

## Paradigms and Different Types of Research



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**ABSTRACT:** The structure of the research processes is represented according to the paradigmatic nature of the researcher's knowledge and two major differentiation criteria: the DIACHRONIC Structure and the SYNCHRONOUS Structure. Every investigative process varies according to its evolution over time for the first structure and how it is considered an independent process over time, according to the second structure (Padrón, 1992). Researchers throughout the history of science have developed, shared, and worked under a worldview of reality that has led them to a system of beliefs around knowledge as ways of accessing and producing the knowledge that they come to be the different paradigms. This belief system has been very divergent from each other in different eras of science. Whether or not it coincides is determined by that paradigmatic vision, which in turn explains the techniques, procedures, types of samples, methods, and language used, among other things.

**KEYWORDS:** structure of research processes, epistemological paradigms, nature of knowledge, types of research, research traditions

### INTRODUCTION

Epistemological paradigms of knowledge refer to the fundamental approaches that govern how we understand, acquire and validate knowledge in different fields of knowledge. (Madriz, & Flora, 2012). These paradigms provide a conceptual and methodological framework for addressing questions and problems in research and the philosophy of science. (Soto, 2023)

The Positivist Paradigm is based on the idea that knowledge is derived from empirical observation and experimentation. (Bourdeau, 2003)

The Hermeneutic Paradigm is focused on the interpretation and understanding of texts and meanings. It has a focus on subjectivity and deep understanding of human interpretations. It emphasizes the usefulness and applicability of knowledge. It is concerned with how knowledge is applied in practice and solves concrete problems. (Espinosa, Agudelo, & Pachón, 2011)

While the Critical Paradigm highlights the influence of power structures in the construction of knowledge. (Giraldo, Cruz, & Guarín, 2023) Examines the social and political dimensions of knowledge and seeks emancipation and social transformation. It maintains that knowledge is constructed by individuals through interaction with their environment. It focuses on subjective perception and personal interpretation. (Molina, Molina, & Vanegas, 2021)

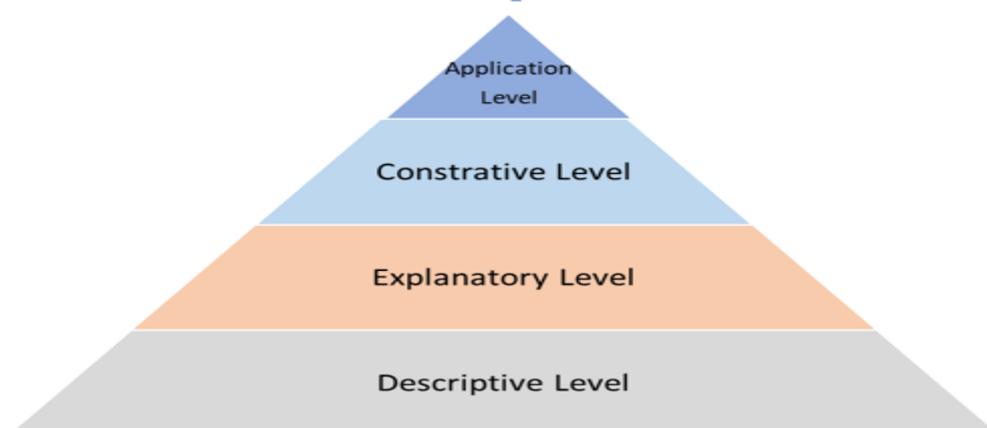
The complexity paradigm is a conceptual and methodological approach used to understand phenomena and systems that are inherently complex and that cannot be fully explained or predicted using traditional analysis approaches. (Morin, (1994) This paradigm is based on the idea that the real world is full of dynamic, interconnected, and adaptive systems that exhibit emergent and nonlinear properties.

These epistemological paradigms represent different ways of approaching the search and construction of knowledge. Each has its own philosophical and methodological premises that influence how knowledge is researched, interpreted, and validated in various disciplines and contexts. (Taeli Gómez, 2010).

The diachronic vision of research defines four phases of these, which are called, respectively: descriptive, explanatory, contrastive and applicative. Which determine typical variations of the investigative processes and that intersect with the four epistemological paradigms forming sixteen basic patterns for research. (Soto, 2016)

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PARADIGM	TYPES OF INVESTIGATIONS
<b>POSITIVISM EMPIRICISM</b>	Quantitative investigation Experimental Surveys and Cohort Studies Correlational research The "ex post facto" investigation or on accomplished facts Quasi-experimental research Historical research
<b>HERMENEUTICAL INTERACTIVE</b>	Qualitative research Ethnography: Case Studies Grounded Theory Research phenomenological research Biographical method or life history research The investigation of Symbolic Interactionism
<b>SOCIAL CRITIC INTROSPECTIVE</b>	Participatory Action Research (PAR) Artifact-Based Research Narrative Research. Research on Content Analysis and Discourse Analysis <u>Ethnomethodological research</u>
<b>COMPLEX THINKING EMERGENT</b>	Complex Systems Research Network Theory Systemic thinking Agent Based Modeling <u>Transdisciplinary Research</u> Research on Change and Adaptation



The most basic level goes from the descriptive level to the application phase, which is the most complex level of depth. The researcher, through the review of the literature and the background, determines the level of development achieved in his research topic (Soto Molina, 2016).

### The different paradigmatic visions and the different types of research

#### 1. Positivist Paradigm:

- Quantitative Research: In this approach, objectivity and precise measurement of phenomena are valued. Quantitative methods are used to collect numerical data and perform statistical analysis.
- Experimental: Experimental research focuses on establishing causal relationships through the manipulation of independent variables and the measurement of effects on dependent variables.
- Surveys and Cohort Studies: Surveys and longitudinal studies are used to collect data from large groups of people and analyze trends and correlations.
- Correlational research: is a research approach that aims to explore and measure the relationship or association between two or more variables without directly intervening in them. In other words, the aim is to determine if there is a statistical relationship between the variables, but the aim is not to establish a causal relationship or manipulate any of the variables.
- "Ex post facto" or fait accompli research is a research approach that is carried out after the events or phenomena have occurred, that is, it is carried out after the fact and does not involve interventions or direct manipulation of variables. The term "ex post facto" comes from Latin and means "after the fact." This methodology is used to observe and analyze the relationships between variables and events that have already taken place and cannot be controlled or altered by the researcher.

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- Quasi-experimental research is a type of scientific research in which researchers manipulate one or more independent variables to observe their effect on a dependent variable, like experimental research. However, unlike traditional experimental research, in quasi-experimental research, researchers do not have complete, random control over the assignment of subjects to study groups. Instead of randomly assigning participants, groups are often formed based on pre-existing characteristics, such as age, gender, or geographic location.

- Historical research is a research process that aims to study and interpret events, people, cultures, and processes that occurred in the past. It is based on the collection and critical analysis of primary and secondary sources, such as documents, letters, diaries, photographs, records, testimonies, and archaeological evidence, among others.

### 2. Interpretive Paradigm:

- Qualitative Research: Focuses on the deep understanding of human experience and the interpretation of meanings. Qualitative methods are used, such as in-depth interviews, participant observation and content analysis.

- Ethnography: Researchers immerse themselves in the culture or context they study to gain a more complete understanding of cultural practices and beliefs.

- Case Studies: A case or a group of cases is thoroughly investigated to understand its uniqueness and context.

- Grounded Theory research, also known as Grounded Theory in English, is a qualitative research approach that aims to develop theories or conceptual frameworks from data collected in the field. Unlike other approaches that may start with existing theories and test predefined hypotheses, Grounded Theory focuses on generating inductive theories from information obtained during research.

- Phenomenological research is a qualitative research approach that focuses on exploring and understanding individuals' subjective experiences and perception of reality. This approach seeks to understand how people experience and make sense of various phenomena, events, or situations in their lives. Phenomenology is based on Husserl's phenomenological philosophy and has been applied in a variety of disciplines, including psychology, sociology, education, and nursing.

- Biographical method or life story research is a qualitative research approach that focuses on the study and narration of the life of a person or a group of individuals. This method seeks to understand in depth the lives of the participants, including their experiences, decisions, changes, and contexts over time.

- Symbolic Interactionism research is a sociological and psychological approach that focuses on the study of social interaction and the construction of meanings in everyday life. This approach is based on the idea that people attribute meanings to symbols and gestures in their interactions with others, and that these meanings influence their behavior and the way they interpret the world around them.

### 3. Socio-Critical or Constructivist Paradigm:

- Participatory Action Research (PAR): Researchers collaborate closely with research participants, and knowledge is constructed through action and reflection.

- Artifact-Based Research: Focuses on the creation and analysis of cultural artifacts, such as documents, works of art or technological systems, to understand the social construction of knowledge.

- Narrative Research: Personal stories and narratives are used to explore how people construct individual and collective meanings and realities.

- Content Analysis research and Discourse Analysis are two qualitative research approaches used to analyze and understand the content of different types of written, oral or visual communication. These approaches allow us to systematically and structurally examine the meaning, patterns and trends present in texts, speeches, images or other types of content.

- Ethnomethodological research is a sociological approach that focuses on the study of how people create and maintain social order in their everyday interactions. This approach is based on the idea that people use routines and unwritten rules to give meaning and structure to their social actions and seeks to unravel these underlying rules through detailed observation of social interactions.

### 4. Complexity or emerging paradigm

The complexity paradigm or emergent paradigm is characterized by addressing phenomena that are inherently complex and difficult to reduce to simple components. In this approach, the interconnection of multiple variables and the influence of contextual factors on the understanding of phenomena are recognized. Research traditions associated with this paradigm include:

Complex Systems Research: This research tradition focuses on understanding systems that consist of numerous interconnected elements. Researchers analyze how system-level patterns and behaviors emerge from the interactions of its components. Computational models and simulation are common tools in this tradition.

Network Theory: Focuses on the study of networks, such as social networks, information networks, or even biological and ecological networks. Researchers explore the structure of connections and how they influence information propagation or system dynamics.

Systems Thinking: This tradition focuses on the analysis of complex systems and how changes in one component can have cascading effects throughout the system. It is used to address interdisciplinary problems and to better understand the interrelationships between different parts of a system.

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**Interconnection:** Recognizes that the elements of a complex system are interconnected and that the interactions between them are fundamental to understanding its behavior.

**Emergent Properties:** Complex systems can exhibit emergent properties, meaning that the characteristics of the system cannot be explained simply by analyzing its individual parts.

**Agent-Based Modeling:** Researchers create models that represent individual agents interacting in an environment. This is used to simulate complex phenomena and observe how collective patterns and behaviors emerge from agent interactions.

**Transdisciplinary Research:** Rather than focusing on individual disciplines, transdisciplinary research seeks to address complex problems through the collaboration of experts from various disciplines. The goal is to develop comprehensive solutions that consider multiple perspectives and dimensions.

**Nonlinearity:** Relationships within complex systems are often nonlinear, meaning that small changes can have disproportionate effects.

**Holistic approach:** Focuses on a holistic understanding rather than a reductionist analysis of systems.

**Research in Change and Adaptation:** In a constantly changing world, this tradition focuses on understanding how organizations, systems and societies adapt and evolve in response to complex and dynamic changes in their environment. In summary, the complexity or emergent paradigm is based on the idea that some phenomena are inherently complex and require research approaches that can capture and understand that complexity. The research traditions mentioned above are examples of how researchers approach problems from this perspective, recognizing the multiple interactions and dimensions involved in complex phenomena. It is important to note that these categories are simplifications and that, in practice, researchers can combine approaches and methods from different paradigms depending on their research objectives and the questions they wish to answer. Furthermore, in recent decades, there has been an increase in the adoption of interdisciplinary approaches that transcend traditional paradigm boundaries, which has enriched research in many areas.

Here is a more detailed definition of each of the research traditions of each paradigm:

### 1. Positivist Paradigm in detail

Correlational research is a type of scientific research that focuses on examining and quantifying the relationship between two or more variables. This relationship can be positive (when an increase in one variable is related to an increase in the other), negative (when an increase in one variable is related to a decrease in the other) or there is no obvious relationship. Researchers use statistical techniques to analyze data collected from samples or populations and determine the strength and direction of correlation between variables of interest. Correlational research is valuable for identifying patterns, trends, or statistical relationships in data, but it does not establish causality or allow us to conclude that one variable directly causes changes in the other.

In summary, correlational research is useful for exploring and describing statistical relationships between variables, which can provide valuable information to understand associations in natural, social, or psychological phenomena, but it does not allow determining cause and effect between the variables studied.

- Experimental research is a scientific research approach in which the researcher deliberately manipulates one or more independent variables (factors believed to cause an effect) to observe their effect on a dependent variable (the outcome being studied). This approach is used to establish cause and effect relationships between variables and is one of the most powerful methodologies for investigating relationships between phenomena. Here is a more detailed definition:

Experimental research is a scientific method that focuses on the controlled manipulation of one or more independent variables to examine their impact on a specific dependent variable. The experimental process is carried out in a controlled environment to minimize the influence of confounding or unwanted variables, allowing researchers to attribute observed results to the variables they are manipulating.

Key elements of experimental research include:

**Manipulation of independent variables:** Researchers make deliberate changes to one or more independent variables to see how they affect the dependent variable.

**Control group:** A control group that is not subject to the manipulation of independent variables is used to compare the results with the experimental group that is. This allows us to evaluate whether the independent variable caused a change in the dependent variable.

**Randomization:** Participants are randomly assigned to the experimental and control groups to ensure that the groups are comparable and to minimize bias.

**Control of confounding variables:** An effort is made to control and keep constant all variables that are not being manipulated, so that they do not affect the results.

**Accurate measurement:** Data are collected accurately and systematically to measure the effects of manipulating independent variables on the dependent variable.

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Experimental research is especially useful for establishing cause-and-effect relationships because it allows researchers to control and manipulate study conditions. This approach is used in various disciplines, including psychology, biology, physics, and social sciences, to answer questions about how variables function and interact in a controlled environment.

- Quasi-experimental research is a research approach that shares characteristics with both experimental research and non-experimental (observational) research. In quasi-experimental research, researchers manipulate an independent variable (as in experimental research) but do not have complete control over the assignment of subjects to study groups, which more closely resembles the design of non-experimental research. Here is a more detailed definition:

Key features of quasi-experimental research:

1. Manipulation of independent variables: Researchers introduce deliberate changes in one or more independent variables to observe their effect on a specific dependent variable.
2. Comparison groups: Comparison groups are used, but assignment to these groups is not completely random, but is based on specific criteria or pre-existing characteristics of the subjects.
3. Control of confounding variables: An effort is made to control and hold constant other variables that may influence the results, although this may be more difficult to achieve than in traditional experimental research.
4. Lack of complete randomization: The assignment of subjects to groups is not done in a complete random manner, which can introduce a certain degree of bias or limit the ability to establish cause and effect relationships with the same confidence as in pure experimental research.

Quasi-experimental research is useful when it is unethical or practical to assign participants randomly or when study groups are formed based on pre-existing characteristics. Although it does not offer the same level of control as pure experimental research, it can provide valuable information about the relationships between variables in situations where full experimental manipulation is not feasible.

- Historical research is a research approach that focuses on the study and understanding of the past through the critical and systematic examination of sources of historical information. Its main objective is to reconstruct and analyze events, processes, cultures, societies and changes over time. Here is a more detailed definition:

Key features of historical research:

1. Gathering Evidence: Historians gather a wide range of sources of historical information to obtain a complete and accurate picture of the past. These sources can be written, visual, oral or material in nature.
2. Critical analysis: A critical and methodological approach is applied to the examination of sources to determine their authenticity, reliability and relevance to the research.
3. Contextualization: Historians seek to understand the context in which historical events and processes occurred, including social, political, cultural and economic factors.
4. Historical Narrative: Historical research involves narrating or constructing a coherent, evidence-based narrative that explains and describes historical events and developments.
5. Interpretation: Historians interpret data and sources to provide a deeper understanding of events and their implications.
6. Historiography: Historians also study historiography, that is, the history of the writing and interpretation of history, to understand how historical perspectives and interpretations have evolved over time.

Historical research is fundamental to understanding the evolution of human societies and how past events have shaped the world today. The results of historical research are often presented in the form of books, academic essays, documentaries, and museum exhibits, among other media, and contribute to our appreciation and understanding of the past and its lessons for the present and future.

Quantitative research is a scientific research approach that focuses on the collection and analysis of numerical data and statistics to understand, describe and explain phenomena, populations or events. This method is based on the measurement and quantification of variables and uses statistical techniques to analyze the data. Here is a more detailed definition:

Quantitative research is a scientific research approach that involves the systematic collection of numerical data and its statistical analysis to understand and explain phenomena, populations, or events. In this type of research, variables that can be measured are identified and numerical data is collected through surveys, questionnaires, structured observations or experiments. This data is processed and analyzed using statistical techniques with the aim of identifying patterns, relationships and trends.

Key features of quantitative research:

1. Measurement of variables: Relevant variables are identified and measured precisely and objectively. These variables can be quantitative (e.g., age, income) or transformed into quantitative data (e.g., opinions rated on a numerical scale).
2. Structured data collection: A standardized and structured methodology is used to collect data, allowing for comparability and replicability.
3. Statistical analysis: Data are analyzed using statistical methods including descriptive statistics (such as means and standard deviations) and inferential analyzes (such as hypothesis testing and regression analysis) to draw evidence-based conclusions.

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4. Generalization: Often, results are sought to be generalized to larger populations or broader contexts, which requires representative samples and appropriate sampling techniques.

5. Objectivity and replicability: Quantitative research strives to be objective and replicable, meaning that other researchers should be able to conduct the same study and obtain similar results using the same data and methods.

Quantitative research is especially useful for answering research questions that can be measured and analyzed quantitatively. It is used in a variety of fields, such as psychology, sociology, economics, medicine, and education, to examine relationships, identify patterns, and make data-driven decisions.

- Survey research and cohort studies are two research approaches used to collect data in observational studies in the field of social sciences and epidemiology. Definitions of each of these approaches are provided below:

- Survey research is a research method that involves the systematic collection of information through standardized questions asked of individuals or study groups. These questions may be open-ended or closed-ended and are administered through written questionnaires, in-person interviews, telephone, online, or other surveys. The goal of survey research is to obtain quantitative or qualitative data on opinions, attitudes, behaviors, demographic characteristics, and other variables of interest. Surveys are used in a variety of fields, including sociology, psychology, politics, marketing, and public health, among others.

- Cohort studies are a specific type of observational research design in which a group of people (the cohort) are followed over time to examine how certain factors or exposures influence their health, behavior, or outcomes over time. These studies are common in epidemiology and public health. For example, a cohort study might follow a group of people for decades to determine how certain lifestyle factors (such as diet and exercise) influence the incidence of chronic diseases such as diabetes or cancer. Cohort studies can be prospective (starting in the present and following the cohort into the future) or retrospective (using existing data on a cohort that formed in the past).

Both approaches, survey research and cohort studies, are valuable for understanding and analyzing a wide range of social and health phenomena. The choice between one or the other depends on the nature of the research questions and whether you seek to collect data at a single point in time (surveys) or follow a population over a longer period (cohort studies).

### 2. Interpretative Paradigm in detail:

- Qualitative research is a scientific research approach used to understand, explore, and analyze in depth the complexity of social, human and cultural phenomena. Unlike quantitative research, which focuses on the numerical quantification of data, qualitative research focuses on the collection of descriptive and non-numerical data, such as observations, interviews, documents, and records, to capture the meaning and context of a phenomenon. Here is a more detailed definition:

Qualitative research is a scientific research approach that seeks to understand and explore the richness and complexity of social, cultural, or human phenomena through the collection and analysis of non-numerical data. In this approach, research techniques such as participant observation, in-depth interviews, content analysis, textual analysis, and document analysis are used to explore the experiences, perspectives, and contexts of the participants or study subjects. Qualitative research focuses on the interpretation and understanding of reality from the perspective of the people involved in the phenomenon studied.

Key features of qualitative research:

**Descriptive and context-rich data:** Narrative and descriptive data are collected that capture the complexity and richness of human and social experiences.

**In-Depth Exploration:** Researchers seek to understand the perspectives and underlying meanings of participants, often using open-ended interviews and immersion in context.

**Selective sampling:** Instead of random samples, purposive or selective sampling is used to choose participants or cases that are especially informative or relevant to the research.

**Contextualization:** Qualitative research focuses on understanding the context in which phenomena occur, including social, cultural, and temporal factors.

**Methodological flexibility:** Researchers can adapt their methods and approaches as they progress through the research, allowing for greater flexibility and responsiveness to emerging findings.

Qualitative research is widely used in disciplines such as sociology, psychology, anthropology, education, health, and social sciences in general. It provides a deep understanding of human and social phenomena, and its results can contribute to richer theories and the formulation of evidence-based policies and practices.

- Case study research is a qualitative research approach used to thoroughly explore a particular phenomenon, event, organization, or situation, with the aim of understanding it in its real-world context and providing a detailed and rich description. This methodology involves an exhaustive and in-depth investigation into a specific case or a set of similar cases.

Case study research is a qualitative research method that focuses on the close examination of a singular case or a limited set of cases, with the aim of obtaining a deep and contextualized understanding of a phenomenon or situation in its natural setting. This approach involves the collection and analysis of data from multiple sources, such as interviews, observations, documents, and records, to provide a rich and detailed description of the case or cases studied. Case study research seeks to reveal patterns, relationships,

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contexts, and factors that contribute to a comprehensive understanding of the phenomenon, without attempting to generalize the results to a broader population. This method is used in various disciplines, such as sociology, psychology, education, administration, and social science research, when seeking to deepen the understanding of complex and contextual phenomena.

In summary, case study research is a qualitative methodology that focuses on the detailed and contextualized exploration of specific cases to gain an in-depth understanding of a phenomenon or situation in its natural setting. This approach is especially useful when seeking rich, contextualized information rather than broad generalizations.

- Ethnographic research is a qualitative research approach used to study and understand the cultural practices, beliefs, values, and behavior of human groups within their natural and everyday context. This approach involves immersion of the researcher in the environment and culture of the group studied, allowing the researcher to gain a deep and contextualized understanding of the experiences and perspectives of the participants. Here is a more detailed definition.

Ethnographic research is a qualitative research approach that focuses on the detailed study and understanding of human cultures and communities through participant observation and participation in the study environment. Ethnographic researchers spend time interacting with members of the group studied, participating in their activities, and collecting data through techniques such as direct observation, in-depth interviews, and document review.

Key features of ethnographic research:

Field Immersion: Researchers spend extended time in the field of study, often living in the community or environment they research, to fully understand the culture and practices of the participants.

Participant Observation: Researchers actively participate in the day-to-day activities of the group, allowing them to gain an inside perspective and in-depth understanding of participants' experiences and perspectives.

Contextual data collection: Detailed data is collected about cultural practices, social interactions, norms, values, and symbols that are meaningful to the group.

Holistic analysis: Data is analyzed holistically, considering the cultural and social context in which it is produced.

Rich narrative: The results of ethnographic research are presented in the form of rich, descriptive narratives that show the daily lives and experiences of the participants.

Ethnographic research is used in disciplines such as anthropology, sociology, education, psychology, and ethnology to explore and document cultural and social diversity. This approach is especially valuable when seeking to deeply understand the practices and perspectives of human groups within their natural and cultural context.

- Grounded Theory research is used in a variety of disciplines, including sociology, psychology, nursing, and education, among others. It is especially useful when seeking to understand complex and poorly understood phenomena and when wanting to develop theories based on empirical data rather than based on pre-existing theories. This approach is valuable for generating knowledge in contexts where existing theory is limited or insufficient.

Grounded Theory research is a qualitative method used to develop theories or conceptual models from empirical data collected in the field. This approach involves immersion in the study context and data collection through interviews, observations, or document analysis, as necessary. The distinctive characteristic of Grounded Theory is that it does not start from pre-existing theories or hypotheses, but rather allows theories to emerge inductively as data are collected and analyzed.

Key features of Grounded Theory research:

Open and axial coding: The data are analyzed using open coding, where emerging categories and themes are identified, and axial coding, where relationships are established between these categories.

Constant comparison: A constant comparison is made between the data collected and the emerging categories, allowing theories to be refined and developed as the research progresses.

Theoretical sampling: Selective sampling based on emerging theory is used to obtain additional data to help develop and enrich developing theories.

Development of core and subordinate categories: As data is analyzed, core categories are developed that represent key concepts and subordinate categories that explain and detail these concepts.

Theory construction: The goal is to build theories or conceptual frameworks that explain the phenomenon studied in a meaningful and profound way.

Phenomenological research is a qualitative research approach that focuses on the study of human experiences as they are lived and perceived by participants. The goal is to understand and describe in depth how people interpret and give meaning to their experiences, as well as to identify underlying patterns and structures in their stories.

Key features of phenomenological research:

Focus on subjective experience: It focuses on the subjective experiences and perceptions of individuals, trying to capture what people feel and how they interpret their reality.

Phenomenological reduction: Researchers apply a technique called "phenomenological reduction" to suspend prior judgments and preconceptions and focus on the experience as it is lived by the participants.

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**Purposive Sampling:** Purposive sampling is used to select participants who have had experiences relevant to the phenomenon under study.

**In-depth interviews:** Data collection is carried out through in-depth interviews in which participants describe their experiences and the researcher seeks to understand and clarify these descriptions.

**Thematic analysis:** The data is systematically analyzed, and recurring themes and patterns are identified in the participants' narratives.

**Rich and detailed description:** Results are presented in the form of rich and detailed descriptions that capture the essence of participants' experiences.

Phenomenological research is valuable for exploring issues related to perception, experience, and meaning making in human contexts. Through this approach, the individual perspectives and shared experiences of participants can be better understood, contributing to a deeper understanding of various phenomena.

- **Biographical method or life history research** is a qualitative research approach that is based on the study of the experiences and personal history of a person or a group of individuals. The main objective is to capture and understand the lives of the participants through the narration of their experiences and the collection of relevant biographical data. This approach often involves in-depth interviews with participants, where they are asked to share details of their lives, significant events, important decisions, and changes over time.

Key features of biographical method research:

**Life Storytelling:** Participants are encouraged to tell the story of their lives, from childhood to the present, including significant events, relationships, challenges, and achievements.

**Holistic approach:** Research focuses on life, considering both personal and contextual aspects, such as family, culture, and society.

**Narrative analysis:** Data is analyzed by studying the narratives and identifying recurring patterns and themes in the participants' life stories.

**Contextualization:** Attention is paid to the social, cultural, and historical contexts that influence the lives of participants.

**Interviewer Participation:** The interviewer plays an active role in guiding the narrative and delving into important topics.

**Respect and ethics:** The ethics and privacy of participants must be considered when discussing their personal stories.

Biographical method research is valuable for understanding human experiences in depth and how people make meaning and construct their lives over time. It is used in a variety of disciplines, such as sociology, psychology, anthropology, education, and history, to explore the diversity of life trajectories and to understand how people face challenges and make decisions in their lives.

### 3. Constructivist Paradigm in detail

- **Participatory Action Research (PAR)** is a research and social action approach that seeks to actively involve people or communities affected by a problem or situation in the research and decision-making process. This approach is based on collaboration and active participation of participants in all stages of the research process, from problem identification to implementation of solutions and reflection on the results. Here is a more detailed definition: Participatory Action Research (PAR) is a research and social action approach that seeks to empower people or communities by actively involving them in the identification, analysis and resolution of problems that affect them. Some key features of IAP include:

**Active participation:** Participants, who may be community members, workers, patients, students, or others, play an active role in all stages of research and action. **Problem identification:** PAR begins with the joint identification of problems or challenges relevant to participants. This process often involves conducting discussions, interviews, focus groups, and other participatory activities.

**Collective analysis and reflection:** Participants work together with researchers to analyze and reflect on the identified problems. This may include collecting qualitative and quantitative data.

**Planning and action:** Participants and researchers collaborate in planning and implementing actions to address identified problems. These actions may include changes in policies, programs, practices, or behaviors.

**Continuous evaluation and feedback:** Continuous evaluation of the implemented actions is carried out to determine their effectiveness and adjust as necessary.

**Empowerment and social transformation:** PAR seeks to empower people and communities by enabling them to make informed decisions and actively participate in solving their own problems. It may also aim to bring about broader changes in social structures and systems.

PAR is used in a variety of contexts, such as education, health, community development, social justice, and general social research. This approach is based on the premise that people who are directly involved in a situation are the best able to understand and address it and promotes collaboration and collective action as tools for social change and the improvement of living conditions.

- **Artifact-Based Research** is a research approach that focuses on the analysis and interpretation of objects, artifacts, or cultural products to understand and obtain knowledge about historical, cultural, social, or human aspects. Instead of focusing on traditional data collection, such as surveys or interviews, this approach uses tangible objects or symbolic representations as a source of investigation and analysis. Here is a more detailed definition:

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Artifact-Based Research is a research approach that relies on the exploration and analysis of physical objects, cultural artifacts, artistic products, or symbolic representations as a means of understanding and gaining knowledge on a variety of topics. These artifacts can be both material and digital and can include works of art, archaeological artifacts, historical documents, everyday objects, media, design products, among others.

**Key Features of Artifact-Based Research:**

**Focus on objects:** The primary focus of research is on the objects or artifacts themselves and what they reveal about culture, history, society, or human behavior.

**Contextual analysis:** Attention is paid to the context in which artifacts were created or used, which can provide valuable information about their meaning and importance.

**Interdisciplinary:** Artifact-Based Research often involves researchers from different disciplines, such as archaeology, art history, cultural anthropology, design, sociology, and other related fields.

**Varied Methods:** A variety of methods are used to analyze and contextualize artifacts, which may include visual analysis, textual analysis, material analysis, content analysis, and interdisciplinary techniques.

**Critical Interpretation:** Researchers apply critical interpretation to artifacts, seeking to understand not only their surface function, but also their deeper cultural and social meaning.

Artifact-Based Research is especially valuable for the study of past and present cultures, as well as for the analysis of cultural and creative products. It allows researchers and academics to explore and better understand history, cultural identity, artistic expression, and the evolution of society through the objects and representations they produce. This approach is also relevant in fields such as museology, heritage conservation and art criticism.

- **Narrative Research** is a qualitative research approach that focuses on the collection and analysis of personal stories or narratives to understand and make sense of human experiences. Instead of focusing on quantitative data or theoretical structures, this approach relies on individual or collective stories as a source of knowledge. Here is a more detailed definition:

Narrative Research is a research approach that is based on the collection and analysis of narratives or personal stories that people share about their experiences, lives, events, or situations. These narratives can be autobiographical, biographical, or collective, and the main objective is to explore and understand human experiences from a subjective perspective.

**Key Features of Narrative Research:**

**Narratives as data:** Narratives are considered research data and are the primary source of information. These can be collected through in-depth interviews, personal diaries, autobiographies, or other forms of storytelling.

**Context and meaning:** Attention is paid to the context in which narratives develop and the meaning that narrators attribute to their experiences.

**Narrative analysis:** Narrative data is analyzed using narrative analysis approaches, which may include identifying themes, narrative structures, and key elements in the stories.

**Subjective interpretation:** The subjective perspective of the narrators is valued, and we seek to understand their perceptions, emotions and constructions of reality.

**Holistic understanding:** Narrative inquiry seeks to understand the entirety of experience, rather than reducing it to predefined variables or categories.

**Emphasis on narrator's voice:** Importance is placed on giving narrators a voice and allowing them to tell their stories in their own words.

Narrative Inquiry is used in various disciplines, such as psychology, sociology, anthropology, education, and nursing, among others, to explore and understand a wide range of topics related to the human experience. This approach is especially valuable in giving voice to people and communities whose experiences may not be adequately represented through quantitative or structured research methods. In addition, it allows a deep understanding of subjectivity and the construction of meaning in people's lives.

- **Content Analysis:**

Content Analysis is a research approach used to systematically examine and analyze the content of written documents, texts, images, audio recordings or any other type of communicative material. The goal is to identify patterns, themes, categories, and trends in the content, as well as understand the underlying meaning. Key features of Content Analysis include:

**Coding and categorization:** Researchers code content into units of analysis and then categorize these units into themes or categories.

**Objectivity and reliability:** The analysis is intended to be objective and reliable, using clear criteria and consistent coding processes.

**Contextualization:** The analysis considers the context in which the content is produced, which helps interpret the meaning of the words or images.

**Use of software:** In some cases, content analysis software is used to facilitate the organization and extraction of patterns from the content.

- **Discourse Analysis:**

Discourse Analysis is a research approach that focuses on the study of how meanings are constructed, communicated, and represented through language, whether in oral, written or visual discourse. This approach is especially valuable for understanding

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how words and language structures are used to influence perception, persuasion, and the construction of reality. Key features of Discourse Analysis include:

Study of rhetoric: Rhetoric, linguistic strategies and discursive structures used to influence the audience and communicate specific messages are analyzed.

Social and political context: The analysis considers the social and political context in which the speech occurs, as this can influence interpretation and meaning.

Ideology and power: We investigate how language can reflect and perpetuate ideologies and power relations.

Identification of narratives: The aim is to identify the narratives present in the discourse, which helps to understand how stories are constructed and communicated.

Both approaches, Content Analysis and Discourse Analysis, are used in various disciplines, such as communication, sociology, psychology, linguistics and social research in general. They allow for a deep understanding of how information is communicated and represented, which can be valuable in exploring topics such as media representation, propaganda, public opinion, political rhetoric, and much more.

- Ethnomethodological research is a sociological approach that relies on the observation and analysis of everyday social practices to understand how people create, maintain and negotiate social order in their interactions. It was developed by Harold Garfinkel and other sociologists in the 1960s and is based on the premise that people use a set of unwritten rules and routines to interpret and make sense of their social world.

Key features of ethnomethodological research:

Detailed analysis of interactions: Ethnomethodological researchers focus on the observation and detailed analysis of social interactions, whether in natural contexts or experimental situations.

Interest in unwritten rules: We seek to identify the unwritten rules and everyday practices that people use to achieve coherence and meaning in their interactions.

Challenging conventional assumptions: Ethnomethodological research often challenges conventional assumptions about how social interactions work and how social order is established.

Emphasis on interpretation: Attention is paid to how people interpret the actions and words of others in real time, including analysis of conversations, gestures, and non-verbal cues.

Construction of social reality: Social reality is actively constructed by participants in interactions, and not simply a set of objective facts. Ethnomethodological research has been influential in sociology and the sociology of communication. It provides a unique perspective on how people create and maintain social order in their daily lives and has contributed to challenging conventional assumptions about communication and social interaction. This approach has been used in studies on topics such as conversation, decision making, negotiation, and social identity construction.

### 4. The complexity paradigm in detail

The complexity paradigm is a conceptual and methodological approach used to understand phenomena and systems that are inherently complex and that cannot be fully explained or predicted using traditional analysis approaches. This paradigm is based on the idea that the real world is full of dynamic, interconnected, and adaptive systems that exhibit emergent and nonlinear properties.

- Complex systems research is an interdisciplinary approach that focuses on the study of systems composed of multiple interconnected and interdependent components, where the interactions between these components can give rise to emergent and often unpredictable behaviors. This approach seeks to understand how these complex systems work, how their global properties and behaviors emerge, and how they can be modeled and analyzed. Complex systems research is an interdisciplinary approach that is dedicated to the study of systems composed of multiple elements or components that interact with each other. These systems can span a wide variety of fields, from biology and ecology to economics, physics, sociology, and beyond. Key features of complex systems research include:

Interconnection and interdependence: The components of a complex system are interconnected and interdependent on each other, meaning that actions or changes in one component can affect others.

Emergent behavior: Complex systems often exhibit emergent behaviors, that is, global properties or patterns that arise from local interactions between components and that can be difficult to predict from the individual properties of the components.

Modeling and simulation: Complex systems research uses mathematical models, computer simulations, and analysis tools to represent and understand the behavior of these systems.

Adaptation and evolution: Complex systems can adapt and evolve over time in response to changes in their environment or in their own internal interactions.

Multidisciplinarity: Complex systems research often involves experts from various disciplines working together to address complex problems.

Examples of complex systems can include ecosystems, the human brain, social networks, financial markets, urban traffic, transportation systems, health systems, and more. Complex systems research seeks to provide a deeper understanding of these

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systems and how they work, which can be valuable in addressing complex problems and challenges in a variety of fields. This approach has also led to the development of theories and tools that can be applied in a wide range of contexts.

- Network Theory research is an interdisciplinary approach that focuses on the study and analysis of the relationships and connections between individual elements (nodes) in a network. These networks can represent a variety of systems, from social and communication networks to biological, transportation or technological networks. The main objective of Network Theory is to understand the structural properties, dynamics and emergent patterns that arise from interactions between network nodes.

Network Theory research focuses on the study of networks, which are sets of nodes (individual elements) connected by links (relationships or connections). Some key features of Network Theory research include:

Topology analysis: Examines the topological structure of the network, that is, how the nodes are connected and what patterns of connections exist.

Measurements and Metrics: Use specific measures and metrics to characterize node centrality, network density, modularity, failure resilience, and other structural and functional aspects.

Identification of communities: Seeks to identify groups or communities of nodes that tend to be more interconnected with each other than with other nodes in the network.

Network Modeling: Develop mathematical and computational models to represent and simulate the behavior of networks and understand how they can change over time.

Dynamics and processes: Explore how nodes interact and influence each other over time, which may include information diffusion, disease spread, collective decision making, and other dynamic processes.

Diverse Applications: Network Theory is applied in a wide variety of fields, from sociology and biology to computer science, transportation, economics, and more.

Examples of networks include online social networks such as Facebook and Twitter, scientific collaboration networks, transportation networks such as the road and highway system, communication networks such as the Internet, protein-protein interaction networks in molecular biology, and many others. Network Theory has proven valuable in understanding the structure and functioning of these complex systems, as well as addressing problems and challenges in a variety of disciplines. It is also used in data analysis, social network analysis and in decision making in organizations and companies.

- The research tradition of Systems Thinking is an interdisciplinary approach that focuses on understanding and analyzing complex systems by identifying and studying their components, interactions, and emerging patterns. This approach seeks to address problems and challenges from a holistic perspective, recognizing that systems can be more than the sum of their individual parts.

Systems Thinking is a research tradition that is based on the application of systemic principles and concepts to address problems and challenges in a variety of fields, including science, engineering, management, economics, ecology, health, education, and more. Some key characteristics of the Systems Thinking research tradition include:

Focus on complex systems: It focuses on the study of complex systems, which can be biological, social, economic, environmental, or technological systems. These systems are made up of multiple interconnected elements.

Holistic perspective: Recognizes that systems are more than the sum of their individual parts and strives to understand how systems function.

Feedback identification: Seeks to identify feedbacks and interconnections between the components of a system, since these feedbacks can give rise to non-linear behaviors and surprising effects.

Modeling and simulation: Use models and simulations to represent and understand the behavior of complex systems and to explore how they respond to changes in key variables.

Focus on systemic causality: Examines causes and effects in the context of systemic relationships, recognizing that actions can have multiple consequences in a system.

Decision making and problem solving: It is applied in strategic decision making and problem solving, as it allows complex problems to be addressed more effectively.

Systems thinking has proven valuable in understanding and addressing complex, global challenges such as climate change, natural resource management, urban planning, business decision making, project management, and more. This approach fosters a deeper understanding of interconnection and interdependence in complex systems, which can help make more informed decisions and design more effective solutions.

- Agent-Based Modeling (MBA) research is a research and simulation approach used to study and understand complex systems by creating models that represent the interaction and behavior of individual agents within a system. "Agents" are autonomous entities that can make decisions and perform actions based on rules and programmed behaviors. This approach allows us to analyze how patterns and dynamics emerge at a systemic level from the interactions of individual agents.

Agent-Based Modeling (MBA) research is an interdisciplinary approach that relies on the creation of simulation models to explore and understand the behavior of complex systems. Some key features of MBA research include:

Individual agents: Models are designed to represent individual agents, which can be people, organisms, machines, or abstract entities, and which have the capacity to make decisions and perform autonomous actions.

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**Interactions:** Agents interact with each other and with their environment, which may include communication, competition, cooperation, and other types of interactions.

**Programmed rules and behaviors:** Each agent follows programmed rules and behaviors that determine how they make decisions and how they respond to their environment and other agents.

**Emergent dynamics:** System dynamics emerge from the interactions and decisions of individual agents, meaning that patterns and behaviors at the systemic level can be difficult to predict from the properties of individual agents.

**Experimentation and simulation:** Computer simulations are used to experiment with different scenarios and conditions within the model and observe how they affect the system.

**Validation and analysis:** The aim is to validate agent models by comparing simulation results with real-world data or existing theories. A detailed analysis of emerging dynamics is also carried out.

MBA research is applied in a wide variety of fields, including science, economics, sociology, ecology, management, robotics, and artificial intelligence, among others. This approach is valuable for understanding and modeling complex systems, as it allows us to analyze how local interactions between individual agents can give rise to patterns and phenomena at a systemic level. It is also used in decision making, strategic planning and behavior prediction in dynamic and adaptive systems.

- **Transdisciplinary research** is an approach that transcends the traditional boundaries of academic disciplines to address complex problems and real-world challenges. Rather than focusing on a single discipline or approach, transdisciplinary research involves experts from different fields and collaborates with multiple perspectives to address interdisciplinary problems.

Transdisciplinary research is an approach that seeks to understand and address complex and multifaceted problems or challenges through collaboration and integration of knowledge, methods and approaches from multiple disciplines and perspectives. Some key features of transdisciplinary research include:

**Interdisciplinary collaboration:** Transdisciplinary researchers work in teams that include experts from different academic disciplines, as well as external stakeholders such as the community, government, industry, or social sector.

**Focus on complex problems:** Focuses on real problems that cannot be effectively addressed from a single disciplinary perspective, such as climate change, public health, poverty, environmental sustainability, among others.

**Knowledge integration:** Transdisciplinary researchers seek to integrate and combine knowledge, theories, approaches, and methods from different disciplines to obtain a more complete understanding of the problem.

**Stakeholder participation:** Involves key stakeholders, such as the local community, government or non-government organizations, industry, and other relevant actors, in all stages of the research.

**Practical solutions:** The goal is to generate practical and applicable solutions to real-world problems, and not just produce academic knowledge.

**Methodological flexibility:** Transdisciplinary researchers can use a variety of methodological approaches, from qualitative and quantitative methods to community engagement tools and policy analysis.

**Emphasis on reflection and ethics:** Transdisciplinary research often includes critical reflection on the ethical and social implications of research and action. Transdisciplinary research is especially valuable in addressing global and complex problems that require deeper and more holistic understanding. This approach is used in fields such as sustainability, public health, natural resource management, technological innovation, public policy, and many others. It facilitates collaboration between different actors and disciplines to address complex challenges and contribute to informed decision-making and effective solutions.

- **Research in Change and Adaptation** focuses on the study of how systems, organizations, communities, and people face and adjust to changes in their environment, whether at a social, economic, environmental or technological level. This research seeks to understand how individual and collective entities respond and adapt to change to maintain resilience, effective functioning, and the ability to adjust to new conditions. Here is a more detailed definition:

Research in Change and Adaptation refers to the study of how systems and entities cope with changes in their environment and how they adapt to cope with those changes. Some key features of this research include:

**Identification of changes:** The first step involves the identification and analysis of changes in the environment, which may be social, economic, environmental, technological, political, or cultural changes.

**Impact evaluation:** How these changes can impact at the individual, organizational or community level is examined, and their scope and consequences are evaluated.

**Adaptive Mechanisms:** Research explores how individual and collective entities develop and apply adaptive strategies and mechanisms to cope with change, which may include changes in policies, technology, organizational practices, and more.

**Resilience and recovery capacity:** The resilience of systems and their ability to recover from disturbances and adverse changes is investigated. **Facilitating factors and obstacles:** Factors that can facilitate or hinder adaptation are examined, such as collaboration, resources, structural barriers, and individual capabilities.

**Continuous learning and improvement:** Research often focuses on how entities can learn from past experiences and improve their adaptation strategies over time. **Multidisciplinary approach:** Since change and adaptation can occur in a variety of contexts and sectors, this research is often conducted from a multidisciplinary perspective involving researchers from different fields.

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Research in Change and Adaptation is relevant in a wide range of areas, such as organizational change management, public policy planning, climate change adaptation, crisis management, psychology of personal change, sociology of social change and more. It helps understand how people, organizations and communities adapt to changing situations and can provide valuable information for decision making, strategic planning and improving resilience in various contexts.

As a synthesis

The relationship between epistemological paradigms and research traditions is fundamental to understanding how research processes are approached in various disciplines. These research paradigms and traditions coexist and intertwine in research practice, and researchers choose approaches based on their objectives and research questions. The choice of paradigm and tradition affects the methodology, methods, and interpretation of results in research. Epistemological paradigms significantly influence the methods, procedures, techniques, and language used in different research traditions. These relationships demonstrate how epistemological paradigms guide the choice of methods and techniques, as well as the language used in research. Each paradigm has its own philosophical and methodological premises that influence how research problems are addressed and knowledge is generated.

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