



When and How to Use Mixed-Method Research: Designs, Advantages, and Limits

¹ Tonny Enrique Jiménez Márquez *, ² Amilkar Sierra Romano ³ Osvaldo Rueda Carreño, ⁴ Alfonso Enrique García Payares

¹Universidad Popular del Cesar, Colombia *Corresponding author

²Universidad Popular del Cesar, Colombia

³Universidad Popular del Cesar, Colombia

⁴Universidad Popular del Cesar, Colombia

Abstract: This article examines mixed-method research as a response to complex phenomena that require complementary quantitative and qualitative data. It highlights its contribution to analytical richness, triangulation, and broadening of understanding, along with challenges: tensions between positivist and interpretive paradigms, complexity of articulation, and design, collection, and analysis requirements. It defines integration (fusion, sequential connection, or construction) in convergent, explanatory or exploratory sequential, and embedded designs; it describes key features (holistic information, contextual depth, interpretive-supported inference, instrumental efficiency); it delineates usage scenarios and requirements, and balances benefits with limits and risks. Methodologically, it is situated within the interpretive paradigm, with a qualitative approach and a hermeneutic method to critically analyze the literature. It includes a systematic review (2015–2024) in Scopus, Scielo, Redalyc, and Google Scholar. Inclusion criteria required an explicit focus on mixed methods, theoretical-methodological or epistemological discussion, and open access. Twenty-four documents were analyzed using open and integrated axial coding.

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1. Introduction

In recent decades, mixed methods research has become consolidated as a methodological alternative for addressing complex phenomena that require the complementarity of quantitative and qualitative data. This methodological integration responds to the need to overcome the limitations that purely single-method approaches may present, whether due to numerical reductionism or an interpretive character limited to context. Thus, mixed methods research represents a commitment to analytical richness, the triangulation of sources, and an expanded understanding of reality.

Nevertheless, this approach is not free of challenges. Epistemological tensions between positivist and interpretivist paradigms, the complexity involved in articulating methods, and the demands of design, data collection, and analysis constitute important limitations that must be acknowledged and debated. Beyond an instrumental view, a reflective approach is needed—one that considers the ontological, epistemological, and ethical assumptions underlying mixed methods practice.

First, the article defines mixed methods research as an approach that integrates quantitative and qualitative procedures in a planned fashion to broaden the understanding of phenomena. Its hallmark is integration through database merging, sequential connecting, or building between components, implemented in convergent, sequential (explanatory or exploratory), and embedded designs. Second, it describes its essential features: the production of comprehensive, holistic information; greater analytical

depth with contextual anchoring; the possibility of statistical inference with interpretive support; and increased efficiency in instrument design and decision-making. Third, it delineates scenarios of use: validation and cross-corroboration; development of variables and instruments; explanation of results and resolution of contradictions; theory formulation and testing; generalization of qualitative findings; program evaluation; and analyses involving multiple actors and contexts. Effective application requires an explicit integration plan, sampling alignment, quality safeguards, and ethical and resource considerations. Fourth, it synthesizes the benefits: complementarity of strengths, greater inferential robustness and credibility, improved instrument refinement, efficiency, and practical utility for designing and communicating interventions. Finally, it warns of limits and risks: design and governance complexity; increased time and resource demands; difficulties in chaining methods; management of interpretive discrepancies; technical requirements; tensions in epistemic coherence and quality; sampling and commensurability issues; ethical and logistical burdens; data management and traceability challenges; and a sometimes uncertain cost–benefit ratio.

2. Methodology

From the interpretive paradigm, this article assumes that scientific knowledge is neither absolute nor purely objective, but rather a situated social and cultural construction. Accordingly, understanding phenomena linked to health requires a reading that integrates meanings, experiences, and contexts of sense-making, beyond purely descriptive or normative accounts (Martínez, 2010).

Consistent with this stance, a qualitative approach is adopted, prioritizing in-depth analysis of discourses, specialized texts, and theoretical developments over the quantification of variables or the application of statistical techniques. This methodological choice enables a more complex treatment of the epistemic components of the object of study and refines the interpretation of its core categories (Martínez, 2022).

As the inquiry strategy, a systematic review of academic literature published between 2005 and 2024 was conducted, using rigorous selection and quality-assessment criteria. The corpus included scientific articles, specialized books, and chapters from edited volumes that contribute to the conceptualization, essential functions, and projections of the theoretical framework within the field under analysis. The review combined classical references with recent contributions, following guidelines that promote a critical articulation between the state of the art and theoretical foundations, as proposed by Salcedo et al. (2022) and specified in recent developments (Martínez et al., 2024). This strategy made it possible to consolidate a robust and up-to-date conceptual scaffolding to support the discussion and guide the findings.

3. Results

This chapter of the article presents findings on mixed methods research: it defines what it consists of, identifies when it is appropriate to apply it, and characterizes its central features of integration and triangulation. It synthesizes advantages such as greater robustness of results, optimization of instruments, and high practical utility. It also warns of disadvantages and limits: design complexity, greater resource demands, challenges in methodological articulation, possible interpretive discrepancies, and risks of bias and overgeneralization.

3.1. Mixed methods research

Mixed methods research is conceived as a methodological approach that integrates, in a planned and coherent manner, quantitative and qualitative procedures to broaden and deepen the understanding of a phenomenon. It assumes that no single method, by itself, captures the complexity of certain problems; therefore, it combines measurements.

Qualitative research privileges the understanding and exploration of participants' meanings, experiences, and perspectives through techniques such as interviews, participant observation, or content analysis, generating contextualized descriptions and interpretations. In contrast, quantitative research is based on the collection and analysis of numerical data to identify patterns, establish relationships, and make statistical inferences.

Mixed methods articulate both approaches within a single study: they may be applied sequentially—collecting and analyzing qualitative and quantitative data separately and then integrating them—or concurrently, collecting and analyzing both types of data in parallel (Cueva et al., 2023). This integration provides a broader and deeper understanding of the phenomenon by combining the generalizability of the quantitative approach with the contextual richness of the qualitative approach; it also strengthens the validity of the findings through data triangulation and complementary analysis.

3.2. Characteristics of mixed methods research

Mixed methods research is defined by the intentional integration of quantitative and qualitative evidence to produce more complete, coherent, and useful understandings of a phenomenon. Such integration combines the breadth and generalization typical of numerical data with the contextual density and interpretation typical of textual or visual data, strengthening the validity of conclusions through explicit combination strategies (Creswell & Plano Clark, 2017; Johnson & Onwuegbuzie, 2004; Tashakkori & Teddlie, 2010; Cueva Luza et al., 2023).

3.2.1. More comprehensive and holistic information

The articulation of standardized measurements with narratives, documents, and observations yields a broad and nuanced view of the object of study. The convergence of sources helps close explanatory gaps and improves result consistency through triangulation and cross-corroboration (Greene et al., 1989; Bryman, 2016; Creswell & Creswell, 2018; Hernández et al., 2018).

3.2.2. Analytical depth and contextual anchoring

The quantitative component gauges the magnitude and patterns of the problem, while the qualitative component clarifies meanings, mechanisms, and conditions of production. This dual reading enables fine-grained interpretations and situated explanations, useful for building solid and transferable interpretive frameworks (Flick, 2018; Greene, 2007; Hanks, 2016; Bryman, 2016).

3.2.3. Statistical inference with interpretive support

With appropriate sampling designs, the quantitative segment enables inferences to defined populations; the qualitative segment contributes credibility and transferability, helps interpret patterns, and delimits the scope of generalization, reducing risks of over-inference (Creswell & Creswell, 2018; Hernández-Sampieri & Mendoza, 2018; Johnson & Onwuegbuzie, 2004).

3.2.4. Efficiency in instrument design and decision-making

Integration favors more precise questionnaires (e.g., Likert scales and dichotomous items) combined with open-ended questions that capture unforeseen nuances. Qualitative exploration guides item drafting, refines pilots, and minimizes bias; in turn, quantitative findings focus where qualitative depth is most valuable. Data management and analysis are supported, when appropriate, by specialized software (e.g., NVivo) to ensure traceability and rigor (Bazeley & Jackson, 2013; Morse, 2003; Morse & Niehaus, 2009; Creswell & Plano Clark, 2017). Taken together, these properties increase methodological robustness, improve interpretive quality, and enhance the practical utility of results (Tashakkori & Teddlie, 2010; Cueva Luza et al., 2023).

3.3. When is it advisable to use mixed methods?

Mixed methods research is appropriate when a single approach does not capture the complexity of the phenomenon and it is necessary to integrate procedures and sources to corroborate, explain, or extend results. Integration should be planned from the design stage—for example, merging, connecting, or building with clear rules for how, when, and according to which criteria evidence will be combined (Fetters et al., 2013; Creswell & Plano Clark, 2017; Tashakkori & Teddlie, 2010).

3.3.1. Ideal situations

- Cross-validation and corroboration of findings across methods to increase credibility and consistency
- Development of variables and instruments: initial qualitative exploration (interviews, focus groups) to identify categories and construct items or scales to be tested quantitatively.
- Explanation of results or resolution of contradictions: qualitative inquiry to understand unexpected numerical patterns.
- Theory building and testing: generating propositions from qualitative data and subsequently testing them with statistical designs and techniques.
- Generalization of qualitative findings to defined populations through measurements and probabilistic sampling.
- Program and policy evaluation requiring both effectiveness metrics and understanding of implementation, barriers, and mechanisms of change.
- Multi-actor and multi-context analyses involving diverse stakeholders and sociocultural settings. (Greene et al., 1989; Johnson & Onwuegbuzie, 2004; Bryman, 2016; Creswell & Creswell, 2018; Greene, 2007).

3.3.2. Choice of mixed design

- **Convergent parallel:** simultaneous qualitative and quantitative data collection and integration at the end.
- **Explanatory sequential:** quantitative first, then qualitative to explain results.
- **Exploratory sequential:** qualitative first, then quantitative to validate and extend.
- **Embedded:** one component inserted into the other to answer specific sub-questions. (Creswell & Plano Clark, 2017; Tashakkori & Teddlie, 2010; Morse, 2003; Morse & Niehaus, 2009).

3.3.3. Conditions for effective use

- An explicit integration plan (what is integrated, when, and by which criteria).
- Sampling alignment (probabilistic vs. purposive) and quality assurance: reliability/validity and credibility/transferability.
- Team resources and competencies in both approaches, rigorous data management (including software when appropriate), and ethical compliance. (Hernández et al., 2018; Creswell & Creswell, 2018; Bazeley & Jackson, 2013).

3.4. Advantages of mixed methods research

Mixed methods research offers a set of advantages that strengthen the methodological, interpretive, and applied quality of studies by integrating quantitative and qualitative evidence in a planned manner (Creswell & Plano Clark, 2017; Tashakkori & Teddlie, 2010).

Complementarity and compensation of weaknesses. Combining measurements and narratives balances limitations: the estimative precision and testing of relationships typical of the quantitative component are articulated with the interpretive depth and context of the qualitative component, reducing bias and increasing the strength of inferences (Johnson & Onwuegbuzie, 2004; Bryman, 2016; Greene et al., 1989).

Comprehensive understanding of the phenomenon. Triangulation of data, sources, and methods makes it possible to observe the what and how much, as well as the how and why of the problem; the convergence of evidence reveals patterns, exceptions, and nuances that would not emerge with a single method (Creswell & Creswell, 2018; Flick, 2018; Greene, 2007).

Better design and refinement of instruments. Qualitative findings guide the construction of items, scales, and culturally pertinent categories; quantitative analyses refine and validate these inputs. This cycle produces more specific and sensitive questionnaires, with analytic traceability supported by software (e.g., NVivo) when appropriate (Bazeley & Jackson, 2013; Hernández-Sampieri & Mendoza, 2018; Arias et al., 2021).

Explanation of findings and elucidation of mechanisms. Sequential or convergent designs facilitate explaining unexpected results, identifying mediations and the conditions under which effects occur, linking evidence to substantive theory rather than mere statistical association (Morse, 2003; Morse & Niehaus, 2009; Creswell & Plano Clark, 2017).

Greater credibility and inferential robustness. The convergence between numbers and narratives improves internal consistency and external legitimacy; meta-inference becomes more stable and useful for decision-making (Fetters, Curry, & Creswell, 2013; Tashakkori & Teddlie, 2010).

Contextualized generalization. The quantitative component allows estimation of prevalences or effects in defined populations, while the qualitative component preserves contextual anchoring, favoring applicable interpretations without losing local specificity (Creswell & Creswell, 2018; Bryman, 2016).

Efficiency in the research process. Qualitative exploration focuses surveys and avoids redundant items; in turn, quantitative results prioritize areas for qualitative deepening, optimizing time, costs, and analytical effort (Creswell & Plano Clark, 2017; Arias et al., 2021).

Practical utility and persuasive communication. Integrating figures and narratives facilitates the design of interventions and policies better tailored to context and enables clearer communication of findings to technical and non-technical audiences (Plano Clark & Creswell, 2015; Cueva Luza et al., 2023).

3.5. Disadvantages and limitations of mixed methods research

Although its explanatory potential is high, implementing mixed designs requires rigorous planning, integrated competencies, and explicit rules of integration and interpretation (Creswell & Plano Clark, 2017; Tashakkori & Teddlie, 2010).

Design and governance complexity. Defining questions, sequences (convergent or sequential), priorities, and integration strategies can be highly complex; poor coupling produces misalignments between objectives, instruments, and analyses (Fetters et al., 2013; Greene, 2007).

Greater demand for time and resources. The dual logic of fieldwork, instrument development, and parallel or chained analyses increases budgets and timelines, and requires differentiated technological support (Hernández-Sampieri & Mendoza, 2018; Creswell & Creswell, 2018).

Difficulties in chaining methods. Translating qualitative categories into quantifiable variables (and vice versa) may entail semantic loss, problems of conceptual equivalence, and delays, especially in “building” or “connecting” designs (Morse, 2003; Morse & Niehaus, 2009).

Management of interpretive discrepancies. Divergences between quantitative and qualitative findings require decision rules (prioritization, triangulation, meta-inference criteria) to avoid ad hoc interpretations or selective use of evidence (Fetters et al., 2013; Greene et al., 1989).

Demands for methodological competencies. Solid mastery of techniques from both approaches and skills to integrate them are required; the scarcity of mixed-methods expertise can lead to superficial analyses or merely formal integrations (Tashakkori & Teddlie, 2010; Bryman, 2016).

Threats to quality and epistemological coherence. Different standards coexist (reliability/validity vs. credibility/transferability). Without explicit harmonization, the study’s overall consistency may be compromised, exacerbating ontological and epistemological tensions (Hanks, 2016; Flick, 2018).

Sampling and commensurability problems. Lack of alignment between units of analysis, sampling frames, and sample sizes hampers integration, limits statistical power, or restricts transferability (Creswell & Creswell, 2018; Greene, 2007).

Ethical and logistical burdens on participants. The use of multiple techniques can increase fatigue, reactivity, and consent demands, while also complicating fieldwork coordination (Hernández et al., 2018; Plano Clark & Creswell, 2015).

Data management and traceability. Integrating heterogeneous datasets (transcripts, fieldnotes, numerical matrices) requires strict protocols of organization, security, and documentation; support from specialized tools contributes to auditability (Bazeley & Jackson, 2013; Tashakkori & Teddlie, 2010).

Communication and publication. Clearly presenting integration within editorial length limits can be difficult; peer review is often specialized in a single approach, creating additional publication barriers (Bryman, 2016; Greene, 2007).

Uncertain cost-benefit ratio. If the research question can be adequately answered with a single approach, the added complexity of a mixed design may not be justified in terms of time, resources, and analytical burden (Creswell & Plano Clark, 2017; Tashakkori & Teddlie, 2010).

4. Discussion

The findings confirm that mixed methods research is an appropriate approach when the aim is to broaden and deepen the understanding of complex phenomena through the planned integration of quantitative and qualitative procedures. This conception is consistent with the canonical literature that defines mixing as a strategy of deliberate—rather than merely additive—integration aimed at producing stronger meta-inferences (Creswell & Plano Clark, 2017; Johnson & Onwuegbuzie, 2004; Tashakkori & Teddlie, 2010). In line with this, the chapter delineates its relevance in contexts of cross-validation, instrument development, explanation of results, program evaluation, and multi-actor analysis, where a single method would be insufficient to address complex research questions (Greene et al., 1989; Bryman, 2016; Creswell & Creswell, 2018).

In terms of added value, the advantages synthesized greater robustness of results, instrumental optimization, and practical utility emerge from triangulation and from the complementarity between breadth and depth. The quantitative component provides estimation and generalization under defined sampling assumptions; the qualitative component offers contextual density, understanding of mechanisms, and semantic clarification, which reduces the risk of over-inference and improves transferability (Creswell & Creswell, 2018; Hernández-Sampieri & Mendoza, 2018). This synergy materializes in convergent and sequential designs—exploratory or explanatory—as well as in embedded schemes, which should be accompanied by an explicit integration plan (merging, connecting, or building) to ensure logical coherence among questions, samples, instruments, and analyses (Fetters, Curry, & Creswell, 2013; Creswell & Plano Clark, 2017).

The chapter also underscores disadvantages and limits whose management is crucial to study quality. Design and governance complexity implies greater demands on time, budget, and cross-cutting competencies, along with clear decisions on prioritization criteria when discrepancies among findings emerge (Greene, 2007; Fetters et al., 2013). Commensurability between units of analysis and sampling frames constitutes another challenge: misalignments restrict statistical power or transferability, hindering analytic integration (Bryman, 2016; Creswell & Creswell, 2018). Likewise, translating qualitative categories into quantifiable variables or viceversa can generate semantic loss and delays, especially in “building” and “connecting” designs (Morse, 2003; Morse & Niehaus, 2009).

On the technical side, data management and traceability require rigorous protocols and, where appropriate, support from specialized software (e.g., NVivo) to document analytic decisions and promote auditability (Bazeley & Jackson, 2013). Ethical and logistical considerations are also emphasized: employing multiple techniques can increase participant burden, making it essential to plan consent

procedures, coordination, and safeguards (Plano Clark & Creswell, 2015; Hernández-Sampieri & Mendoza, 2018).

Taken together, the findings engage with recent contributions that conceive integration as an epistemological and practical process that links numerical and narrative evidence within robust interpretive frameworks. The chapter not only supports adopting a mixed approach when warranted by the research question, but also cautions that its value depends on the quality of the integration design, sampling alignment, and explicit meta-inference that weaves the results into situated and useful explanations (Hanks, 2016; Tashakkori & Teddlie, 2010; Cueva Luza et al., 2023).

5. Conclusions

The evidence presented supports the conclusion that mixed methods research offers substantive advantages when the complexity of the phenomenon simultaneously demands estimation and understanding. Properly planned integration of approaches increases methodological robustness through triangulation, improves interpretive quality by clarifying mechanisms and contexts, and enhances practical utility for designing interventions and communicating results to diverse audiences (Creswell & Plano Clark, 2017; Fetters, Curry, & Creswell, 2013).

Nevertheless, its adoption is justified only when the research question requires combining breadth and depth; otherwise, the added complexity does not offset the costs in time, resources, and analytical burden (Tashakkori & Teddlie, 2010). For effective use, the following are essential: (i) an explicit integration plan defining what is integrated, when, and according to which criteria; (ii) sampling alignment between components to support meta-inference; (iii) coherent quality standards (reliability/validity and credibility/transferability); and (iv) data management and traceability protocols that ensure auditability and research ethics (Creswell & Creswell, 2018; Bazeley & Jackson, 2013; Hernández-Sampieri & Mendoza, 2018).

It is recommended to select the mixed design according to purpose: convergent for simultaneous corroboration; exploratory sequential to build variables and instruments from emerging categories; explanatory sequential to clarify numerical patterns; and embedded to address specific sub-questions without oversizing the study (Morse, 2003; Morse & Niehaus, 2009; Creswell & Plano Clark, 2017). It is also advisable to anticipate strategies to resolve interpretive discrepancies and to mitigate ethical and logistical burdens on participants (Greene, 2007; Plano Clark & Creswell, 2015).

In sum, mixed methods research offers high explanatory potential when aligned with the team's objectives, resources, and competencies. Its value does not lie in mixing for the sake of mixing, but in integrating judiciously, producing clear and applicable meta-inferences that coherently articulate quantitative and qualitative evidence (Johnson & Onwuegbuzie, 2004; Cueva Luza et al., 2023).

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