational purpose he can avail knowledge through distance learning. However there are many doors are opens for accessing knowledge throughout the world. Learner can search primary sources or secondary sources of information for accumulating knowledge. Learning can be done selectively as per the requirements of the knowledge seeker.

Q.2 Discuss the accepted connotation of research. To what extent do you agree to them? Explain.

Research is the collection and evaluation of information about a particular subject. The overarching purpose of research is to answer questions and generate new knowledge.

Two broad approaches to research are commonly recognized, though these different approaches may overlap. Put simply, quantitative research involves the systematic collection and analysis of data, while qualitative research involves "the studied use and collection of a variety of empirical materials," which may include "case study, personal experience, introspection, life story, interviews, artifacts, [and] cultural texts and productions" (The SAGE Handbook of Qualitative Research, 2005). Finally, mixed-method research (sometimes called triangulation) has been defined as the incorporation of various qualitative and quantitative strategies within a single project.

There are other ways of classifying different research methods and approaches. For example, sociology professor Russell Schutt observes that "[d]eductive research begins at the point of theory, inductive research begins with data but ends with theory, and descriptive research begins with data and ends with empirical generalizations"

"College **research** assignments are an opportunity for you to contribute to an intellectual inquiry or debate. Most college assignments ask you to pose a question worth exploring, to read widely in search of possible answers, to interpret what you read, to draw reasoned conclusions, and to support those conclusions with valid

and well-documented evidence. Such assignments may at first seem overwhelming, but if you pose a question that intrigues you and approaches it like a detective, with genuine curiosity, you will soon learn how rewarding research can be.

"Admittedly, the process takes time: time for researching and time for drafting, revising, and documenting the paper in the style recommended by your instructor. Before beginning a research project, you should set a realistic schedule of deadlines."

(Diana Hacker, *The Bedford Handbook*, 6th ed. Bedford/St. Martin's, 2002)

"Talent must be stimulated by facts and ideas. Do **research**. Feed your talent. Research not only wins the war on cliché, it's the key to victory over fear and its cousin, depression."

(Robert McKee, *Story: Style, Structure, Substance, and the Principles of Screenwriting*. HarperCollins, 1997)

"Beginning researchers need to start by using the seven steps listed below. The path is not always linear, but these steps provide a framework for conducting **research**..."

(Leslie F. Stebbins, *Student Guide to Research in the Digital Age*. Libraries Unlimited, 2006)

1. Define your research question
2. Ask for help
3. Develop a research strategy and locate resources
4. Use effective search techniques
5. Read critically, synthesize, and seek meaning
6. Understand the scholarly communication process and cite sources
7. Critically evaluate sources"

Q.3 Discuss in detail the need of educational research.

A careful consideration of study regarding a particular concern or problem using scientific methods. According to the American sociologist Earl Robert Babbie, "Research is a systematic inquiry to describe, explain, predict, and control the observed phenomenon. Research involves inductive and deductive methods."

Inductive research methods are used to analyze an observed event. Deductive methods are used to verify the observed event. Inductive approaches are associated with qualitative research and deductive methods are more commonly associated with quantitative research.

Research is conducted with a purpose to understand:

- What do organizations or businesses really want to find out?
- What are the processes that need to be followed to chase the idea?
- What are the arguments that need to be built around a concept?
- What is the evidence that will be required for people to believe in the idea or concept?

Characteristics of research

1. A systematic approach must be followed for accurate data. Rules and procedures are an integral part of the process that set the objective. Researchers need to practice ethics and a code of conduct while making observations or drawing conclusions.
2. Research is based on logical reasoning and involves both inductive and deductive methods.
3. The data or knowledge that is derived is in real time from actual observations in natural settings.
4. There is an in-depth analysis of all data collected so that there are no anomalies associated with it.
5. Research creates a path for generating new questions. Existing data helps create more opportunities for research.
6. Research is analytical in nature. It makes use of all the available data so that there is no ambiguity in inference.
7. Accuracy is one of the most important aspects of research. The information that is obtained should be accurate and true to its nature. For example, laboratories provide a controlled environment to collect data. Accuracy is measured in the instruments used, the calibrations of instruments or tools, and the final result of the experiment.

Following are the types of research methods:

Basic research: A basic research definition is data collected to enhance knowledge. The main motivation is knowledge expansion. It is a non-commercial research that doesn't facilitate in creating or inventing anything. For example: an experiment to determine a simple fact.

Applied research: Applied research focuses on analyzing and solving real-life problems. This type refers to the study that helps solve practical problems using scientific methods. Studies play an important role in solving issues that impact the overall well-being of humans. For example: finding a specific cure for a disease.

Problem oriented research: As the name suggests, problem-oriented research is conducted to understand the exact nature of a problem to find out relevant solutions. The term "problem" refers to multiple choices or issues when analyzing a situation.

For example, revenue of a car company has decreased by 12% in the last year. The following could be the probable causes: there is no optimum production, poor quality of a product, no advertising, or economic conditions.

Problem solving research: This type of research is conducted by companies to understand and resolve their own problems. The problem-solving method uses applied research to find solutions to the existing problems.

Qualitative research: Qualitative research is a process that is about inquiry. It helps create in-depth understanding of problems or issues in their natural settings. This is a non-statistical method.

Qualitative research is heavily dependent on the experience of the researchers and the questions used to probe the sample. The sample size is usually restricted to 6-10 people. Open-ended questions are asked in a manner that encourages answers that lead to another question or group of questions. The purpose of asking open-ended questions is to gather as much information as possible from the sample.

The following are the methods used for qualitative research:

1. One-to-one interview
2. Focus groups
3. Ethnographic research
4. Content/Text Analysis
5. Case study research

Quantitative research: Quantitative research is a structured way of collecting data and analyzing it to draw conclusions. Unlike qualitative methods, this method uses a computational and statistical process to collect and analyze data. Quantitative data is all about numbers. Quantitative research involves a larger population — more people means more data. With more data to analyze, you can obtain more accurate results. This method uses close-ended questions because the researchers are typically looking to gather statistical data. Online surveys, questionnaires, and polls are preferable data collection tools used in quantitative research. There are various methods of deploying surveys or questionnaires. Online surveys allow survey creators to reach large amounts of people or smaller focus groups for different types of research that meet different goals. Survey respondents can receive surveys on mobile phones, in emails, or can simply use the internet to access surveys.

There are three purposes of research:

1. **Exploratory:** As the name suggests, exploratory research is conducted to explore a group of questions. The answers and analytics may not offer a final conclusion to the perceived problem. It is conducted to handle new problem areas which haven't been explored before. This exploratory process lays the foundation for more conclusive research and data collection.
2. **Descriptive:** Descriptive research focuses on expanding knowledge on current issues through a process of data collection. Descriptive studies are used to describe the behavior of a sample population. In a descriptive study, only one variable is required to conduct the study. The three main purposes of descriptive research are describing, explaining, and validating the findings. For example, a study conducted to know if top-level management leaders in the 21st century possess the moral right to receive a huge sum of money from the company profit.
3. **Explanatory:** Explanatory research or causal research is conducted to understand the impact of certain changes in existing standard procedures. Conducting experiments is the most popular form of casual research. For example, a study conducted to understand the effect of rebranding on customer loyalty.

To understand the characteristic of research design using research purpose here is a comparative analysis:

	Exploratory Research	Descriptive Research	Explanatory Research
Research approach used	Unstructured	Structured	Highly structured

Research conducted through	Asking research questions	Asking research questions	By using research hypotheses.
When is it conducted?	Early stages of decision making	Later stages of decision making	Later stages of decision making

Qualitative Methods

Qualitative research is a method that collects data using conversational methods. Participants are asked open-ended questions. The responses collected are essentially non-numerical. This method not only helps a researcher understand what participants think but also why they think in a particular way.

Types of qualitative methods include:

- **One-to-one Interview:** This interview is conducted with one participant at a given point in time. One-to-one interviews need a researcher to prepare questions in advance. The researcher asks only the most important questions to the participant. This type of interview lasts anywhere between 20 minutes to half an hour. During this time the researcher collects as many meaningful answers as possible from the participants to draw inferences.
- **Focus Groups:** Focus groups are small groups comprising of around 6-10 participants who are usually experts in the subject matter. A moderator is assigned to a focus group who facilitates the discussion amongst the group members. A moderator’s experience in conducting the focus group plays an important role. An experienced moderator can probe the participants by asking the correct questions that will help them collect a sizable amount of information related to the research.
- **Ethnographic Research:** Ethnographic research is an in-depth form of research where people are observed in their natural environment without this method is demanding due to the necessity of a researcher entering a natural environment of other people. Geographic locations can be a constraint as well. Instead of conducting interviews, a researcher experiences the normal setting and daily life of a group of people.
- **Text Analysis:** Text analysis is a little different from other qualitative methods as it is used to analyze social constructs by decoding words through any available form of documentation. The researcher studies and understands the context in which the documents are written and then tries to draw meaningful inferences from it. Researchers today follow activities on a social media platform to try and understand patterns of thoughts.

Case Study: Case study research is used to study an organization or an entity. This method is one of the most valuable options for modern this type of research is used in fields like the education sector, philosophical studies, and psychological studies. This method involves a deep dive into ongoing research and collecting data.

Q.4 Differentiate between basic and applied research.

- **Definition**

Applied research is a research methodology that creates practical solutions for specific problems while basic research is an approach to research that seeks to expand knowledge in a field of study. This means that applied research is solution-driven while basic research is knowledge-specific.

Basic research seeks to advance the frontiers of knowledge by creating new theories or modifying existing ones. On the other hand, applied research is primarily concerned with creating solutions to problems by collecting and analyzing empirical data in order to arrive at valid research outcomes.

- **Characteristics**

Applied research is primarily defined by its focus on providing a practical solution to a defined problem while basic research is primarily defined by its focus on expanding knowledge. In other words, basic research is theory-oriented, applied research is practical-oriented.

Applied research is action-oriented and synthetic in nature while basic research is explanatory and analytical in nature. Basic research is solution-specific and primarily concerned with the expansion of knowledge and not with the application of research findings which is the focus of applied research.

- **Advantages of Basic Research over Applied Research**

Basic research results in the acquisition of new knowledge and it also expands existing knowledge while applied research does not lead to the acquisition of new knowledge. Applied research only focuses on applying knowledge to solve existing problems hence, it is solution-specific.

Findings from basic research have been predominantly responsible for breakthroughs in different fields of study while findings from applied research are primarily useful for solving specific research problems. Hence, basic research is universal in nature while applied research is limited in nature.

- **Advantages of Applied Research over Basic Research**

Applied research helps organizations and individuals to solve specific problems, unlike basic research that is simply focused on expanding knowledge without providing solutions to existing problems. This, however, does not negate the fact that findings from basic research are useful to proffer solutions to problems.

Unlike basic research which is somewhat subjective in its approach, applied research is an objective method of inquiry. Typically, applied research is unbiased because it arrives at outcomes by subjecting empirical evidence to standardized scientific procedures and this makes it a more valid research method.

- **Examples in Education**

In education, applied research is used to improve teaching and learning methods by providing practical solutions to pedagogic problems. On the other hand, basic research is used in education to develop new pedagogic theories that explain different behaviors by teachers and students within the learning environment.

Examples of basic research in education include:

1. How does the human memory work?
2. How do children acquire new languages?

Examples of applied research in education include:

1. A study to build students' interests in religious studies.
2. A study to improve classroom interaction between teachers and students.

- **Examples in Health**

Applied research helps health and medical practitioners to develop evidence-based solutions to pressing health problems. On the other hand, basic research helps medical practitioners to gain insights into different health issues such as the origin and symptoms of diseases and infections which can be useful in developing a cure for such conditions.

Examples of basic research in health include:

1. An investigation into the secondary symptoms of the Human Papilloma Virus (HPV).
2. An investigation into the symptoms of diarrhea.

Examples of applied research in health include:

1. An investigation to determine the healing properties of mushrooms.
2. An investigation to determine the side effects of alcohol consumption.

- **Examples in Psychology**

Applied research is extremely useful in industrial-psychology to create solutions for problems related to workplace behavior, organizational policies and employee recruitment processes. Basic research in psychology is used to gain insights into different psychological conditions in order to understand these behaviors better.

Examples of basic research in psychology include:

1. How do panic attacks happen?
2. What are the symptoms of anxiety disorders?

Examples of applied research in psychology include:

1. What are the treatment options for anxiety disorders?
2. What are the ways to improve employees' productivity in the workplace?

- **Other Names**

Basic research is also known as pure or fundamental research because it is knowledge-specific while applied research is also referred to as contractual research because of its primary focus on providing a solution to a specific problem.

- **Uses**

Applied research is useful for finding practical solutions to defined problems while basic research is useful for gathering novel information about a concept, phenomenon or field of study.

Basic research explores the functions and features of newly discovered phenomena in order to improve the understanding of these concepts hence; it fuels scientific and technological innovations. Applied research, on the other hand, helps to provide solutions to improve a specific condition or create new technology.

- **Research Purpose**

Basic research is driven by curiosity and the need to explore new areas of knowledge in different fields. On the other hand, applied research is driven by the need to provide answers to specific questions in order to solve a problem.

This means that applied research is primarily concerned with examining empirical evidence for answers while in basic research, the researcher examines data samples in order to gather more information about them. Such information improves the quality of knowledge of the subject matter.

- **Research Context**

Basic research is conducted in a controlled research environment such as a laboratory while conceptual research is conducted in a real-life setting that is not sterile or restricted. The sterile research context in basic research allows the researcher to strictly observe the behaviors and characteristics of the research subjects.

In applied research, however, the researcher allows the dependent and independent variables to freely interact with one another in an unrestricted setting where other variables or third factors may intervene. This allows the researcher to have a broader overview of the research problem and arrive at valid and practical solutions.

- **Scope of the Research**

Generally, applied research is more limited in scope when compared to basic research. This is because unlike basic research that can be applied to diverse concepts, applied research largely focuses on a specific subject, and its research outcomes are primarily relevant to this subject.

Because it deals with diverse concepts across different subject matters, basic research is considered a more universal research method than conceptual research. Fundamental research explores knowledge across multiple dimensions in order to gather new information and improve an existing body of knowledge.

- **Theory Formulation**

Basic research aims at formulating theories that explain research findings and in the process, improve a body of knowledge while applied research aims at arriving at research findings that can solve practical problems. Basic research focuses on principles and theories while applied research focuses on solutions.

Typically, basic research aims at formulating theories and generalizations that explain a concept, subject or phenomenon and are universally applicable. On the other hand, applied research or conceptual research studies empirical evidence in order to align its findings with a specific problem.

- **Research Outcomes**

After carrying out applied research by testing the empirical evidence, the researcher arrives at valid findings or conclusions that confirm or negate the research hypotheses. These findings typically answer the specific research questions, that is, the reason for the applied research.

On the other hand, at the endpoint of basic research lies new theories, new dimensions to existing theories or new information that improves on a body of knowledge. The outcomes of basic research do not directly serve as innovative solutions to a practical problem.

- **Research Approach**

Basic research is theoretical in nature while applied research is practical in nature. In this sense, basic research generates theories and improves on existing theories with the aim of contributing to an existing knowledge bank.

Applied research, on the other hand, is practical and more descriptive in nature. It is more concerned with the utility and value of research outcomes in terms of their end usage, that is, how they can be used to solve existing problems and develop innovations.

Are There Similarities Between Applied and Basic Research?

- **Data Gathering Methods**

basic and applied research adopt similar data collection processes in order to gather relevant data and arrive at the most objective research outcomes. They typically make use of qualitative and quantitative data gathering methods such as interviews, questionnaires, surveys, and focus groups to gather information and arrive at research outcomes.

- **Intersectionality**

The research outcomes of basic research often serve as the bedrock for applied research.

- **Inductive and Deductive Reasoning**

Basic and applied research methods make use of both inductive and deductive reasoning to support the research hypotheses. In deductive reasoning, the researcher moves from the idea to observation, while in inductive reasoning, the researcher transits from observation to the idea.

Conclusion

It is important for researchers to understand the similarities and differences between applied and basic research methods. As highlighted earlier, the major difference between applied and basic research is the purpose of the research, that is, what the research is set to achieve.

Apart from the purpose of the research, applied and basic research also differ based on the research outcomes, nature of the research and its contexts, to mention but a few. However, both research methods adopt similar data gathering processes including observation and interviews, in order to arrive at objective outcomes.

Q.5 Describe the experimental designs in your own words.

Experimental research is a scientific approach to research, where one or more independent variables are manipulated and applied to one or more dependent variables to measure their effect on the latter. The effect of the independent variables on the dependent variables is usually observed and recorded over some time, to aid researchers in drawing a reasonable conclusion regarding the relationship between these 2 variable types.

The experimental research method is widely used in physical and social sciences, psychology, and education. It is based on the comparison between two or more groups with a straightforward logic, which may, however, be difficult to execute.

Mostly related to a laboratory test procedure, experimental research designs involve collecting quantitative data and performing statistical analysis on them during research. Therefore, making it an example of quantitative research method.

The types of experimental research design are determined by the way the researcher assigns subjects to different conditions and groups. They are of 3 types, namely; pre-experimental, quasi-experimental, and true experimental research.

Pre-experimental Research Design

In pre-experimental research design, either a group or various dependent groups are observed for the effect of the application of an independent variable which is presumed to cause change. It is the simplest form of experimental research design and is treated with no control group.

Although very practical, experimental research is lacking in several areas of the true-experimental criteria. The pre-experimental research design is further divided into three types

- **One-shot Case Study Research Design**

In this type of experimental study, only one dependent group or variable is considered. The study is carried out after some treatment which was presumed to cause change, making it a posttest study.

- **One-group Pretest-posttest Research Design:**

This research design combines both posttest and pretest study by carrying out a test on a single group before the treatment is administered and after the treatment is administered. With the former being administered at the beginning of treatment and later at the end.

- **Static-group Comparison:**

In a static-group comparison study, 2 or more groups are placed under observation, where only one of the groups is subjected to some treatment while the other groups are held static. All the groups are post-tested, and the observed differences between the groups are assumed to be a result of the treatment.

Quasi-experimental Research Design

The word "quasi" means partial, half, or pseudo. Therefore, the quasi-experimental research bearing a resemblance to the true experimental research, but not the same. In quasi-experiments, the participants are not randomly assigned, and as such, they are used in settings where randomization is difficult or impossible.

This is very common in educational research, where administrators are unwilling to allow the random selection of students for experimental samples.

Some examples of quasi-experimental research design include; the time series, no equivalent control group design, and the counterbalanced design.

True Experimental Research Design

The true experimental research design relies on statistical analysis to approve or disprove a hypothesis. It is the most accurate type of experimental design and may be carried out with or without a pretest on at least 2 randomly assigned dependent subjects.

The true experimental research design must contain a control group, a variable that can be manipulated by the researcher, and the distribution must be random. The classification of true experimental design include:

- **The posttest-only Control Group Design:** In this design, subjects are randomly selected and assigned to the 2 groups (control and experimental), and only the experimental group is treated. After close observation, both groups are post-tested, and a conclusion is drawn from the difference between these groups.
- **The pretest-posttest Control Group Design:** For this control group design, subjects are randomly assigned to the 2 groups, both are presented, but only the experimental group is treated. After close observation, both groups are post-tested to measure the degree of change in each group.
- **Solomon four-group Design:** This is the combination of the pretest-only and the pretest-posttest control groups. In this case, the randomly selected subjects are placed into 4 groups.

The first two of these groups are tested using the posttest-only method, while the other two are tested using the pretest-posttest method.

Differences between Experimental and Non-Experimental Research

- In experimental research, the researcher can control and manipulate the environment of the research, including the predictor variable which can be changed. On the other hand, non-experimental research cannot be controlled or manipulated by the researcher at will.

This is because it takes place in a real-life setting, where extraneous variables cannot be eliminated. Therefore, it is more difficult to conclude non-experimental studies, even though they are much more flexible and allow for a greater range of study fields.

- The relationship between cause and effect cannot be established in non-experimental research, while it can be established in experimental research. This may be because many extraneous variables also influence the changes in the research subject, making it difficult to point at a particular variable as the cause of a particular change
- Independent variables are not introduced, withdrawn or manipulated in non-experimental designs, but the same may not be said about experimental research.