



BRIDGING PARADIGMS: RETHINKING QUANTITATIVE, QUALITATIVE, AND MIXED METHODS IN CONTEMPORARY RESEARCH

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Abstract:

The evolution of research methodology reflects a persistent effort to reconcile the measurable and the meaningful in the pursuit of knowledge. This paper examines the paradigms of quantitative, qualitative, and mixed methods through a conceptual lens, questioning the widespread belief that methodological hybridity is inherently superior. It argues that such assumptions often overlook the philosophical divergences that define each tradition and the necessity of aligning methodological choice with epistemological coherence. Through a reflective synthesis of historical and theoretical perspectives, the discussion challenges the notion that combining approaches automatically enhances validity or depth. Instead, it calls for principled methodological reflexivity, an awareness that the strength of any method lies in its fit with the research question rather than disciplinary fashion. Ultimately, the paper advocates for a more integrative, self-aware research culture that privileges epistemological alignment over methodological trends.

Keywords: quantitative methods, qualitative methods, mixed methods

1. Introduction

In the ever-evolving landscape of academic inquiry, methodological choices are not merely technical decisions; they reflect philosophical commitments, epistemological beliefs, and intellectual identities. Researchers today navigate a rich spectrum of approaches, from the numerical precision of quantitative designs to the interpretive depth of qualitative traditions, and increasingly, toward the integrative logic of mixed methods research. Each of these paradigms offers a distinct lens for viewing reality and

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constructing knowledge, and each has evolved through decades of theoretical refinement and empirical testing.

Historically, the methodological divide between the quantitative and qualitative traditions has often been described as a “*paradigm war*” (Gage, 1989; Hammersley, 1992; Oakley, 1999), rooted in contrasting ontological and epistemological assumptions.ⁱⁱ Quantitative research, grounded in positivist and post-positivist thought, seeks to measure, predict, and test hypotheses through objective observation and statistical reasoning (Creswell & Creswell, 2018). In contrast, qualitative research, shaped by constructivist and interpretivist traditions, aims to understand meanings, lived experiences, and social contexts through in-depth, context-sensitive exploration (Denzin & Lincoln, 2018). These two worldviews, though once seen as irreconcilable, now coexist in a more pluralistic research environment.

The emergence of mixed methods research represents both a synthesis and an evolution of this methodological dialogue. Scholars such as Creswell and Plano Clark (2023) and Tashakkori and Teddlie (2021) have articulated frameworks for intentionally combining qualitative and quantitative procedures within a single study, guided by the philosophical stance of pragmatism. This paradigm emphasizes practical consequences and the centrality of the research question over allegiance to a single method. As a result, mixed methods research has gained prominence across disciplines, from education and health sciences to sociology and psychology, where complex phenomena demand multi-layered inquiry.

Despite its growing popularity, the mixed methods approach is often embraced with the implicit assumption that it is inherently superior to its predecessors. This perception, while understandable, requires careful examination. As several scholars have noted, no single approach is universally “*stronger*” than another; rather, methodological rigor arises from alignment between the research question, theoretical framework, and design choice (Creswell & Plano Clark, 2023; Greene, 2007). Thus, the true strength of a research design lies not in the number of methods employed but in the coherence, transparency, and depth of its implementation.

The present article seeks to offer a comprehensive synthesis of the three major research approaches, quantitative, qualitative, and mixed methods, with particular emphasis on the contemporary tendency to favor mixed designs. Drawing on the seminal works of Creswell and Creswell (2018), Creswell and Plano Clark (2023), Tashakkori and Teddlie (2021), and other foundational scholars, this paper aims to provide new researchers with both theoretical clarity and practical orientation. It will trace the philosophical underpinnings, key characteristics, strengths, and limitations of each approach while critically examining the assumptions that underpin the growing preference for methodological hybridity. In doing so, it aspires to equip emerging

ⁱⁱ The term refers to the longstanding debates concerning the relative merits and assumptions of quantitative and qualitative research traditions (see Alasuutari, P., Bickman, L., & Brannen, J. (Eds.). (2008). *The SAGE handbook of social research methods*. SAGE Publications).

scholars with the intellectual tools to make informed, reflective, and contextually grounded methodological choices.

2. The Quantitative Approach

The quantitative research tradition stands as one of the most enduring and influential paradigms in the social and behavioral sciences. Rooted in the epistemological foundations of positivism and post-positivism, it is guided by the belief that reality can be observed, measured, and represented through numerical data. The goal is not merely to describe phenomena but to test hypotheses, identify relationships, and predict outcomes based on statistical regularities. As Teddlie and Tashakkori (2009) explain, quantitative (QUAN) methods may be “*most simply and parsimoniously defined as the techniques associated with the gathering, analysis, interpretation, and presentation of numerical information*” (p. 12). This approach, historically grounded in positivism, assumes that scientific inquiry should be objective and systematic, while post-positivism refines this stance by recognizing that researchers’ values can influence interpretation and design without undermining the rigor of quantitative inquiry.

2.1 Philosophical Foundations

At its core, the quantitative approach is grounded in a positivist worldview, which assumes that there exists a single, objective reality independent of human perception. Knowledge, therefore, is derived from empirical observation and logical reasoning. The post-positivist refinement of this stance, articulated by scholars such as Phillips and Burbules (2000), acknowledges that absolute objectivity is unattainable, yet maintains that systematic inquiry and rigorous methodology can approximate truth. This paradigm values replicability, control, and generalization, positioning the researcher as a detached observer who minimizes personal bias.

Within this framework, theories serve as the scaffolding of inquiry. As Kerlinger (1973) famously stated, “*A theory is a set of interrelated constructs, definitions, and propositions that presents a systematic view of phenomena by specifying relations among variables*” (p.9). Quantitative research thus progresses through a deductive logic: it begins with theory, formulates hypotheses, and tests them empirically. The aim is to move from the general to the specific, to confirm or refute theoretical propositions through observable evidence.

2.2 Key Features and Methodological Practices

Quantitative research is distinguished by its structured design and reliance on standardized instruments that yield measurable data. Common tools include surveys, tests, experiments, and existing databases, all of which generate data in numerical form. This numerical representation allows for statistical analysis, enabling researchers to summarize large data sets and detect patterns of association, difference, or causation.

Typical research designs within this tradition include:

- Descriptive designs, which aim to portray characteristics of a population or phenomenon as it currently exists;
- Correlational designs, which explore relationships between variables without asserting causality;
- Experimental and quasi-experimental designs, which manipulate variables to examine cause-and-effect relationships.

Each design is anchored in control and measurement, hallmarks of the quantitative mindset. Creswell and Creswell (2018) note that the hallmark of this approach lies in its systematic procedures: defining variables operationally, ensuring instrument reliability and validity, and using inferential statistics to draw conclusions that extend beyond the sample studied.

The quantitative researcher's role is to ensure precision, objectivity, and replicability. Data are often collected through large samples to enhance generalizability, and results are interpreted within a framework of probability and statistical significance. The entire process, from hypothesis formulation to data interpretation, is characterized by logical sequencing and transparency.

2.3 Strengths of the Quantitative Approach

One of the principal strengths of quantitative research lies in its capacity for generalization. When sampling is rigorous and representative, findings can be extended to broader populations with confidence. Furthermore, the use of statistical analysis allows researchers to test theoretical predictions and quantify the strength of relationships between variables, contributing to the accumulation of cumulative knowledge.

Another key advantage is objectivity. Because quantitative methods rely on numerical data and standardized procedures, they minimize the influence of researcher bias, thus enhancing reliability and comparability across studies. Quantitative studies also lend themselves to replication, a cornerstone of scientific progress. As Cohen, Manion, and Morrison (2018) discuss, replicability provides confidence that research findings are not idiosyncratic and can be generalized within defined parameters.

Additionally, quantitative methods are invaluable for evaluating interventions and policies, particularly in education, health, and social sciences. They provide empirical evidence that can inform decision-making and validate or challenge assumptions about causality and effectiveness.

2.4 Limitations and Critiques

Despite its strengths, quantitative research has not escaped critique. One of the most persistent criticisms concerns its reductionist nature, its tendency to fragment complex human experiences into measurable variables. As Denzin and Lincoln (2018) argue, such fragmentation risks overlooking the social and cultural contexts that shape meaning and behavior. Quantitative data may reveal what happens, but not always why it happens.

Another limitation arises from the illusion of objectivity. While statistical precision suggests neutrality, every stage of research, formulating questions, selecting instruments, interpreting findings, is shaped by the researcher's assumptions and values. Post-positivist thinkers such as Guba and Lincoln (1994) have emphasized that inquiry is inherently value-laden and that researchers must acknowledge the interpretive act embedded even in quantitative analysis.

Moreover, quantitative designs are often criticized for their inflexibility. Once hypotheses, instruments, and variables are defined, adaptation to emerging insights is limited. This rigidity may be ill-suited for exploratory or context-dependent phenomena where meanings evolve dynamically.

2.5 Relevance in Contemporary Research

In contemporary scholarship, the quantitative approach remains indispensable. The expansion of big data, learning analytics, and evidence-based policy has renewed interest in quantitative rigor and predictive modelling. Yet, modern researchers increasingly recognise that quantitative evidence alone cannot capture the full texture of human experience. This awareness has fuelled the shift toward methodological pluralism and the rise of mixed methods research, which seeks to integrate numerical precision with qualitative depth.

As Creswell and Plano Clark (2023) observe, quantitative and qualitative approaches should not be seen as competing paradigms but as complementary strategies that, when integrated, can provide a more complete understanding of research problems. Beyond merely using both strands, the real strength lies in how they are combined: the processes of integration, interpretation and drawing metainferences transform separate data into richer, more comprehensive insights. Thus, while quantitative methods continue to offer unmatched clarity and analytical power, their greatest potential today may lie in collaboration rather than isolation, performing not simply as one half of a study but as part of a broader, integrated methodological dialogue.

While quantitative inquiry seeks to measure and explain, qualitative research aspires to understand, to penetrate beneath surface variables and grasp the meanings, experiences, and interpretations through which individuals construct their realities. It is grounded not in measurement but in meaning, not in prediction but in understanding. As Denzin and Lincoln (2011) aptly describe it, qualitative research is "*a situated activity that locates the observer in the world,*" one that "*consists of a set of interpretive, material practices that make the world visible*" (p.3).

3. The Qualitative Research

3.1 Philosophical and Theoretical Foundations

The philosophical roots of qualitative research lie in constructivism and interpretivism, traditions that emphasize the socially constructed nature of reality. Constructivists argue that knowledge is co-created between the researcher and participants, rather than

discovered as an objective truth waiting to be found (Crotty, 1998). Reality, in this sense, is plural, subjective, and context-bound.

Interpretivism, in turn, holds that human behavior cannot be understood apart from the meanings individuals attach to their experiences. As Weber (1949) noted, the task of social inquiry is to achieve *verstehen*, a deep understanding of human actions from the actor's own perspective. This approach thus rejects the notion of the detached observer and embraces a relational, dialogic stance.

In this paradigm, the researcher is not a neutral instrument but an active participant in the co-construction of meaning. Guba and Lincoln (1994) highlight this epistemological stance by arguing that *"the investigator and the object of investigation are interactively linked so that the findings are literally created as the investigation proceeds"* (p. 111).

3.2 Central Features of Qualitative Research

Qualitative research is distinguished by several defining features that set it apart from quantitative inquiry. It is grounded in naturalistic inquiry, with data collected in real-world settings where phenomena occur organically rather than under artificial, controlled conditions (Lincoln & Guba, 1985). The research process is inherently flexible and adaptive, following an emergent design that allows questions, sampling strategies, and even theoretical frameworks to evolve as understanding deepens (Merriam & Tisdell, 2016). Participants are selected through purposeful sampling, chosen not for statistical representativeness but for their ability to provide rich, relevant, and diverse insights into the phenomenon under investigation. Findings are presented through thick description, offering detailed, contextually nuanced accounts that convey the complexity and depth of social life (Geertz, 1973). Central to this approach is researcher reflexivity, where investigators continuously examine how their own perspectives, assumptions, and positionality influence both the research process and the interpretation of data. Unlike quantitative methods that prioritize breadth, qualitative research values depth. Data collection often involves interviews, focus groups, participant observations, or document analysis, generating textual rather than numerical data. These texts are then interpreted through iterative processes of coding, categorization, and theme development, aimed at uncovering patterns of meaning.

As Creswell and Poth (2018) explain, qualitative researchers typically collect data in natural settings sensitive to the people and places under study and analyze it inductively, moving from particular observations to broader themes and conceptual understanding. This inductive movement, from experience toward conceptualization, is central to the logic of qualitative inquiry.

3.3 The Role of Theory in Qualitative Inquiry

In contrast to the deductive approach of quantitative research, qualitative inquiry often employs an inductive or abductive logic. Theory may not precede data collection but emerge from it, a process epitomized by the grounded theory methodology developed by Glaser and Strauss (1967). Here, theory is *"discovered"* through systematic interaction

with the data, ensuring that conceptual categories remain grounded in participants' lived realities.

However, other qualitative traditions, such as phenomenology, ethnography, and narrative inquiry, may begin with a philosophical or theoretical orientation that frames the study. In these cases, theory serves as a lens rather than a template, guiding interpretation without dictating outcomes.

3.4 Strengths of the Qualitative Approach

The primary strength of qualitative research lies in its ability to capture complexity and meaning. It reveals how people experience, interpret, and negotiate the social world, offering insights that numbers alone cannot provide. This approach excels at exploring processes, contexts, and human emotions, dimensions of reality that resist quantification. Moreover, qualitative inquiry fosters theoretical insight and innovation. By attending to anomalies and nuances, it generates new concepts and frameworks that enrich social theory. As Maxwell (2013) argues, qualitative research contributes not only to understanding but also to conceptual development, enabling researchers to build middle-range theories that bridge empirical observation and abstract reasoning. Another enduring strength is its ethical and humanistic orientation. Qualitative inquiry foregrounds participants' voices and experiences, often empowering marginalized groups whose perspectives are underrepresented in quantitative datasets. The emphasis on reflexivity and relational ethics positions qualitative research as both an epistemological and moral endeavor (Tracy, 2010).

3.5 Limitations and Challenges

Despite its richness, qualitative research faces certain limitations. The most frequently cited is its limited generalizability. Because data are context-specific and samples are small, findings cannot easily be generalized to larger populations. However, qualitative scholars often argue that their goal is not statistical generalization but transferability, the ability for readers to assess the applicability of findings to other contexts based on thick description (Lincoln & Guba, 1985).

A second challenge concerns subjectivity and researcher bias. Since the researcher is the primary instrument of data collection and analysis, maintaining credibility and trustworthiness demands reflexivity, triangulation, and transparency. Trustworthiness is thus established through credibility, dependability, confirmability, and transferability, rather than through reliability and validity in the quantitative sense.

Qualitative research can also be time-intensive. Collecting and analyzing detailed data requires sustained engagement with the field and participants, which can limit sample size and scope. Moreover, some critics argue that the interpretive nature of qualitative analysis leaves room for ambiguity and inconsistency. Yet, proponents contend that this openness is a strength, reflecting the fluid, situated character of human experience.

3.6 The Contemporary Role of Qualitative Inquiry

In the 21st century, qualitative research has undergone a profound transformation. Digital ethnography, virtual interviews, and narrative analytics have expanded the field's methodological possibilities. The growing interest in mixed methods designs has also elevated the status of qualitative inquiry, positioning it as a crucial partner in the integration of interpretive depth with empirical breadth.

As noted by Denzin and Lincoln (2005b, as cited in Teddlie & Tashakkori, 2009, p. 92), *"Qualitative research is now a complex, interconnected family of terms, concepts, and assumptions that embrace multiple methods, paradigms, and interpretive practices."* This pluralism underscores its dynamism: qualitative research today is not a single method but a family of evolving approaches that continue to shape the frontiers of social inquiry. Ultimately, the enduring value of qualitative research lies in its capacity to make the invisible visible, to transform individual stories into collective understanding, and lived experience into theoretical insight. It reminds the research community that human meaning cannot be reduced to numbers alone and that understanding remains at the heart of knowledge creation.

4. The Rise of Mixed Methods Research

The emergence of mixed methods research marks one of the most significant methodological shifts in contemporary inquiry. It represents not a compromise between the quantitative and qualitative traditions, but rather an integration; an intentional and philosophically grounded effort to draw on the strengths of both paradigms while mitigating their individual limitations. Over the past three decades, this approach has evolved from a marginal innovation to a mainstream methodological movement, widely acknowledged for its capacity to address the complexity of real-world phenomena that cannot be adequately captured through a single lens (Creswell & Plano Clark, 2023; Tashakkori & Teddlie, 2021).

4.1 Historical Emergence and Evolution

The intellectual roots of mixed methods research can be traced to the late twentieth century, when scholars began questioning the rigid dichotomy between quantitative and qualitative paradigms, often described as the *"paradigm wars"* of the 1970s and 1980s. During this period, the incompatibility thesis dominated methodological discourse, asserting that the two paradigms were epistemologically irreconcilable (Guba & Lincoln, 1994). However, a growing number of scholars, most notably Greene, Caracelli, and Graham (1989), argued that methodological pluralism offered a more productive pathway. They proposed mixed methodology as a means of expanding understanding through complementarity, rather than competition.

By the early 2000s, the field had entered what Creswell and Plano Clark (2007) termed the *"legitimation phase,"* characterized by the development of detailed frameworks and design typologies. Journals, handbooks, and methodological texts began to treat

mixed methods not as an ad hoc combination of tools, but as a coherent research paradigm with its own philosophical foundations and criteria for rigor. The publication of *Handbook of Mixed Methods in Social and Behavioral Research* (Tashakkori & Teddlie, 2003) and successive editions of Creswell and Plano Clark's *Designing and Conducting Mixed Methods Research* (2007, 2011, 2018, 2023) provided scholars with systematic guidance on design integration, interpretation, and validity.

4.2 Philosophical Foundations: Pragmatism and Beyond

The philosophical backbone of mixed methods research is pragmatism, a worldview emphasizing practical consequences, contextual meaning, and the primacy of the research question over methodological orthodoxy (Biesta, 2010; Morgan, 2014). From a pragmatic perspective, methods are tools rather than ideologies, what matters is their utility in generating meaningful answers to complex questions. Creswell and Plano Clark (2023) succinctly captured this stance: *"The central premise of mixed methods is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone"* (p. 5).

Pragmatism rejects the notion that researchers must commit exclusively to either positivist or constructivist epistemologies. Instead, it embraces methodological flexibility and pluralism, allowing researchers to move fluidly between numerical and narrative forms of evidence. This stance does not imply philosophical relativism; rather, it underscores the idea that truth is both contextual and provisional, grounded in action and experience (Morgan, 2014). Such a view aligns well with the interdisciplinary nature of contemporary research, where social, psychological, and educational phenomena often require both measurement and interpretation.

Although pragmatism remains the dominant philosophical foundation, other paradigms have influenced the evolution of mixed methods. The transformative paradigm, for instance, emphasizes the integration of methods within a social justice framework, highlighting the role of research in empowering marginalized groups (Mertens, 2015). Similarly, the dialectical pluralist perspective (Greene, 2007) encourages researchers to engage tensions between paradigms rather than resolve them, fostering a dynamic and reflexive approach to knowledge construction.

4.3 Defining Mixed Methods Research

While definitions vary across scholars, most converge on the idea that mixed methods research involves the systematic integration of quantitative and qualitative data, techniques, and approaches within a single study or a program of inquiry. According to Creswell and Plano Clark (2023), this integration may occur at multiple stages, data collection, analysis, interpretation, or reporting, and aims to produce *"meta-inferences"* that transcend the insights available from either method alone. Tashakkori and Teddlie (2021) similarly describe mixed methods as a research design that combines quantitative and qualitative data across one or more phases of a study, aiming to provide a more comprehensive understanding of the research problem.

A defining characteristic of mixed methods research is intentionality, the deliberate planning and philosophical justification of integration. This distinguishes it from multi-method studies, where different methods are used independently without interaction or synthesis. Integration, therefore, is not a technical act but an intellectual one: it requires researchers to think critically about how different forms of evidence interact, complement, or even challenge one another (Fetters & Molina-Azorin, 2017).

4.4 The Expansion Across Disciplines

The flexibility and inclusiveness of mixed methods have facilitated its rapid expansion across disciplines. In education, it has become central to understanding complex processes such as learning, teaching, and assessment (Creswell & Plano Clark, 2023). In health sciences, it bridges clinical data with patient narratives, enhancing the ecological validity of findings. In social sciences, it captures both the structural and experiential dimensions of phenomena like migration, inequality, and identity. This interdisciplinary adaptability reinforces its status as a “*third methodological movement*,” a term coined by Tashakkori and Teddlie (2010) to reflect its maturity and independence as a research tradition.

The growing adoption of mixed methods has, however, led to a persistent belief that it is inherently “*stronger*” or more “*comprehensive*” than either quantitative or qualitative research alone. The next section will critically examine this assumption, its philosophical roots, its empirical justifications, and its potential misconceptions, highlighting that methodological strength lies in coherence, not complexity.

5. Designs and Typologies in Mixed Methods Research

The intellectual sophistication of mixed methods research lies not only in its philosophical pluralism but also in its structural design. A mixed methods design provides a blueprint for the systematic integration of quantitative and qualitative components within a coherent framework that responds directly to the research purpose and questions. As Creswell and Plano Clark (2023) emphasize, “*designs are not simply sequences of methods; they are strategies of inquiry that embody the logic of integration*” (p. 61). Understanding these typologies is therefore crucial for researchers seeking to apply mixed methods with both rigor and intentionality.

5.1 Foundational Dimensions of Mixed Methods Designs

- 1) Mixed methods designs are typically distinguished along three foundational dimensions: Timing, which refers to the sequence in which qualitative and quantitative data are collected (concurrent or sequential);
- 2) Weighting, which concerns the relative priority given to each component (equal or dominant); and

- 3) Integration, this third dimension pertains to the stage and form through which the two strands of data are brought together (data collection, analysis, interpretation, or reporting).

These dimensions interact to form the architecture of a mixed methods study, providing researchers with flexibility while maintaining methodological coherence (Tashakkori & Teddlie, 2021). The interplay of these factors determines whether integration occurs side by side, sequentially, or through embedding, and whether the qualitative or quantitative strand leads the inquiry.

5.2 Core Mixed Methods Designs

Creswell and Plano Clark (2023) identify four core designs that have become the cornerstone of contemporary mixed methods research: sequential explanatory, sequential exploratory, concurrent triangulation, and embedded designs. Each embodies a distinct logic of integration and serves particular research purposes. Campbell and Fiske's (1959) pioneering notion of methodological triangulation laid much of the groundwork for these later developments, emphasizing the value of combining different forms of evidence to enhance validity and depth of understanding. This foundational idea continues to inform the architecture of mixed methods inquiry today.

5.2.1 Sequential Explanatory Design (QUAN → qual)

The sequential explanatory design is one of the most widely used mixed methods strategies, particularly in education and social sciences. In this design, quantitative data are collected and analyzed first, followed by qualitative data intended to explain or elaborate on the quantitative results (Creswell & Plano Clark, 2023). For example, a researcher might administer a survey to measure students' attitudes toward online learning (quantitative phase) and subsequently conduct interviews to explore why certain patterns emerged (qualitative phase). The strength of this design lies primarily in its clarity and logical progression from numerical trends to explanatory narratives. Moreover, it allows researchers to build upon quantitative findings through deeper qualitative insight, creating a coherent link between breadth and depth of understanding. Nevertheless, a potential limitation emerges in the risk of imbalance: if the qualitative follow-up is superficial or poorly integrated, the study may revert to a predominantly quantitative logic, thereby weakening its explanatory value. Ultimately, in explanatory-sequential mixed-methods designs, the explanatory strength of the study depends less on the simple sequence of quantitative followed by qualitative data collection and more importantly on the depth and quality of the qualitative follow-up used to interpret and explain the quantitative results (see Creswell & Plano Clark, 2023; Tashakkori & Teddlie, 2021).

5.2.2 Sequential Exploratory Design (QUAL → quan)

The sequential exploratory design reverses this logic. It begins with a qualitative phase aimed at exploring a phenomenon or developing theoretical insights, followed by a

quantitative phase to test or generalize these findings. This design is particularly useful when the topic is underexplored or conceptually ambiguous. For instance, an initial phase of interviews may reveal emerging themes about students' perceptions of critical thinking in writing, which are then operationalized into a survey instrument for broader validation.

As Creswell and Creswell (2018) note, this design is especially valuable for instrument development, theory building, and contextual understanding. The challenge, however, lies in the *translation* of qualitative insights into measurable constructs without oversimplification, a delicate process requiring both conceptual and methodological sophistication.

5.2.3 Concurrent Triangulation Design (QUAN + QUAL)

In the concurrent triangulation design, quantitative and qualitative data are collected simultaneously, analyzed separately, and then merged for comparison or corroboration. The goal is to achieve convergence or complementarity, to see whether different forms of data lead to consistent or enriched conclusions (Greene, 2007). This design is powerful when the researcher seeks to validate findings through multiple forms of evidence. For example, survey data about teacher motivation might be triangulated with classroom observations and interviews to reveal both the structural and emotional dimensions of motivation. However, true triangulation requires more than parallel data collection; it demands thoughtful integration at the interpretation stage. As Fetters, Curry, and Creswell (2013) remind, integration is the hallmark of mixed methods and is necessary to transform separate data streams into a coherent, dialogic synthesis (Fetters, Curry, & Creswell, 2013).

5.2.4 Embedded Design (QUAN(qual) or QUAL(quant))

The embedded design in mixed methods research involves the incorporation of one methodological component within the framework of a larger, primary design of the opposite type. For example, a primarily quantitative experiment may include a qualitative strand to provide contextual understanding or participant perspectives (QUAN[qual]), while a primarily qualitative ethnographic study may embed quantitative survey data to achieve greater breadth or generalizability (QUAL[quant])ⁱⁱⁱ. The philosophical assumptions guiding an embedded design are grounded in the paradigmatic orientation of the dominant approach. Thus, a quantitative primary design typically aligns with postpositivist assumptions, emphasizing measurement, objectivity, and causal inference, whereas a qualitative primary design often reflects constructivist principles, privileging meaning, context, and subjective interpretation.

ⁱⁱⁱ The notation *QUAL[quant]* (or *QUAN[qual]*) is a conventional shorthand used in mixed methods research to indicate the relative emphasis of qualitative and quantitative components. For instance, *QUAL[quant]* denotes a qualitatively driven design in which qualitative data predominate, while quantitative data play a supportive role. This notation follows the framework proposed by Creswell and Plano Clark (2023).

This design exemplifies methodological pragmatism, prioritizing the research question over strict adherence to a single epistemological tradition. It acknowledges that postpositivist and constructivist assumptions are not inherently incompatible but can be strategically combined to enrich inquiry and strengthen interpretive validity. For instance, qualitative data may illuminate processes underlying quantitative outcomes, while quantitative data can add scope or precision to qualitative insights. As noted by Creswell and Plano Clark (2023), the embedded approach is particularly effective in evaluation studies, intervention research, and program assessment, where one methodological strand serves a supportive role in addressing subsidiary or complementary questions. However, successful integration requires philosophical clarity; as Tashakkori and Teddlie (2021) emphasize, coherence between paradigms must be maintained to avoid conceptual fragmentation. Ultimately, the embedded design represents an adaptive and reflexive model of inquiry, one that situates methodological complementarity within the broader pursuit of holistic understanding.

5.2 Advanced and Emerging Designs

As mixed methods research has matured, more sophisticated designs have emerged. These include transformative designs, which integrate qualitative and quantitative approaches within a social justice framework (Mertens, 2015); multiphase designs, in which several sequential studies contribute to a long-term program of research; and complex adaptive designs, often used in policy and organizational studies to capture dynamic change.

Moreover, recent scholarship emphasizes integration as the core criterion of quality in mixed methods research (Fetters & Freshwater, 2015). Integration may occur through techniques such as joint displays, where quantitative and qualitative results are visually aligned to generate new insights, or through meta-inference, where interpretations transcend the boundaries of individual datasets.

5.3 Toward Methodological Coherence

The diversity of mixed methods designs underscores a central truth: mixed methods research is not a collection of tools but a way of thinking about inquiry. Greene (2007) frames it as an intellectual orientation that invites engagement with difference—an invitation to view research through multiple lenses, to juxtapose diverse ways of understanding rather than merely combine techniques. For novice researchers, the key lies in aligning design choice with epistemological stance and research purpose. Methodological coherence, achieved through thoughtful design, transparent integration, and philosophical consistency, is the hallmark of high-quality mixed methods research. While the diversity of mixed methods designs reflects their adaptability and depth, it has also contributed to the widespread belief that mixed methods research is inherently superior to purely quantitative or qualitative approaches. The next section examines this assumption critically, exploring whether methodological integration necessarily translates into greater validity, generalizability, or insight.

6. The “Superiority” Assumption of Mixed Methods Research

As the mixed methods movement gained intellectual legitimacy and practical traction, it also acquired a subtle yet pervasive reputation for being “stronger” or “more comprehensive” than purely quantitative or qualitative approaches. This perception, often referred to as the superiority assumption, has become one of the most discussed and debated notions in contemporary methodological discourse. While the integrative potential of mixed methods is undeniable, the assumption that more methods automatically mean better research is both philosophically and empirically contestable.

6.1 The Rhetoric of Integration

The appeal of mixed methods stems largely from its rhetoric of inclusiveness and complementarity. Advocates frequently emphasize that combining quantitative precision with qualitative depth enables researchers to capture a fuller, more authentic picture of complex social phenomena. This logic is intuitively persuasive: by linking numbers to narratives, patterns to meanings, and breadth to depth, researchers can achieve a form of “methodological triangulation” that enhances credibility and richness (Creswell & Plano Clark, 2023). Indeed, Tashakkori and Teddlie (2021) describe mixed methods as “the best of both worlds,” offering a synthesis that balances empirical generalization with contextual interpretation. Similarly, Johnson, Onwuegbuzie, and Turner (2007) famously characterized it as the “third methodological movement,” transcending the traditional dichotomy between positivism and constructivism. However, as Greene (2007) and Bryman (2006) caution, the promise of integration often risks turning into methodological idealism, the belief that combining two methods will automatically correct the weaknesses of each. In reality, integration is neither easy nor guaranteed; it requires philosophical coherence, methodological transparency, and reflexive awareness of how different paradigms frame reality.

6.2 Methodological Strength vs. Methodological Fit

The true measure of methodological strength does not lie in complexity but in coherence and congruence. A sophisticated mixed design poorly aligned with its research question is far weaker than a single-method study executed with rigor and precision. Creswell and Creswell (2018) emphasize that the selection of a research design should be guided by the nature of the research problem and the purpose of the study, rather than by the sophistication of the methods employed.

Quantitative approaches remain unparalleled in testing hypotheses, measuring variables, and estimating causal relationships across large populations. For instance, certain research questions, such as those focused on measuring gains in standardized test scores, are most appropriately addressed through quantitative methods (Knight & Wood, 2005). Qualitative approaches, by contrast, excel at uncovering meanings, lived experiences, and cultural contexts. Mixed methods research achieves its greatest value when the research question genuinely requires both perspectives, when the problem is

multidimensional, demanding explanation and exploration, generalization and deep understanding. Hence, methodological strength arises from fit rather than fusion.

As Greene (2007) notes,

"A mixed-methods way of thinking is an orientation toward social inquiry that actively invites us to participate in dialogue about multiple ways of seeing and hearing, multiple ways of making sense of the social world, and multiple standpoints on what is important and to be valued and cherished" (p. 20).

The power of mixed methods, therefore, lies not in hybridity for its own sake, but in its capacity to foster reflective and constructive dialogue between differing ways of knowing. When implemented thoughtfully, this dialogic potential allows researchers to leverage the complementary strengths of quantitative and qualitative approaches while maintaining philosophical and methodological coherence.

6.3 Philosophical and Practical Tensions

The integration of quantitative and qualitative methods is conceptually complex because it involves reconciling divergent philosophical assumptions about reality (ontology) and knowledge (epistemology). Quantitative research is often grounded in post-positivism, which assumes an objective reality measurable through empirical observation. Qualitative research, conversely, is rooted in constructivism, which posits multiple realities co-constructed through human experience. In navigating these tensions, mixed methods researchers must exercise reflexivity and intellectual honesty. Integration does not entail dissolving philosophical differences, but rather negotiating them thoughtfully in the service of understanding. As Greene (2007) emphasizes in *Mixed Methods in Social Inquiry*, mixing methods invites researchers to bring diverse ways of thinking and valuing into constructive dialogue. She describes this approach as a "dialogic" process, one that seeks to engage respectfully and generatively across paradigmatic differences in order to deepen understanding. She further highlights that adopting a mixed methods perspective encourages researchers to engage with multiple viewpoints and ways of understanding the social world, fostering a reflective dialogue that acknowledges diverse perspectives and what is deemed meaningful or valuable in a study.

6.4 The Need for Reflexive Integration

Ultimately, mixed methods should not be regarded as a hierarchical "super-method" but rather as a reflexive practice, one that acknowledges the strengths and limits of each methodological tradition while pursuing thoughtful synthesis where appropriate. Methodological pluralism becomes genuinely valuable only when it is underpinned by epistemological awareness and design clarity, rather than a mere checklist of techniques. As Bryman (2006) observes, the value of mixed methods lies not in the mechanical combination of techniques but in the interpretive complexity that emerges through the integration of qualitative and quantitative insights. Integration must therefore be

purposeful, principled, and philosophically justified. In line with this, Olaghere (2022) introduces the notion of *reflexive integration of research elements (RIRE)* as a mechanism by which mixed-methods researchers explicitly attend to how and when integration occurs, enhancing transparency and depth of inquiry. Similarly, studies in health research highlight how purposeful planning of integration, via distinct mixed-methods questions, sampling strategies, joint displays, and interpretive narratives, anchors the mixed-methods study in a pragmatic paradigm rather than method-driven trendiness (International Journal of Pharmacy Practice, 2023). To fulfil its epistemic potential and serve as a genuine “*third paradigm*,” mixed-methods research must embrace reflexivity, not only in merging methods, but in interrogating the philosophical, ontological, and procedural commitments that underlie the design choice.

7. Rethinking Methodological Traditions and Future Directions

The three dominant approaches, quantitative, qualitative, and mixed methods, represent not merely technical pathways but philosophical legacies shaped by centuries of inquiry into the nature of knowledge and truth. From the rational empiricism of the Enlightenment to the interpretive revolutions of the twentieth century, the evolution of research methodology mirrors the intellectual history of humankind itself: our shifting conceptions of reality, evidence, and meaning.

7.1 From Ancient Inquiry to Modern Science

Long before the formalization of research methods, philosophers such as Aristotle, Francis Bacon, and René Descartes wrestled with questions that still underpin modern methodology. Aristotle’s empirical logic, grounded in observation and classification, foreshadowed the positivist ideals of quantitative research. Bacon’s *Novum Organum* (1620) formalized the inductive method, the systematic collection of data to derive general laws, while Descartes’ rationalism privileged deduction and logical reasoning.

In contrast, thinkers such as Wilhelm Dilthey (1976) and Max Weber (1949) later argued that understanding human behavior required a different logic: *Verstehen*, or interpretive understanding. This philosophical turn laid the foundation for qualitative inquiry, emphasizing meaning, context, and subjectivity (Schwandt, 2015). Thus, the methodological divide that modern researchers navigate is rooted in this centuries-old dialectic between explanation (*Erklären*) and understanding (*Verstehen*). While *Erklären* seeks to uncover causal relationships through objective observation and measurement, *Verstehen* aims to grasp the subjective meanings individuals attach to their experiences. Together, these perspectives continue to shape contemporary debates about the nature of social inquiry and the integration of quantitative and qualitative paradigms.

7.2 The Mixed Methods “Buzz”: Pragmatism or Post-Paradigmatic Shift?

The rise of mixed methods in the late twentieth and early twenty-first centuries can be seen as a pragmatic response to the increasing complexity of research problems, but also as a post-paradigmatic shift toward methodological convergence. The label “mixed methods” has, however, become something of a buzzword in academic discourse. Many studies adopt it superficially, mistaking combination for integration, and trend for innovation.

As Greene (2007) cautions that mixed-methods inquiry sometimes advances not from epistemological necessity but from its rhetorical appeal within the research community. The danger of such popularity lies in methodological instrumentalism, using mixed methods merely to enhance credibility, without the philosophical reflection that true integration demands.

Yet, at its best, mixed methods represents a philosophical reconciliation, a deliberate act of bridging the “big abyss” between objectivism and constructivism. By acknowledging that reality can be both measurable and interpretable, both external and socially constructed, mixed methods research gestures toward a dialectical ontology: one that recognizes multiplicity without collapsing it into relativism.

7.3 The Question of New Methodological Horizons

As we look ahead, a profound question emerges: Should researchers continue following the established approaches, or is the field ripe for new paradigms of inquiry? The existing triad, quantitative, qualitative, and mixed methods, has served as a powerful scaffold, but it may not be the final stage of methodological evolution.

Emerging trends such as computational social science, participatory action research, and AI-assisted inquiry are reshaping the contours of what we consider data, evidence, and analysis. These developments suggest the possibility of hybrid paradigms that go beyond traditional distinctions, approaches that integrate not just methods, but modes of cognition, blending human interpretation with algorithmic intelligence.

However, the call for innovation does not imply abandoning tradition. Notably, Teddlie and Tashakkori (2010) remind us that new paradigms emerge not by rejecting the old but by transcending them, absorbing their insights into broader, more inclusive frameworks. The challenge for future researchers is therefore not to discard the quantitative, qualitative, or mixed approaches, but to reimagine them in light of the epistemic demands of the twenty-first century.

7.4 Toward an Integrative Future

Ultimately, the evolution of research methodology reflects a timeless human aspiration: to understand reality in all its complexity. Quantitative precision, qualitative insight, and mixed integration are not competing doctrines but complementary expressions of this quest. As knowledge systems evolve, researchers must continue to practice methodological reflexivity, a constant interrogation of not only how we know but what it means to know.

In this sense, the future of research lies not in methodological allegiance but in epistemological openness, a willingness to traverse paradigmatic boundaries, embrace complexity, and cultivate intellectual humility. Mixed methods research, when practiced reflexively, exemplifies this openness; it is not the final answer but a bridge toward new ways of thinking about inquiry, meaning, and truth.

8. Conclusion

The trajectory of research methodology, from the empiricist rigor of quantitative science to the interpretive richness of qualitative inquiry and the integrative ambition of mixed methods, mirrors humanity's enduring quest to comprehend the world in both its measurable and meaningful dimensions. Each approach, rather than representing a discrete or competing paradigm, embodies a particular way of seeing, a lens through which scholars interpret reality, structure questions, and construct knowledge.

This article has revisited the foundations, evolutions, and intersections of the three principal approaches to research, challenging the pervasive belief in the inherent superiority of mixed methods. While integration offers undeniable epistemic potential, it should not be mistaken for methodological transcendence. As the analysis revealed, the strength of any approach lies not in its complexity or hybridity but in its philosophical coherence, methodological integrity, and alignment with the research problem. Quantitative inquiry provides clarity and generalizability; qualitative inquiry offers depth and contextual meaning; and mixed methods research, when authentically designed, bridges these dimensions without diluting their essence. Yet, beyond the comparison of methods lies a deeper philosophical insight: the very act of research is a negotiation between certainty and understanding, between the impulse to measure and the need to interpret. The contemporary fascination with mixed methods reflects not merely a methodological trend but a broader intellectual impulse to reconcile fragmentation, to heal the long-standing divide between objectivity and subjectivity, and to cultivate a more holistic epistemology. It is, in essence, an expression of the modern scholar's desire to make sense of complexity without surrendering to relativism.

Looking ahead, the future of research will likely transcend even the tripartite structure of quantitative, qualitative, and mixed approaches. As data, technology, and human experience continue to intertwine, new methodological horizons will emerge, blurring distinctions between human and computational reasoning, between empirical evidence and interpretive meaning. The challenge for future researchers is not to remain loyal to a single tradition but to engage all traditions critically, reflexively, and creatively. Methodological innovation does not emerge from rejecting established approaches but from reimagining their potential in new contexts and combinations. The evolution of inquiry, therefore, is not a linear path from simplicity to sophistication, but a spiral of reflection and renewal, a continual return to the question that has always animated scholarship: How do we know what we know? In this question lies the enduring vitality

of research, not as a fixed set of techniques, but as a living dialogue between philosophy, method, and meaning.

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Conflict of Interest Statement

The author declares no conflicts of interest.

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