

Understanding Research Paradigm War

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Research and its methodology are governed by the research paradigm. The research paradigm is a guide to the research work and researcher as it directs the investigator to define and delimit the problem, decide its design of work and conclude the way the selected research paradigm is directed. As a concept, it started its journey with the Positivist paradigm followed by the Interpretivism paradigm which emerged as an opponent to Positivism. Now we have Pragmatic and Critical research paradigms as well. There continues a war among different aspects of paradigm and even about their category and their relative relevance. Some researchers find other paradigms as well, though most of the available literature talks only in terms of these four research paradigms. There is also differing opinion on the concept of paradigm, especially about the Pragmatic paradigm. Some literature claims about three methodologies within the pragmatic paradigm Mixed Method, Q-Methodology, and Generic Qualitative Inquiry; whereas most of the research interchangeably uses either the pragmatic paradigm or mixed method paradigm.

There is differing opinion about the elements of the paradigm as well. Some researchers believe only in three elements Ontology, Epistemology and Methodology, others add Axiology to make the number four. Research has research ethics and it is being undertaken to help man and mankind in some way or other, so the list of research elements cannot be considered complete without including Axiology as the fourth element. No doubt, the two paradigms-Positivism and Interpretivism are the main research paradigms as they are opposite to each other in a complete sense. As they are opposite to each other they complete the circle of the research demand of the investigators. Pragmatism claims that by mixing and integrating these two paradigms by employing their strengths together the research work may be done in a better way. Can we think of research where we use the strength of both paradigms and simultaneously remove their limitations? How one can use any two approaches or systems by removing their limitations to go with their strength only and that too without sacrificing their originality? The maximum conflict among the researchers is on this issue of mixing and integrating positivism and anti-positivism. N. L. Gage may not be completely right in their intense war-like concepts in terms of paradigm war, but he cannot be found at any juncture of research work completely wrong. Paradigm war is there, and it needs to be. It is good for the development of the research world, researchers and the academia. A critical research paradigm with the objectives to study and fight for the improvement of humans and humanity may not be practical, but it has logic in it. We need academic activists to work as social activists. Gandhi, Bose, Mandela, and Jaiprakash are there in history and their success story is not without the support of the academic world and academic institutions. A group of researchers claims that days are to come when the dual pole of Positivism and Interpretivism will shift as Critical and Non-critical paradigms only. This claim may not be reliable and valid, but the thought war is for the development of the research world and the larger academic audience. Let us continue with this ongoing paradigm war for the betterment of the academic world and the development of mankind at large.

Keywords: Research paradigm, Positivist, Interpretivist, Critical, Pragmatism, Ontology, Epistemology, Research Methodology, Axiology, Paradigm War

Research Paradigm as a Concept

The word paradigm originated from the Greek word – paradeigma, and this means pattern (Wikipedia, 2020). A paradigm is a standard perspective or set of ideas. A paradigm is a way of looking at something. This word was first used in the research by Kuhn in 1962 to describe a conceptual framework that is accepted by a community of researchers and that provides them with an in-depth guideline to conduct the research. Wikipedia (2020) manifests, "The Oxford Dictionary of Philosophy (2008) attributes the following description of the term in the history and philosophy of science to Thomas Kuhn's 1962 work The Structure of Scientific Revolutions." A research paradigm is an approach or a research model to conduct research that has been verified by the research community for a long and that has been in practice for more than hundreds of years. Wikipedia(2020) quoting The Merriam-Webster Online Dictionary narrates that "The Merriam-Webster Online dictionary defines one usage of paradigm as " a philosophical and theoretical framework of a scientific school or discipline within which theories, laws, and generalizations and the experiments performed in support of them are formulated; broadly: a philosophical or theoretical framework of any kind." If we analyse the statement we may easily conclude that a research paradigm is a framework that provides a philosophical and theoretical basis to the research to be undertaken. In fact, a research paradigm is a philosophical framework that one's research is based on. It offers a pattern of beliefs and understanding from which the theories and practices of one's research work operate. It

forms the philosophical basis of a research task or work. Quoting Kuhn and Morgan Brierley, John A. (2017) defines, " A paradigm is a shared belief system that influences the types of knowledge researchers seek to obtain and how they interpret any research evidence they may collect (Morgan,2007). Kuhn (1962, 1996) is responsible for the use of paradigms as an approach for summarizing researcher's beliefs and practices that relate to how they create knowledge."

A research paradigm is a set of common beliefs and agreements shared between scientists about how problems should be understood and addressed. A paradigm determines the criteria according to which one selects and defines problems for inquiry. A paradigm determines scientific approaches and procedures which stand out as exemplary to a new generation of scientists- as long as they do not oppose it. Kuhn characterizes a paradigm as an integrated cluster of substantive concepts, variables and problems attached to corresponding methodological approaches and tools.

Khatri, Krishna Kumar (2020) writes, "According to Lincoln and Guba (1985), a paradigm comprises four elements, namely, epistemology, ontology, methodology and axiology." A group of researchers talks about three elements by adding methodology in epistemology& ontology and ignoring axiology. Lakshmi, Y.Vijaya (2019) also states in a paper in the same manner, "All researchers work within the framework or paradigms of underpinning philosophical assumptions about the nature of knowledge (epistemology), nature of reality (ontology) and philosophy of science even though they will not necessarily be aware of them and might not even claim to hold." As per Guba Research paradigm can be characterised by the way scientists respond to three basic questions - ontological, epistemological and methodological questions. Kkatri, KK (2020) very comprehensively narrates paradigm as a concept and its related elements, "Research paradigm is a philosophical standpoint of the researcher from which research phenomena are observed and analyzed. It is the comprehensive belief system and philosophical worldview that guide the process and actions of the whole research activity. More specifically, a research paradigm is a philosophical base of research dealing with the nature of reality, whether it is external or internal (i.e., ontology); the nature, type and sources of knowledge generation (i.e., epistemology); a disciplined approach to generate that knowledge (i.e., methodology); the ethical issues that need to be considered in research (i.e., axiology)."

Types of Research Paradigm

Most of the research paradigm emerges from any of the two approaches to research which are the positivist approach and interpretivist approach. One of the paradigms that emerged in recent years is the Pragmatic Paradigm or Mixed- Method Paradigm. Among scientists, social scientists and scholars research paradigm wars continued, but most of them do agree to talk in terms of four major research paradigms in vogue today:

- (1) Positivist Paradigm
- (2) Interpretivist Paradigm
- (3) Critical Paradigm
- (4) Pragmatic Paradigm

Kivunja, Charles and Kuyini, Ahmed Bawa(2017) with the support of the review also advocate talking in terms of four research paradigms as mentioned above, " A large number of paradigms have been proposed by researchers but Candy (1989), one of the leaders in the field, suggests that they all can be grouped into three main taxonomies, namely Positivist, Interpretivist, or Critical paradigms. However, other researchers such as Tashakkori and Teddlie (2003a; 2003b) propose a fourth that borrows elements from these three and is known as the Pragmatic paradigm." A Research Paradigm consists of Ontology, Epistemology and Research Methodology. Ontology and Epistemology comprise Research Philosophy. Research Philosophy combined with Methodology comprises a Research Paradigm.

Elements of Research Paradigm

Usually, most of the research literature finds ontology, epistemology and research methodology as the three key elements of the research paradigm. In our deliberation considering Lincoln and Guba (1985), we shall be talking of four elements - ontology, epistemology, research methodology and axiology.

Ontology

Ontology comes from two Greek words "On" which means being and "logia", which means study; and so ontology is the study of being alive and existing. It is the metaphysical study of the nature of being and existence. Ontology is the branch of metaphysics dealing with the nature of being. It is a set of concepts and categories in a subject area or domain that shows their properties and the relations between them. Wikipedia (2022) defines Ontology as the branch of philosophy that studies concepts such as existence, being, becoming and reality. It includes the questions of how entities are grouped into basic categories and which of these entities exist on the most fundamental level. Ontology is sometimes referred to as the science of being and belongs to the major branch of philosophy known as metaphysics.

Monocategorical ontologies hold that there is only one basic category, which is rejected by polycategorical ontologies. Hierarchical ontologies assert that some entities exist on a more fundamental level and that other entities depend on them. Flat ontologies, on the other hand, deny such a privileged status to any entity.

Ontology enables the researcher to examine his/her underlying belief system and philosophical assumptions as the researcher about the nature of being, existence and reality. It is the ontological question that leads a researcher to inquire what kind of reality exists. Ontology refers to the nature of our beliefs and reality.

Epistemology

Epistemology is derived from the Greek word – episteme meaning knowledge and logos meaning account. Epistemology is the branch of philosophy concerned with knowledge or a branch that is related to the account of knowledge. Epistemologists study the nature, origin, and scope of knowledge, epistemic justification, the rationality of belief, and various related issues. Epistemology is the theory of knowledge, especially about its methods, validity, and scope, and the distinction between justified belief and opinion.

Epistemology refers to the branch of philosophy that studies the nature of knowledge and the process by which knowledge is acquired and validated. It is concerned with the nature and forms of knowledge, how it can be acquired and how communicated to other human beings.

It is an epistemological question that leads a researcher to debate the possibility and desirability of objectivity, subjectivity, causality, validity, and generalisability. The epistemological question asks, what is the nature of knowledge and what is the relationship between the knower and the known or the knowledge? Epistemology is the study of the nature of knowledge and justification and is used to describe how we come to know something, and how we know the truth or reality.

Research Methodology

Research methodology tells about the outline of the conduction of the research. It includes the process of data collection and analysis. It forms the philosophical basis of research. Research design, methods, approaches and procedures used in a study is a methodology of research. Data gathering, use of research tools, data analysis and many other research-related aspects are the integral elements of research methodology.

Axiology: Axiology refers to the ethical issues related to research work. It deals with defining, evaluating and understanding concepts of right and wrong behaviour relating to the research process. There are four criteria of ethical conduct: Teleology, Deontology, Morality and Fairness.

Teleology: Teleology is the theory of morality which postulates that doing what is intrinsically good or desirable. It is a moral obligation that should be pursued in human behaviour.

Deontology: Deontology is the understanding that every action that will be undertaken during the research will have its consequence, intended to benefit participants, the researcher, the scholastic community or the public at large.

Morality: It refers to the intrinsic moral values that will be upheld during the research i.e., the researcher will be truthful in their interpretation of the data.

Fairness: It drew the researcher's attention to the need to be fair to all research participants and to ensure their rights are upheld. There are four principles of ethical conduct; Privacy, Accuracy, Property and Accessibility. **Privacy** means the privacy of information given by participants. **Accuracy** means the accuracy of data or information. It needs to be recorded accurately. **Property** means who will own the data? How one will exchange the data to whom and how? Accessibility means who will have to access the data? and how will the data be kept safe and secure?

All these four elements of the research paradigm are distinct but related. Axiology provides a paradigm soul and the other three elements together complete its body. Without axiology, research has no meaning as this decides the utility of research work for human civilization and mankind. Krauss, SE(2005) states about the relationship of the other three elements of paradigm, "Epistemology is intimately related to ontology and methodology; as ontology involves the philosophy of reality, epistemology addresses how we come to know that reality while methodology identifies the particular practices used to attain knowledge of it." Like Krauss, other researchers miss out on axiology, but it is the essential element of the paradigm.

Positivist Research Paradigm

The positivist research paradigm is also known as the Analytic—Empirical —Positivistic—Quantitative Paradigm. Positivism as a philosophy views only factual knowledge and the knowledge gained by observation (through senses) and measurement. In a positivist study, the researcher is to collect data and interpret it objectively. The researcher in positivism is an objective analysis and distances from personal values in conducting the study. It is a hypothetico-deductive approach and the researcher usually adopts a deduction approach. The positivist paradigm is based on the philosophical ideas of French philosopher- August Comte who is considered the father of sociology. The positivist paradigm is based on the general doctrine of positivism that all genuine knowledge is based on sense experience and can be advanced only through observation and experiment. Besides Comte, Bacon, Mill, Hum, etc. contributed to the development of the concept of positivistic paradigm. The term is also used in a school of philosophy known as logical positivism originated by the scholars of the Vienna Circle. Logical positivists hold that the meaning of a statement is given by the method of its verification and so unverifiable statements are, therefore, meaningless.

Assumptions Behind Positivistic Paradigm

Positivism accepts natural science as the paradigm of human knowledge and so principles and assumptions of science or scientific method are the means of knowledge generation. There are four assumptions of science which are the assumptions behind the Positivist research paradigm. These are Determinism, Empiricism, Parsimony ,and Generality.

Determinism (Events have causes): Determinism considers that events have causes and are determined by other circumstances. All events are determined completely by previously existing causes. It believes in a cause-effect relationship and believes that it is not true that people could have decided or acted otherwise than they did. Determinism does not believe that the events in the universe occur capriciously. Scientists and researchers formulate laws based on happenings that provide the basis for prediction and control to be made.

Empiricism (support of empirical evidence): Knowledge can be reliable if originates with the help and support of empirical evidence. Empirical evidence is verifiable by observation. Empirical science gathers data based on experience, classifies and quantifies data, tries to establish a relationship and ultimately approximates the truth.

Parsimony (Economical way): Phenomena are explained in the most economical way possible. This economy is meaningful in research.

Generality (with inductive and deductive reasoning): All events in nature, at least to a degree, are ordered, lawful, predictable and regular. Truth can be derived only from observation. Findings are due to integration and synthesis and that makes meaning, pattern or theory. Generalisation of knowledge is possible.

Criteria to Validate Knowledge

The following are the criteria for validating research located in the Positivism Paradigm:

- Internal Validity,
- External Validity,
- Reliability, and
- Objectivity.

A good-quality positivist approach has (1) Internal validity (2) External validity, (3) Reliability and (4) Objectivity. If it is proved that the independent variable affects the dependent variable it is internal validity. If the result is generalizable it has external validity. If results are the same in different times, places and contexts and by different people it is reliable. If a researcher is not biased it is objective.

The positivist research paradigm, which is also called as Empiricist paradigm, emphasises careful and controlled observation as the basis for knowledge. In this paradigm activities or processes proceed in a hypothetical – deductive way. We have a theory behind the particular problem we wish to investigate. The theory provides the concepts which pose the research problem. Positivist believes that there is a single reality that is possible to measure and understand. Positivists propose a hypothesis that can be proved or disproved using statistical data analysis. Positivism tends to investigate the existence of a relationship between two variables rather than the reason behind it.

Quantitative methods of research are usually employed in the positivist paradigm. Probability sampling techniques and inferential and parametric statistics are usually applied in the positivist paradigm. Positivism is governed by objectivity, measurability, predictability, probability, and controllability.

The ontological assumptions behind positivism are **critical realism**. Its epistemology is said to be **objectivist**. Its methodology is **experimental** and its axiology is **beneficence** (moral obligation to work for the welfare of others.).

As the ontological position of positivism is that of realism, it considers the social world like the natural world. It believes in the cause-effect relationship between phenomena and finds reality context-free. It finds sense-experiences instrumental for the study of phenomena and believes that prediction is possible accurately after generalisability.

Epistemologically positivism follows objectivism. The researcher objectively observes the phenomena to complete his/her study. It believes that only facts derived from the scientific method can make legitimate knowledge claims.

The experimental methodology means the manipulation of one variable to learn the effect on another. It helps to study the relationship between dependent and independent variables. It believes in scientific methods and quantitative methodologies.

The beneficence axiology refers to the research work done for the cause of humanity. Research must take care of risk, harm, and wrong effects during and after the research work.

Characteristics of Positivist Paradigm

The following are the characteristics of the positivist paradigm:

- Generalization can be made through the implications of this paradigm and theory can be established.
- Context as well as assumption is not important in this paradigm.
- Research discourses truth and generates knowledge in the paradigm.
- Cause and effect are central to the research paradigm.
- It believes in the quantification of results.
- It believes in control and prediction.
- It only believes in scientific methods and enquiry.
- It works by formulating hypotheses and testing hypotheses.
- It employs analytical or empirical approaches.
- It believes in objectivity.

Strength of Positivist Paradigm

The following are the strengths of the positivist paradigm:

- It uses the scientific approach of study and allows generalisability of results.
- It is empiricist in nature.
- It uses statistical treatment to make the result reliable.
- It involves quantification.
- It studies a larger number of people at a time.
- There is less risk of research bias in the application of this paradigm.

Limitations of Positivist Paradigm

The following are the limitations of the positivist paradigm:

- It reflects a mechanistic and reductionist view of nature.
- It excludes notions of choice, freedom, individuality, moral responsibility, etc.
- It considers the study of social phenomena as natural phenomena.
- It eliminates the concept of life itself. Life experiences are ignored.
- It reduces life to conceivable measurement. Life cannot be measured on a physical scale. It reduces people to statistical aggregate.
- The human element is not given weightage. People suffer from the illusion of objectivity. The capacity of subjectivity is undermined, and individuality is not taken into account.
- It fails to account for the unique ability of an individual human being.
- Its findings are of little consequence to those for whom they are intended such as teachers, social workers, managers, counsellors, etc.

Positivist Paradigm and Research Methods

Positivist Paradigm uses the following research methods:

- Experimental Research
- Quasi- Experimental
- Co- relational Research Methodology
- Casual- comparative Research
- Descriptive Survey Research
- Randomized control trial methodology. etc.

Interpretive Research Paradigm

It is also known as the Constructivist-Hermeneutic-Interpretivist-Qualitative paradigm. Interpretivist paradigm took birth as against of positivist paradigm. IGNOU (2009) through its booklet MES-016 expresses, "The anti-positivist movement in different disciplines of the social sciences is represented by three schools of thought- phenomenology, ethno-methodology and symbolic interactionism. A common thread running through the three schools is a concern with phenomena, that is, the things we directly apprehend through our senses as we go about our daily lives, together with a consequent emphasis on qualitative as opposed to quantitative methodology." It is also known as a constructivist paradigm, though some scholars find constructivist paradigms outside the interpretive paradigm. The interpretivist paradigm grew on the line of Edmund Husserl's phenomenology and German Philosophers' study of interpretive understanding. It is also called a phenomenological paradigm. It believes in the world of human experiences and concludes that reality is socially constructed. It is an approach based on philosophical phenomenology in the area of qualitative research. It is the bi-product of the Anti-positivist movement represented by three schools of thought – phenomenology, Ethno-methodology and symbolic interactionism. All these schools support the qualitative method and have concerns with phenomena.

This paradigm emphasizes social interaction as the basis of knowledge. It considers knowledge as subjective, constructed through mutual negotiation and specific to the situation under investigation. It is contextualized within a social, cultural and historical framework. A German sociologist Max Weber is considered the founder of Interpretivism. Interpretivism believes that there is no single reality or truth, but multiple realities. It believes that human behaviour is multilayered. They are devoted to understanding and interpreting the meaning attached to an action. It uses qualitative research methods and collects data through interviews or case studies. It aims to answer why. Not merely establish the relationship between two variables. It does not follow the probabilistic method and controlled situation to study. It is governed by subjectivity and study human behaviour in a real-life setting.

The interpretivist paradigm has relativist ontology, subjectivist epistemology, naturalistic methodology and balanced axiology. The ontological dimension of interpretivism is relativism. It considers that reality is multilayered and relative. It believes in multiple interpretations of phenomena. It aims for a deeper understanding of the phenomena and does not focus on generalizing the result to a whole population. It considers that the problem or situation studied has multiple realities.

The subjective epistemology of interpretivism believes that the researcher constructs knowledge through his/her cognitive and thinking process of data gathered through various sources. When the researcher interacts with the subject through dialogue, questioning and many other sources construct the meaning of the situation and problem.

The naturalistic methodology indicates that the study is being conducted in the natural setting and analysis of the gathered data is also made as per the humanistic approach. Interviews, reflective sessions, participant observation, interaction, etc. are being used for data gathering and that too in a natural setting.

The Balanced axiology indicates that the outcome of the research will reflect the value of the researcher as and when the researcher is trying to present a balanced report of the findings.

Validating Criteria

Criteria used to validate research located within the interpretivist paradigm are as:

- Credibility,
- Dependability,
- Confirmability, and
- Transferability.

Like the four criteria against the validation of research located in the positivist paradigm, the interpretivist paradigm has four criteria of trustworthiness and authenticity Credibility, Dependability, Confirmability and Transferability. Criteria of credibility are like that of criteria of internal validity in the positivist paradigm, it refers to the extent to which data and data analysis are authentic, believable and trustworthy. Criteria of dependability are like that of criteria of reliability in the positivist paradigm. It refers to the ability to observe the same outcome or findings under similar circumstances. Criteria of conformability are close to the criteria of objectivity of the positivist paradigm. It refers to the extent to which the findings of the study can be confirmed by the other related persons of the field specified. Criteria of transferability are like the external validity of the positivist paradigm. It refers to the findings of the research that can be related to the findings of others in the context of researcher findings and findings of others.

Characteristics of Interpretivist Paradigm

The following are the characteristics of the interpretivist paradigm:

- It does not need assumptions like the positivist paradigm.
- It believes that the social world cannot be understood like the natural world.

- It considers that realities are multi-layered and socially constructed.
- It considers that research needs interaction between the researcher and participants.
- It believes in context and content-specific knowledge.
- It believes that knowledge is value-based and value-laden.
- It focuses on understanding individual rather than universal laws.
- It usually collects qualitative data.
- Interpretivists use the inductive approach instead of the deductive approach as they do not consider theory as the driving force of research.
- Usually, data is verbal, not statistical.
- It uses those methods that generate qualitative data.
- Open-ended interviews, participant observation, field notes, personal notes, documents, etc. are usually employed for data collection.

Strength of Interpretivism

The following are the strengths of interpretivism:

- It works in a natural setting to understand the phenomenon.
- It studies from a holistic perspective.
- It believes in in-depth answers to the research questions.
- It is exploratory.
- It is more useful for the study that is contextual, situational, dynamic, social and personal.
- It is more useful for the study of human behaviour in a natural environment.
- It uses flexible designs.

Limitations of Interpretivism

The following are the limitations of Interpretivism:

- Subject bias is an integral part of this paradigm.
- Its credibility is low due to its purely subjective nature.
- Its generalisability is always questionable.
- It does not deal effectively with quantitative data.
- Its controllability is under threat.
- Its implication in educational research is comparatively less.
- It does not work with the principle of probability.

Interpretivist Paradigm and Research Methods

The interpretive paradigm uses the following research methods:

- Phenomenology
- Ethnography
- Case Study
- Grounded theory
- Naturalist methodology
- Narrative inquiry methodology
- Hermeneutics methodology
- Action Research Methodology
- Heuristic inquiry methodology.

Difference between Positivist and Interpretivist Paradigm

Positivist believes in empirical hypothesis testing. It follows a probabilistic model and believes that the findings of one study can be generalized to another study of a similar kind. It believes that human behaviour can be explained using a scientific approach to research. Human behaviour can be studied and predicted quantitatively. Positivism is governed by objectivity, measurability, predictability, probability, and controllability. It controls laws that can predict human behaviour.

Interpretivism believes that human behaviour is multilayered and it cannot be determined by pre-defined probabilistic models. It depends on the situation and is determined by environmental factors. Interpretivism is governed by subjectivity and studying human behaviour in a real-life setting.

Both these research Paradigms are opposite to each other and represent reality in two different manners. Following are the differences between positivism and Interpretivism:

- Positivism uses scientific method to analyze human behaviour and society.
Interpretivism uses non-scientific methods for the same.
- Positivism uses a quantitative approach.
Interpretivism uses a qualitative approach.
- Positivism believes in quantitative methods like experimental and co-relational.
Interpretivism believes in qualitative methods like ethnography, phenomenology, case studies etc.
- Positivism uses a probabilistic approach to study.
Interpretivism uses the non-probabilistic approach of study.
- Positivism employs Parametric and non-parametric statistics of data analysis.
Interpretivism employs qualitative aspects of data collection and analysis.

- Positivism employs a probability sampling technique.
Interpretivism does not necessarily, employ a non-probability sampling technique.
- Hypothesis formation is necessary in the Positivist paradigm.
Interpretivism works with objectives and hypothesis formation may be considered and may not be.
- Positivism usually employs parametric and inferential statistics.
When needed usually interpretivism employs non-parametric and descriptive statistics.
- The positivist paradigm is a hypothetico-deductive approach in which the researcher usually adopts a deductive approach.
In Interpretivist paradigms, researcher adopts an inductive approach instead of the deductive approach as they do not consider theory as the driving force of research.
- Positivism is based on the philosophical ideas of French philosopher- August Comte.
Edmund's phenomenology and the German philosopher's study of interpretive understanding are instrumental in the basis of interpretivism. A German sociologist Max Weber is considered the founder of Interpretivism.
- Positivism is also called an empiricist paradigm and emphasizes careful and controlled observation as the basis for knowledge.
Interpretivism believes in qualitative data and emphasizes the collection of data in natural settings. It uses open-ended interviews, participant observation, field notes, etc for data collection.
- Positivism is governed by objectivity, measurability, predictability, probability and controllability.
Interpretivism has four criteria of trustworthiness and authenticity credibility, dependability, confirmability and transferability. It is governed by subjectivity, construction through mutual negotiation and studies human behaviour in real-life settings.
- Critical realism is its ontological assumption of positivism.
Interpretivism has a relativist ontology.
- Objectivism is in the epistemology of positivism.
Interpretivism has subjectivist epistemology (relativism).
- Positivist methodology is experimental.
Interpretivist methodology is naturalistic.
- Positivist axiology is beneficence (more obligations to work for the welfare of others.).
Interpretivist axiology is balanced (balanced report to reflect the value of the researcher).
- Positivism considers the social world like the natural world and believes in a cause-effect relationship.
Interpretivism believes that the social world cannot be understood like the natural world. In the social world realities are multi-layered and socially constructed.
- Positivism believes in context-free reality and phenomena.
- Interpretivism believes in context-specific reality and phenomena within a social, cultural and historical framework.
- Positivism believes that prediction is possible accurately after generalisability.
Interpretivism does not believe either in prediction or in generalisability.
- Positivism adopts the defined pattern of the research process to work in a more general form.
Interpretivism is the study that is contextual, situational, dynamic, social and personal.
- Experimental, correlation, quasi-experimental, causal-comparative, descriptive, etc. are some methods that are being employed in the positivist paradigm.
- Phenomenology, ethnography, case study, grounded theory, philosophical, historical, action research, etc. are some methods that are being employed in the interpretive paradigm.

Critical Research Paradigm

It is also known as the Transformative Paradigm. It originated in the 20th century. University of Frankfurt through the Institute of Social Research worked in the area. Herbert Marcuse, Theodor Adorno, Max Horkheimer, Erich Fromm, Jurgen Habermas, etc. are the main contributors in the area. This paradigm works in the area of social issues and takes care of social, economic, and political aspects of research. It deals with social and justice issues related to social oppression, conflict, struggle, and power structures. Keeping in view the nature of work it is called the transformative paradigm. IGNOU (2001) through its booklet ES-315 narrates, "The critical paradigm emphasises that knowledge is problematic and capable of systematic distortion... One of the concerns of the critical paradigm is to understand the theory as well as practices." The IGNOU text further expresses, "It aims to integrate the research act into the educational settings so that research can play a direct and immediate role in the improvement of practice and it aims to overcome the distance between practitioners to become researchers."

The aim of the critical paradigm is not to explain or understand society only but to make required changes. It is critical to both paradigms – Positivist and Interpretivist. It does not focus on generating knowledge of the social world but rather tries to put light on actions, issues and beliefs that limit human freedom. It is to confront those in positions of power to expose the oppressive structures. It believes in dialogue with participants to modify the social systems. It works for the marginalized with a collaborative approach. Its objective is the transformation of the social system. The critical paradigm is defined as an alternative paradigm related to a society whose purpose is to criticize and justify the existing status quo in society and to provide alternative knowledge to produce a better social order.

Easily identifiable examples of critical approaches are Marxism, Postmodernism, Feminism, etc. These critical theories expose and challenge the communication of dominant social, economic, and political structures. It is a perspective of research that addresses social inequities, inequities and power differentials. The methodologies include action research, participatory action research,

critical research, and feminist research. It has its roots in sociology and literary criticism and argues that social problems stem more from social structures and cultural assumptions than from individuals. It argues that ideology is the principal obstacle to human liberation. It has applications in various fields of study including sociology, history, philosophy, psychology, education, feminist theory, communication theory, etc.

Critical theory is a school of thought practised by the Frankfurt school from which Herbert Marcuse, Theodor Adorno, Walter Benjamin, Erich Fromm, Max Horkheimer, etc. belong. In addition to its roots in the first-generation Frankfurt school, critical theory has also been influenced by Gyorgy Lukacs and Antonio Gramsci. Additionally, second-generation Frankfurt school scholars have been influential, notably Jurgen Habermas. Habermas's work, critical theory transcended its theoretical roots in German idealism and progressed closer to American Pragmatism. Researchers advocating this research paradigm find it more important than any other research paradigm and hope in days to come there will be only two research paradigms Critical and Non-critical. Asghar and Jabreel (2013) agree, "With the advent of critical paradigm, I believe that the bipolar era of constructive and positivistic approaches is likely to turn into critical and non-critical approaches. Non-critical paradigms only present what is observable in a situation, whereas critical paradigm, because of its inherent, reformative fervour, goes beyond mere recording observations, and strives to reform for a better world." Asghar may be proved correct in future, but he is not correct today and he accepts by accepting the dominance of positivist and interpretive paradigms as two major poles.

The critical paradigm has historical realism ontology, subjective epistemology, dialogic methodology and cultural respect axiology. The ontological position of critical theorists is that of historical realism. It is assumed that reality exists, but it has been shaped by factors like cultural, ethnic, religious, political, and gender to create a social system – through interaction. It relates to oppression. Epistemologically, it is subjective. No object can be researched without being affected by the researcher. It assumes a transactional epistemology, in which the researcher interacts with the participants. It uses dialogic methodology. It has an axiology that respects cultural norms.

Characteristics of Critical Paradigm

The following are the characteristics of the critical research paradigm:

- It is concerned with power relationships and social structures.
- It respects cultural norms.
- It focuses on the act of construction, not on discovery.
- It works in the area like politics, morality, ethics, etc.
- It uses deliberate efforts to promote research and research in human rights, social justice, reciprocity, etc.
- It addresses issues of power, oppression, and trust among research participants.
- It uses an action research approach.
- It uses participatory research.
- It uses ethnomethodology.

Strength of Critical Paradigm

The following are the merits of the critical paradigm:

- It works for social transformation.
- It believes in inclusion.
- It takes social, ethnic, political, religious, cultural, gender, etc. into consideration.
- It exposes the ideology that aims to keep people subjugated.

Limitations of Critical Paradigm

The following are the limitations of the critical paradigm:

- It is more a social movement less a research paradigm.
- It uses qualitative data.
- It wants to make the researcher a social activist.
- It is less academic and more revolutionary.

Critical Paradigm and Research Methods

Critical paradigm uses the following research methods:

- Postcolonial/indigenous methodology
- Ethnomethodology
- Action research
- Phenomenology
- Neo-Marxist methodology
- Cultural studies.
- Feminist theory
- Critical race theory
- Participatory emancipation
- Freireau Studies
- Queer Theory
- Disability Theories

Pragmatic Research Paradigm

It is also known as Mixed Methods or Eclectic – Mixed Method. The pragmatic paradigm believes in a mixed-method approach and it

is also called mixed-method research and sometimes a Mixed-Paradigm. It believes that the positive aspect or strength of Positivist and Interpretivist paradigms may be employed simultaneously – and this is the central idea behind this Pragmatic Paradigm or Mixed Method Research. For pragmatists, a mono-paradigmatic orientation of research is not good enough and it suggests pluralistic approaches and application of various methods of research. The class of research where the researcher mixes or combines qualitative and quantitative research techniques, methods, approaches, concepts, language, etc. into a single study is said to be mixed method research or pragmatic paradigm.

It is being considered as a third wave or a third research movement. It uses the pragmatic method and system of philosophy. Its logic of inquiry includes the use of induction, deduction and abduction. It integrates numeric and narrative approaches.

Besides Positivism and Interpretivism, the third paradigm that is frequently used in research is Pragmatism. A group of researchers finds it as Mixed Method Research, though another group of researchers considers mixed method as one approach within the pragmatic research paradigm. The next group concludes that Pragmatic research philosophy generally employs research methodologies based on its approach as: 1. Mixed Methodology, 2. Q-Methodology, and 3. Generic Qualitative Inquiry. Most of the literature suggests using the Pragmatic Paradigm interchangeably with that of Mixed Method Research. Pragmatism as a mixed-method approach can be accepted with the view that the major focus of the pragmatic paradigm is to integrate positivist and interpretive research methodologies. Q-methodology and Generic qualitative enquiry mix/integrate positivist and interpretivist paradigms in different ways. They have different ways of employing both paradigms in the process or their methodologies.

The mixed method uses both qualitative and quantitative approaches in a single study. It conducts a series of study to work on a research problem and in the process collect, analyze and integrate data from both the qualitative and quantitative approaches. This method is based on the philosophy that it is possible to find and investigate what both approaches cannot do alone. It is most suitable when the investigator has to address qualitative and quantitative approaches simultaneously to investigate a problem. This is useful when unexpected results occur from a prior study. It is helpful in situations where one has to get a deep understanding of quantitative findings or whenever the researcher has to increase the generalisability of qualitative research findings. This method is also useful when the researcher has to design and validate research instruments like questionnaires or complex interventions to be used in further studies. The major weakness of mixed method research is its requirement for an investigator to know a wide range of methods from both the approaches of research- qualitative and quantitative. It also has a weak point in terms of its planning, complexity of setting up, etc. It can be difficult at times when the investigator has to decide to proceed with sequential designs.

Q-methodology does not believe in combining the qualitative and quantitative approaches of research like mixed methods research, rather it applies an approach having characteristics of both approaches. A series of representative statements collected from literature and other evidence related to the phenomena are presented before participants to place the statements in the category Strongly Agree to Strongly Disagree. Q-methodology is meant for the study of subjectivity. Subjective opinions, values or beliefs are allowed or collected to answer questions about “what” or “how”. Researchers do claim that Q methodology is a complete methodology which employs techniques such as sorting and method as factor analysis. Researchers favouring this method also claim that it has philosophy, ontology, and epistemology. Q was created by William Stephenson (1902-1989) who obtained PhDs in Physics (1926) and Psychology (1929). He studied Psychometrics with Charles Spearman, who is known for the creation of factor analysis. Q-methodology allows the researcher to identify and describe the shared viewpoints that exist on a topic revealing areas of consensus and disagreement across these shared viewpoints. Q reveals and describes divergent views in a group as well as it reaches consensus.

Generic Qualitative research is a descriptive methodology which aims at understanding how individuals make meaning of a phenomenon or a situation based on "what will work best" in finding answers to the questions under investigation. Generic qualitative inquiry can be considered when the parameters of the study do not meet the strict requirements for any of the paradigm-positivist and interpretivist. In this inquiry, the practical requirements of the research question dictate the methods of data collection, and hence a pragmatic paradigm is adopted. Studies using qualitative inquiry either combine several qualitative approaches or draw on a single approach and deviate from its intent, guidelines or rules. When little is known it is useful as it explores the who, what, where types of questions. Researchers in this method of pragmatic paradigm do not adhere to any recognized qualitative approach. Its strength as a method is that when little is known about the phenomenon and an in-depth description of the phenomena is needed it works. It is useful to explore the who, what, and where types of questions. Its major limitation is that it lacks a strong theoretical or methodological basis. This limitation leaves questions or contradictions about its findings and interpretation.

The pragmatic paradigm believes in a mixed-method approach and it is also called mixed-method research and sometimes a Mixed-Paradigm. It believes that the positive aspect or strength of Positivist and Interpretivist paradigms may be employed simultaneously. This mixing is the central idea behind this Pragmatic Paradigm or Mixed Method Research. In some way or other Q-methodology and Generic Qualitative Inquiry also use both paradigms –positivist and interpretivist and apply them in an integrated manner, but they do not mix but rather integrate. How integration and mixing is different? The answer leads towards their difference, but there is no doubt about the fact that they all represent a pragmatic paradigm.

The pragmatic paradigm adopts Pragmatic Ontology and Epistemology. It advocates the pragmatic method of classical pragmatists like Charles Sanders Peirce, William James and John Dewey to think about traditional dualisms. Pragmatists adopt a methodology eclectic, pluralistic approach to research, drawing on positivistic and interpretivistic epistemologies based on their applicability. It investigates reality as both objective and socially constructed.

Research is driven by the research questions rather than the methodological preference of the researcher. It adopts qualitative and quantitative components in its writing in a way they are mutually illuminating. This approach enables a more comprehensive understanding of the phenomenon than that of a single-method approach.

The pragmatic paradigm refers to an emergent methodology of research that advances the systematic integration or mixing of quantitative and qualitative data within a single investigation or sustained program of inquiry. It originated in the social sciences

and has recently expanded into the health and medical sciences including fields such as nursing, family medicine, social work, mental health, pharmacy, allied health and others.

The pragmatic paradigm has a non-singular ontology, relational epistemology, Mixed method methodology and value-laden axiology. The pragmatic paradigm adapts non-singular reality ontology. There is no single reality and all individuals have their unique interpretation of reality. The pragmatic paradigm advocates a relational epistemology. Relationship in research is best determined by what the researcher deems appropriate to that particular study. The pragmatic paradigm believes in Mixed Method Methodology. It employs a combination of quantitative and qualitative research methods. The pragmatic Paradigm adopts value-laden axiology conducting research that is beneficial to people.

We have learned that the assumptions that underpin the research and its position are known as research paradigms. Pragmatism as a research paradigm believes that there are different ways of conducting research and investigating reality. Positivist and interpretive approaches are mutually exclusive, but Pragmatism conduct research in innovative and dynamic ways to find solutions to research problem. In a pragmatic research work firstly a problem is identified and it is viewed within its broadest context. It may involve multiple methods though its focus is on the use of a combination of methods pragmatically to advance a specific piece of research in the best possible manner. This mixing is the central idea behind this pragmatic paradigm. *It advocates the pragmatic method of classical pragmatists like Charles Sanders Pierce, William James and John Dewey to think about traditional dualisms.* These persons are known as classical pragmatists. Among Neo-pragmatists are Richard Rorty, Cornel West, George Herbert Mead, Richard Bernstein, W.V.O Quinine, Wilfrid Sellers, Donald Davidson, Nelson Goodman, Cherryholmes, Hilary Putnam, and others.

Characteristics of Pragmatic Paradigm

The following are the characteristics of the Pragmatic Paradigm:

- It emphasizes workability in research.
- In this paradigm choice of research methods depends on the purpose of research.
- It does not believe in positivism that social science inquiry can uncover the truth about the real world.
- It does not believe that the research work can be placed in either a positivist or interpretivist paradigm.
- It believes in the collection and analysis of both qualitative and quantitative data.
- It tries to integrate data during collection, analysis, and discussion.
- It uses procedures that employ qualitative and quantitative components.
- It views knowledge as being constructed based on real-world experiences.
- It rejects traditional philosophical dualism but prefers more moderate and common sense philosophical dualism based on how well they work in solving the problem under study.
- In this paradigm, meaning is created from human experiences.
- This paradigm views truth as tentative and changing over time.
- It understands human experiences through language and communication.
- It believes that an enquiry should bring relief and benefit to the condition of man. It advocates for individual freedom and human rights.
- It accepts human enquiry as being analogous to scientific and experimental enquiry.
- It endorses theories that inform practice. It means it focuses on Practical Theory.
- Researchers claim that it is more inclined to Interpretivism.

Important Decisions Regarding Pragmatic Paradigm

The following are the important decisions that need to be taken while employing the Pragmatic Research Paradigm:

- Priority- priority of the research work under investigation.
- Implementing- how to implement the plan of action.
- Timing-how much time to be given to different aspects of the research process.
- Integration to integrate the taken paradigm.
- Issues-Whether the issue is relevant for the pragmatic paradigm implication.
- Independence to manage independence while integrating or mixing.
- Interaction-which type of interaction is meaningful in a given situation.

Research Designs and Pragmatic Paradigm

Following research designs are being suggested while adopting a pragmatic research paradigm:

- Parallel Mixed Designs or Concurrent Designs
- Sequential Mixed Designs
- Quasi-Mixed Designs
- Conversion Mixed Designs
- Multilevel Mixed Designs
- Fully Integrated Mixed Designs, etc.

Strength of Pragmatic Paradigm

The following are the strengths of the pragmatic research paradigm:

- It compares quantitative and qualitative data.
- It integrates qualitative and quantitative data.
- It reflects the participant's point of view.

- It fosters scholarly interaction.
- It provides methodological flexibility.
- It collects rich and comprehensive data.
- It uses words, pictures and narratives to add meaning to numbers.
- In this paradigm numbers can be used with words, pictures and narratives.
- It can provide qualitative and quantitative research strengths simultaneously.
- It integrates the application of both qualitative and quantitative paradigms- (positivism and interpretivism) that produce a more complete knowledge for theory and practice.
- It helps to generalize data.
- It enables the investigator to develop a holistic analysis to fully incorporate numerous relevant factors into the study undertaken.
- It may help design and validate an instrument.
- It may be useful when a prior study yields unexpected results.

Limitations of Pragmatic Paradigm

The following are the limitations of the pragmatic research paradigm:

- It increases the complexity of evaluation.
- It needs a multidisciplinary team for research work.
- It requires increased research on the paradigm to prove its applicability.
- It needs trained manpower in both the paradigms of research.
- It is more expensive and time-consuming.
- It is still in the developing stage and has not taken the concrete shape of a complete research approach like positivism and interpretivism.
- At times there may occur discrepancies between different types of data that are hard to interpret.
- In the application of this paradigm, it is difficult to decide how to order different types of data collection and how to follow the sequential design.

The conclusion yielded by the Pragmatic paradigm in the situation of contradictory findings may provide a safe situation to go by both ways either to accept the result obtained through data analysis or to highlight the discrepancies received. Sandelowski, Margarete(2000) express in the same way for mixed method studies, "If the result from two data collection techniques does not converge, the results are treated as interpretive opportunities: either to show that no true discrepancy exists or to suggest the phenomenon that accounts for the apparent discrepancy."

Pragmatic Paradigm and Research Methods

Following are the research methods usually employed in the pragmatic research paradigm:

- Ethnography
- Phenomenology
- Action Research
- Experimental
- Quasi-Experimental
- Causal Comparative
- Case study
- Naturalistic methodology
- Narrative Inquiry

Paradigm War is Inconclusive

The review of related literature reveals that the paradigm controversy has gone a long way, and it is still not conclusive in terms of its types, historical development and also in definitions and explanations. Critical paradigm has its limited scope in comparison to other paradigms, and the Pragmatic Paradigm has to go a long way as it is still shaping without going into any paradigm war further. A new researcher like us may conclude that we employ Positivist and Interpretivist paradigms more frequently in our research work, and in one sense or another with caution, we can conclude that these are two important paradigms for the researchers of education and psychology. Four paradigms have a wide range of research methodologies and several research methodologies can be combined within one research paradigm. Many claims are there in the literature as Critical and Non-critical paradigms may acquire the position of Positivism and Interpretivism paradigms as main paradigms. Young researchers are working with their little knowledge of paradigms. They have nothing to do with this war. In future, they can jump into the issue by gaining more research experience.

The war is not about the types of paradigms and their specific name and differences in name. It is also about their relative superiority. No doubt what positivism does cannot be questioned and especially done in the situations in which it is being employed more suitably. Its sophistication, rigidity and generalisability provide it an edge over others, particularly in a situation that suits it. It needs certain conditions fulfilled in its application, this is its greater strength and simultaneously the weakest link. To manage the gap created by its pre and post conditions interpretivism as a research paradigm emerged. Most of the researchers are ready to accept that both Positivism and Interpretivism are opposite to each other and so these two complete the requirement of the research paradigm and don't leave space or scope for any other paradigm. A group of researchers is also of the opinion that the pragmatic paradigm is largely inclined towards the interpretive paradigm, they are also of the opinion that the positivist paradigm cannot be diluted to mix and integrate. This group of researchers questions and does not believe that methods based on paradigm

may be mixed, hypotheses may be framed in a mixed form to be tested, and probability and non-probability sampling techniques may be mixed. They are anxious about how standardized tests and inventory or questionnaires may be employed together. They also find perturbed while thinking about generalization through descriptive statistics like graphical representation of data and other qualitative ways of analysis. Their major question is whether can positivism and interpretivism be mixed or integrated with their merits and that too by ignoring their limitations. Some of the researchers is a little bit generous about pragmatism, but they too are not ready to accept the experimental, and especially the true experimental research's mixing with any other methods. Agency for Healthcare Research and Quality (AHRQ) has worked as a research methods series in the area of Patient-Centered Medical Home (PCMH) and has found mixed approach useful in the context, but simultaneously has narrated about the difficulties in employing the mixed method approach. AHRQ (2013) narrates, "Mixed methods studies are challenging to implement, especially when they are used to evaluate complex interventions such as the PCMH model". AHRQ further concludes, "By carefully selecting the mixed method design that best suits the evaluation's questions and meets its resource constraints, the evaluator can facilitate deeper, more meaningful learning regarding the effectiveness and implementation of PCMH models." This difficulty comes in social science studies as well and social science researchers also apply the approach to benefit from the approach by employing the mixed method approach with care. They accept that with caution and in the presence of experts of both paradigms pragmatic paradigms may work with a survey or any other descriptive method. They also believe that the range of interpretivism is large and it leaves little scope for the pragmatic paradigm.

Many serious researchers find critical research paradigms a movement and think that interpretivism contains it. They also suggest that researchers are for research work, not for social movements like the activists. The claim of critical research paradigm researchers that there may emerge only two paradigms Critical and Non-critical by replacing the dual paradigm mode – positivism vs. interpretivism is not going to take place shortly. Even today research is being dominated by positivism followed by post-positivism. Pandey, Asha (2021) rightly concludes that educational research is dominated by positivist perspectives and it is only in the last decade of the twentieth century that qualitative research approach (i.e. post-positivism) has been used. Knowledge has no boundary and anything can happen in future, but most of the researchers today in social science are happily working with positivist and interpretivist paradigms. Knowledge war and paradigm war may yield something without damaging the academic world; let us ignite the war for more fruitful results and more constructive criticism. However, Siddique, Sulaiman (2019) suggests adopting the pragmatic paradigm as and when there occurs any conflict in the choice of paradigm, "Philosophical underpinnings of both positivistic and interpretive paradigms are distinctive and self-contained, but gaining robust and rigorous findings have more appeal than philosophical conflicts. Finally, research value depends more on pragmatic measures rather than theoretical triumph. Therefore, researchers who are confused by the so-called 'paradigm wars' might find mixed methods easier to adopt."

War for the types and superiority of one paradigm over another will continue as we have a large number of researchers and academic audiences. It is really good for knowledge generation and positive criticism, but over-generalization will not be good against any research approach or paradigm. Quoting Gage, Guba & Lincoln; Rehman, Adil Abdul and Alharthi, Khalid (2016) rightly conclude, " Nathaniel Gage(1989) went so far as to call the discussions and disagreements between adherents of different educational research approaches 'the paradigm wars'. Guba and Lincoln (1994) considered this description overdrawn because it painted the matter as more confrontational than was. We do not agree with the view that the three paradigms should be treated as three religions: that adhering to one paradigm makes one a heretic according to the lenses of the adherents of other paradigms." War-like situations may not be welcomed, but critical criticism provides an opportunity to look into the phenomena from different angles and approaches.

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