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Scientific Paradigms: concepts, typologies, similarities and differences

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ABSTRACT: Scientific paradigms are epistemic frameworks that guide the production of knowledge. They include ontological, epistemological, and methodological assumptions. Among the most notable are the positivist, interpretive, and critical paradigms. The interpretive paradigm differs from the positivist paradigm in seeking to understand social meanings from the perspective of actors and is similar to the critical paradigm in its interest in context, although without assuming a directly transformative stance. Regarding methodology, the interpretive paradigm is articulated with the qualitative approach, which prioritizes a deep understanding of complex phenomena. The hermeneutic method, associated with this approach, allows for the interpretation of discourses, texts, and human actions through a reflective, contextualized, and meaningful reading, which is key in social and educational research.

Keywords: research paradigms, positive, interpretive, socio-critical

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1. Introduction

The scientific paradigm, according to Thomas Kuhn (1970), is defined as the set of theories, principles, and methods that guide the production of knowledge within an academic community. In the social sciences, Ricoy (2006) identifies three major paradigms: positivist, interpretive, and socio-critical, each with its own ontological, epistemological, and methodological conceptions.

The positivist paradigm is based on the idea of an objective, external, and measurable reality. It relies on empirical observation, quantification, and the formulation of general laws. Its tradition stems from the thinking of Comte, Mill, and Popper, and it is commonly applied in the natural and social sciences when the goal is control, replicability, and prediction.

In contrast, the interpretive paradigm posits that reality is a social construction dependent on context and the meanings attributed by individuals. It draws on currents such as phenomenology and symbolic interactionism. It favors qualitative methods, such as interviews, ethnography, or narrative analysis, aiming to understand human experiences from the perspective of social actors. Here, the researcher plays an active role in the interpretive process.

The socio-critical paradigm, for its part, seeks not only to understand reality but to transform it. Inspired by critical theory and liberating pedagogy, it considers knowledge to be mediated by power relations. It promotes participatory methodologies, such as action research, in which research subjects are co-authors of the process, with emphasis on emancipation, collective reflection, and social change.

Despite their differences, all paradigms share three key elements: they have an epistemological view of knowledge, aim to produce valid knowledge, and demand coherence between objectives, methods, and results. Their divergences lie in how they understand reality, the role of the researcher, and the appropriate methods for investigation.

In summary, scientific paradigms are fundamental frameworks for guiding research. Their selection should be consistent with the research purpose, the nature of the phenomenon under study, and the adopted methodological approach.

2. Methodology

The methodology employed in the development of this chapter is framed within the **i**nterpretive paradigm**,** whose epistemological orientation privileges a deep understanding of the meanings that individuals attribute to their practices, discourses, and contexts. This paradigm recognizes the subjectivity of knowledge**,** social interaction as a source of understanding, and the situated nature of knowledge—elements that make it particularly suitable for addressing complex phenomena from a critical and reflective perspective.

In line with this framework, a qualitative approach is adopted, focused on the comprehensive, inductive, and contextualized analysis of academic sources. This approach does not seek to generalize universal laws but rather to explore and interpret the meanings and theoretical constructs emerging from the field of study. In this sense, qualitative research captures the semantic richness **and** conceptual diversity embedded in scientific discourses, especially concerning the philosophical and epistemological foundations that shape contemporary schools of thought.

Furthermore, the chapter relies methodologically on the hermeneutic method, which is particularly relevant when the goal is to critically interpret academic texts, theories, and paradigmatic positions. Hermeneutics, understood as the art of understanding and interpreting, provides tools to decode meanings, reveal conceptual tensions, and reconstruct arguments through a deep and contextualized reading of documents. This method is especially useful for analyzing philosophical and epistemological categories**,** as it enables the researcher to unravel their ontological, methodological, and ethical implications within the knowledge production process.

As a concrete inquiry strategy, a systematic literature review was conducted, allowing for the rigorous identification, selection, and analysis of a representative corpus of relevant texts. This review aimed at building a solid state of the art to support the formulation of the theoretical framework. Thus, the goal is not only to map the historical and theoretical development of the research problem but also to critically interpret the dominant epistemic positions in current science (Martínez et al., 2024; Salcedo et al., 2022).

2. Results

3.1. **Scientific Paradigm**

The scientific paradigm can be defined as a theoretical structure composed of principles, postulates, explanatory models, technical procedures, and results accepted by a given scientific community. This structure functions as a normative guide that directs knowledge production and the formulation of research within a specific disciplinary field. This conception was initially developed by Thomas S. Kuhn in his influential work *The Structure of Scientific Revolutions* (1962), where he argued that paradigms act as matrices that delineate what is valid to research, how it should be done, and with what epistemological objectives. According to Kuhn (1970), paradigms not only determine the objects of study but also regulate the methods and interpretative frameworks deemed legitimate within an academic community.

In the field of social sciences and humanities, Ricoy (2006) identifies three major paradigms that have guided scientific research: positivist, interpretive, and socio-critical. Each differs in its epistemological stance, methodology, and fundamental purpose. The positivist paradigm promotes objectivity, the use of quantitative tools, and the formulation of general laws through empirical verification. The interpretive paradigm focuses on understanding the meanings that social actors assign to their experiences, using qualitative methods and acknowledging subjectivity as a constitutive part of knowledge. Lastly, the socio-critical paradigm aims to transform reality through investigative processes that integrate reflection, participation, and emancipatory action, framed within an ethical-political commitment to social justice.

Generally, paradigms can be understood as frameworks of thought that shape a particular worldview, establish criteria for what is valid knowledge, and how to access it. In this sense, they are fundamental references that guide the theoretical, methodological, and ethical decisions of the researcher. As noted by Kuhn (1970), Ricoy (2006), and Martínez (2010), the adopted paradigm conditions how reality is conceived, how research questions are formulated, and how collected information is interpreted, making its understanding a key element for the rigorous and coherent development of any research process.

Ricoy (2006) highlights that the labels assigned to different scientific paradigms have been multiple and have undergone significant transformations over time, in line with the evolution of epistemological currents and the diversity of approaches within different disciplinary fields. This terminological variability not only reflects the conceptual richness of paradigms but also the various ways in which they have been adopted, reinterpreted, and applied in specific research contexts.

Thus, the positivist paradigm has been identified under various labels, such as quantitative, empirical-analytical, rationalist, scientific-technological, and systematic-managerial. All these names emphasize its objectivist nature, explanatory orientation, and basis in controlled observation and empirical measurement.

In contrast, the interpretive paradigm is known by terms such as qualitative, naturalistic, phenomenological, humanistic, hermeneutic, and symbolic. These labels underline its comprehensive orientation, its emphasis on the subjectivity of social actors, and its interest in meanings constructed in specific contexts.

The critical or socio-critical paradigm, for its part, is associated with labels such as committed, emancipatory, ecological, participatory, or dialogic, referring to its transformative nature, political involvement, and connection with collective processes of reflection and social action.

In summary, this diversity of terms demonstrates not only the semantic richness of each paradigm but also their adaptability to different theoretical frameworks, fields of study, and research needs, while maintaining internal coherence with their ontological, epistemological, and methodological principles.

3.1.1. Positivist Paradigm

The positivist paradigm represents one of the most influential traditions in the historical development of scientific thought, particularly in the field of natural sciences. This current is based on the idea that reality is objective, unique, and external to the subject who observes it, and therefore can be understood through empirical observation, controlled experimentation, and the use of rigorous methodological tools. According to Usher and Bryant (1992) and Ricoy (2006), this paradigm is grounded in an epistemology that prioritizes quantitative methods, the possibility of replicating findings, and the formulation of general laws that causally explain studied phenomena.

Historically, positivism emerged in the 19th century and was consolidated in the early 20th century, closely linked to the rise of experimental methods and the consolidation of empirical sciences. Its philosophical basis lies in the work of Auguste Comte, who proposed an objective science, free of subjective values and focused exclusively on observable facts. This approach was expanded and strengthened by other prominent thinkers such as John Stuart Mill, Émile Durkheim, and Karl Popper, whose contributions established positivism as the dominant paradigm for the study of empirical reality.

Under this perspective, knowledge is conceived as a neutral product, independent of the personal interpretation of the researcher, and therefore susceptible to being measured, quantified, and evaluated through statistical procedures. The validity of knowledge is ensured through the strict application of the scientific method, control of variables, and exclusion of value judgments, which allows for the attainment of precise, reliable, and verifiable results.

The positivist paradigm has been widely used in research requiring experimental control and systematic procedures, such as clinical trials, educational assessments, population surveys, or comparative studies. Although its limitations become evident in contexts requiring a more interpretative or contextual understanding, its legacy remains solid and relevant in many fields of study, especially when aiming to test hypotheses, identify causal patterns, or construct generalizable predictive models (Usher & Bryant, 1992; Ricoy, 2006).

3.1.2. Interpretive Paradigm

The interpretive paradigm, also known as comprehensive or hermeneutic, focuses on the deep understanding of the meanings people assign to their experiences, actions, discourses, and contexts. Unlike the positivist approach, this paradigm assumes that reality is not something objective and external to the subject but is socially constructed through symbolic interaction, shared languages, and situated experiences. In this framework, both researchers and participants are considered active subjects whose subjectivity significantly influences the generation of knowledge.

Methodologically, this approach prioritizes the use of qualitative techniques that allow access to the deeper and contextual meanings of human experience. These include in-depth interviews, participant observation, narrative analysis, and case studies. Its application is common in fields such as anthropology, interpretive sociology, qualitative psychology, and critical pedagogy, where the goal is to interpret social phenomena from the perspective of those who live them.

Historically, the interpretive paradigm is rooted in various philosophical and epistemological currents. Notable influences include Edmund Husserl's phenomenology, Mead's (1934) and Blumer's (1969) symbolic interactionism, and the works of Dilthey (1957), Schutz (1957), and Berger and Luckmann (1966), who enriched the understanding of the social world as a meaningful and contextual construction.

According to Pérez (1994), Ricoy (2006), and Kobylarek (2014), this paradigm is characterized by the following principles:

- **Praxis-based construction**: Theory does not arise from abstract schemes but from concrete action and lived experience. Interpretation is grounded in the meanings social actors assign to their lives.
- **Contextual and relational knowledge**: Knowledge is neither neutral nor absolute but relative to the historical, cultural, and symbolic context in which it is produced. Understanding requires recovering past meanings and recognizing the structures mediating current action.
- **Intersubjectivity and methodological plurality**: The research process seeks to capture the diversity of shared meanings, acknowledging the co-construction of knowledge through dialogue between subjects. Methodological plurality is a necessary condition for studying complex human phenomena.

In summary, the interpretive paradigm offers a comprehensive vision of social reality, centered on subjectivity, lived experience, and situated interpretation, making it a powerful tool for accessing the multiple dimensions of the social world.

3.1.3. Socio-critical Paradigm: Foundations, Characteristics, and Methods

The socio-critical paradigm represents a research perspective oriented not only toward describing or interpreting social reality but also toward actively transforming it through an emancipatory understanding of knowledge. This approach is rooted in the theoretical foundations of critical tradition, including Marxism, critical pedagogy, and participatory approaches. It recognizes that knowledge is shaped by power

relations, social inequalities, dominant ideologies, and historical conditions that influence both individual and collective experiences (Ricoy, 2006; Alvarado & García, 2008).

Unlike more descriptive or interpretive approaches, this epistemological current assumes that the people involved in research are not mere objects of analysis but active, reflective, and conscious subjects who can become agents of change. Therefore, methodologies such as participatory action research, collaborative research, and dialogical methods aim to foster horizontal participation, in which the researcher acts as a facilitator in collective processes of reflection and social transformation. This approach has been supported by theorists such as Horkheimer, Adorno, Habermas, Paulo Freire, Carr, and Kemmis (Escudero, 1987; Gómez, 2010).

Key characteristics of this paradigm include:

- **Critical self-reflection**: The research process begins with the social actors' deep reflection on their own living conditions. Communities not only describe their reality but identify structural causes of their problems and critically appropriate knowledge as a tool for transformation (Escudero, 1987; Ricoy, 2006).
- **Active participation**: The relationship between researcher and participants is based on equity and co-responsibility. Communities define problems, design strategies, and participate in decision-making, legitimizing knowledge built from their own experience (Alvarado & García, 2008).
- **Social emancipation**: The goal is to empower collectives, fostering their critical capacity and leadership in change processes. This involves a collaborative ethic and a commitment to social justice (Asghar, 2013).
- **Consensus-based decision-making**: Actions resulting from the research are collectively constructed, prioritizing open dialogue and community deliberation as tools to guide transformation processes from a democratic logic (Ricoy, 2006).
- **Inclusion and epistemic equity**: A conception of knowledge based on diversity, plurality of voices, and recognition of local and popular knowledge is promoted. Research thus becomes a space for articulating academic knowledge with community experience (Alvarado & García, 2008).
- **Transformative practical orientation**: This paradigm does not aim for abstract or universal theories but for contextualized solutions to real problems, based on the concrete needs of involved communities (Gómez, 2010).

In short, the socio-critical paradigm redefines scientific research as a tool for social change, producing knowledge with and for the subjects, from an ethical, participatory, and transformative perspective.

3.2. Similarities and Differences Among Scientific Paradigms

3.2.1. Similarities

Despite notable ontological, epistemological, and methodological differences that distinguish various research paradigms such as positivist, interpretive, and socio-critical, certain common elements underlie all of them, allowing for points of convergence in their conceptual and operational structures.

First, all paradigms are based on an epistemological conception—that is, a theory about the nature of knowledge and the legitimate ways of producing it. Each one establishes its own definition of what constitutes valid knowledge, how to access it, and the relationship between the researcher and the object of study. This epistemological foundation is essential for framing the logic of scientific inquiry, regardless of methodological differences.

Second, all scientific paradigms aim to produce rigorous, valid, and reliable knowledge, though according to specific validation criteria. For example, while the positivist paradigm values results that can be replicated and statistically generalized, the interpretive paradigm emphasizes internal coherence and depth of understanding, and the socio-critical paradigm legitimizes knowledge by its ability to contribute to social transformation. In all cases, the objective is to produce knowledge that is recognized as relevant, useful, and methodologically sustainable within its respective frame of reference.

Finally, internal coherence is a transversal requirement across all paradigms, implying logical consistency between research objectives, theoretical approach, data collection techniques, and criteria for analysis and interpretation of results. Methodological consistency not only ensures the quality of the research process but also reinforces the credibility and legitimacy of the knowledge produced, regardless of the paradigm adopted.

In summary, although each scientific paradigm defines its foundations and procedures differently, they all share a commitment to systematic knowledge production, methodological rigor, and logical articulation between theory, method, and results.

3.2.2. Differences

Scientific paradigms differ in how they understand reality, the relationship between the researcher and the object of study, and the appropriate methods for addressing research phenomena. These differences operate on three fundamental levels: ontological, epistemological, and methodological, which define the interpretive frameworks from which scientific knowledge is produced.

Ontological Differences: Conception of Reality

From the positivist perspective, reality is conceived as an objective, singular, and external entity, independent of beliefs or interpretations. Facts exist on their own and can be observed, measured, and explained without the researcher's subjectivity interfering. Research should focus on discovering general laws that govern this reality.

In contrast, the interpretive paradigm views reality not as an external and immutable entity but as a social construction that varies depending on cultural, historical, and symbolic contexts. Thus, multiple realities exist each valid that emerge from the meanings individuals attribute to their daily experiences.

Meanwhile, the socio-critical paradigm asserts that reality is shaped by structures of power, domination, and inequality political, economic, cultural, and historical that condition individuals' lives. Knowledge, therefore, must serve as a tool to expose, question, and contribute to the transformation of those conditions.

Epistemological Differences

In positivism, the researcher is an external, neutral, and impartial observer, uninfluenced by the object of study. Knowledge is produced through rigorous application of the scientific method, guided by empirical-deductive logic, and oriented toward establishing universal truths.

In the interpretive approach, the researcher is an active participant in the process, whose subjectivity influences interpretation. Knowledge is constructed collaboratively between the researcher and social actors, privileging dialogue, understanding, and contextual interpretation.

From the socio-critical perspective, the researcher not only interprets reality but assumes an ethical and political role committed to social transformation. They are seen as a situated subject participating in praxis alongside communities, seeking to empower traditionally excluded social groups.

Methodological Differences

The positivist paradigm relies on quantitative methods that allow for precise measurement of variables, such as surveys, experiments, standardized tests, and statistical analysis. These procedures help establish causal relationships and formulate general laws based on empirical data.

In contrast, the interpretive paradigm favors qualitative methods such as in-depth interviews, participant observation, discourse analysis, and case studies, which allow for understanding the meanings individuals attribute to their actions in specific contexts.

Finally, the socio-critical paradigm employs participatory and dialogical methodologies, such as participatory action research (PAR), collaborative research, or transformative research. These methods are developed in active collaboration with communities, promoting critical reflection, awareness, and collective action for social transformation.

In summary, differences among paradigms are not merely technical or procedural—they reflect distinct worldviews and epistemological commitments. Each offers valuable tools depending on the object of study, the objectives set, and the intended impact on knowledge production.

4. Discussion

The comparative analysis of the positivist, interpretive, and socio-critical paradigms allows for a better understanding of the epistemological diversity that characterizes scientific production in the social sciences and humanities. Each of these approaches constitutes a coherent framework of ontological, epistemological, and methodological assumptions that guide how social phenomena are conceived, how knowledge is formulated, and how the role of the researcher is defined within the research process.

The positivist paradigm, with its emphasis on objectivity, quantification, and generalization, has been fundamental in consolidating empirical research, particularly in fields where measurement and control are essential. However, its limitations become apparent when attempting to capture the complexity of human meanings, cultural particularities, and symbolic dimensions of social reality. Despite these shortcomings, its relevance remains evident in disciplines such as education, medicine, and economics, where statistical analysis and replicability are still prioritized.

In contrast, the interpretive paradigm emerged as a response to the shortcomings of the positivist model, offering a situated and subjective understanding of knowledge. By recognizing that reality is socially constructed, this approach values the voices of actors and the contextual interpretation of their experiences. The hermeneutic method and the use of qualitative strategies reinforce the potential to access the deeper meanings underlying social practices, which is crucial in research focused on culture, education, community health, and human behavior.

Finally, the socio-critical paradigm represents a theoretical and political evolution that goes beyond explanation or understanding, advocating for research committed to social transformation. From this perspective, science cannot limit itself to describing the world; it must also contribute to changing it, especially in contexts marked by inequality, exclusion, or oppression. The active participation of communities, critical self-reflection, and the emancipatory nature of knowledge are distinctive features of this approach.

In sum, paradigms should not be understood as mutually exclusive, but rather as complementary lenses that depending on the object of study—allow for the examination of reality from multiple dimensions. Their proper selection and methodological articulation strengthen the theoretical soundness and ethical commitment of all scientific research.

5. Conclusions

The study of scientific paradigms demonstrates that research is not confined to a single way of knowing; rather, it is configured as a pluralistic practice guided by different conceptions of reality, knowledge, and social intervention. In this regard, understanding the characteristics, strengths, and limitations of the positivist, interpretive, and socio-critical paradigms is essential for designing coherent, relevant, and ethically responsible research.

The positivist paradigm, grounded in objectivity and quantitative measurement, continues to be relevant for studies aimed at generalizing results, though it presents limitations in contexts where meaning and subjectivity are key. The interpretive paradigm, on the other hand, emphasizes the importance of understanding social processes from the perspective of the actors themselves, privileging empathy, interaction, and contextual interpretation. Finally, the socio-critical paradigm introduces a transformative dimension, which not only seeks to interpret reality but also to actively improve it through participatory and emancipatory processes.

Moreover, comparing these paradigms reveals both their similarities (such as the coherence between method and objective) and their substantive differences (ontological, epistemological, and methodological), facilitating more reflective methodological decision-making. Thus, rather than adopting a

single or superior approach, the researcher must consider the nature of the problem, the research objectives, and the context of action in order to select the most appropriate paradigm.

In conclusion, understanding scientific paradigms not only enriches research training but also broadens the researcher's critical and ethical capacities, strengthening their commitment to the construction of meaningful and socially relevant knowledge.

References

[1] Alvarado, M. & García, A. (2008). *La investigación educativa en el paradigma crítico: elementos para su comprensión*. Universidad de Granada.

[2] Asghar, M. Z. (2013). Critical Paradigm: A Pre-Understanding of Contemporary Educational Research. *International Journal of Humanities and Social Science*, 3(15), 229–236.

[3] Berger, P. L. & Luckmann, T. (1966). *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*. Anchor Books.

[4] Blumer, H. (1969). *Symbolic Interactionism: Perspective and Method*. Prentice-Hall.

[5] Comte, A. (1830–1842). *Cours de philosophie positive*. Paris.

[6] Dilthey, W. (1957). *Ideas Concerning a Descriptive and Analytical Psychology*. In M. Heidegger (Ed.), *Essays on the History of Philosophy*. Harper.

[7] Durkheim, E. (1895). *Las reglas del método sociológico*. Editorial Planeta (traducción moderna).

[8] Escudero, T. (1987). *Evaluación educativa: una aproximación práctica*. Ediciones Morata.

[9] Gómez, A. (2010). *Investigación educativa y transformación social: una mirada desde el paradigma crítico*. *Revista de Estudios Pedagógicos*, 36(1), 89–104.

[10] Husserl, E. (1913). *Ideas relativas a una fenomenología pura y una filosofía fenomenológica*. Alianza Editorial (traducción moderna).

[11] Kobylarek, A. (2014). Text analysis in the interpretative paradigm of research. En L. Jakubowska & A. Kobylarek (Eds.), *Qualitative Content Analysis in Research Conducted in Cyberspace*. Adam Marszałek Publishing House.

[12] Kuhn, T. S. (1962). *The Structure of Scientific Revolutions*. University of Chicago Press.

[13] Martínez, H. E. (2010). *El proceso de investigación científica en la universidad*. Valledupar: Fundación Élite.

[14] Martínez, H. E., Pumarejo, H. M., Montero, M. J., & Monter, E. (2024). State of the art design: Reflections, meaning, objective, structure and example. *Russian Law Journal, 12*(1). https://doi.org/10.52783/rlj.v12i1.3931

[15] Mead, G. H. (1934). *Mind, Self, and Society: From the Standpoint of a Social Behaviorist*. University of Chicago Press.

[16] Mill, J. S. (1843). *A System of Logic, Ratiocinative and Inductive*. London: Parker.

[17] Pérez Serrano, G. (1994). *Investigación cualitativa: Retos e interrogantes II. Técnicas y análisis de datos*. Editorial Muralla.

[18] Popper, K. (1959). *The Logic of Scientific Discovery*. Hutchinson.

[19] Ricoy, M. C. (2006). *Paradigmas de la investigación educativa: una aproximación crítica*. *Educación XX1*, 9, 51–84. https://doi.org/10.5944/educxx1.9.2006.147

[20] Salcedo, J., Martínez, H., Urriago, J. y Romero, A. (2022). The theoretical framework in research: meaning, functions, structure and example for its design. Russian Law Journal, 10, 877-884. https://doi.org/10.52783/rlj.v10i4.4450

[21] Schutz, A. (1967). *The Phenomenology of the Social World*. Northwestern University Press.

[22] Usher, R., & Bryant, I. (1992). *Adult Education as Theory, Practice and Research: The Captive Triangle*. Routledge.