

DIFERENCIAS CONCEPTUALES Y METODOLÓGICAS ENTRE LA INVESTIGACIÓN CUALITATIVA, CUANTITATIVA Y MIXTA EN EDUCACIÓN: UN ANÁLISIS CRÍTICO DE LOS ERRORES COMUNES

CONCEPTUAL AND METHODOLOGICAL DIFFERENCES BETWEEN QUALITATIVE, QUANTITATIVE, AND MIXED RESEARCH IN EDUCATION: A CRITICAL ANALYSIS OF COMMON ERRORS

Yerson José Muñoz Chavarría^{1*}

¹ Docente Universidad Estatal del Sur de Manabí. Ecuador. ORCID: <https://orcid.org/0009-0006-6310-3500>. Correo: yerson.munoz@unesum.edu.ec

Rodrigo Alexander Rincón Zambrano²

² Docente Universidad Estatal del Sur de Manabí. Ecuador. ORCID: <https://orcid.org/0000-0002-2713-5111>. Correo: rodrigo.rincon@unesum.edu.ec

Ing. Noé Salomón Morán Lozano, Mg³

³ Docente Universidad Estatal del Sur de Manabí. Ecuador. ORCID: <https://orcid.org/0000-0002-9183-446X>. Correo: noe.moran@unesum.edu.ec

Carmen Stephany Campozano Falconi⁴

⁴ Docente Unidad Educativa Particular Redemptio. ORCID: <https://orcid.org/0009-0003-0464-5797>. Correo: carpita.1234@hotmail.com

* Autor para correspondencia: yerson.munoz@unesum.edu.ec

Resumen

Este artículo realiza un análisis crítico de las diferencias conceptuales y metodológicas entre la investigación cualitativa, cuantitativa y mixta en el ámbito educativo. Se destaca la importancia de comprender los enfoques epistemológicos y las técnicas de recolección y análisis de datos para evitar confusiones metodológicas. Se explican los principales criterios que definen cada enfoque, enfatizando que la mera utilización de instrumentos numéricos, como encuestas con escalas de Likert, no convierte automáticamente un estudio en cuantitativo o mixto. La clasificación adecuada requiere la intención y lógica del análisis, así como una

integración coherente de los métodos. Además, se describen los diseños metodológicos más comunes en estudios mixtos y los errores frecuentes en su aplicación. Finalmente, se propone fortalecer la formación metodológica de los investigadores para mejorar la calidad y validez de la producción científica en educación. Este trabajo forma parte del proyecto de investigación “Fortalecimiento del nivel didáctico-pedagógico de los docentes en las instituciones educativas del cantón Jipijapa” y del proyecto de vinculación “Tareas dirigidas y apoyo psicopedagógico para fortalecer el aprendizaje de los alumnos en la Educación Básica Pública de Jipijapa, Fase III – 2025”

Palabras clave: Investigación cualitativa; investigación cuantitativa; investigación mixta; metodología educativa; formación metodológica

Abstract

This article provides a critical analysis of the conceptual and methodological differences between qualitative, quantitative, and mixed research in the field of education. It highlights the importance of understanding epistemological approaches and data collection and analysis techniques to avoid methodological confusion. It explains the main criteria that define each approach, emphasizing that the mere use of numerical instruments, such as Likert scale surveys, does not automatically make a study quantitative or mixed. Proper classification requires the intention and logic of the analysis, as well as a coherent integration of methods. In addition, it describes the most common methodological designs in mixed studies and frequent errors in their application. Finally, it proposes strengthening the methodological training of researchers to improve the quality and validity of scientific production in education. This work is part of the research project "Fortalecimiento del nivel didáctico-pedagógico de los docentes en las instituciones educativas del cantón Jipijapa" and the outreach project "Tareas dirigidas y apoyo psicopedagógico para fortalecer el aprendizaje de los alumnos en la Educación Básica Pública de Jipijapa, Fase III – 2025"

Keywords: *Qualitative research; quantitative research; mixed methods research; educational methodology; methodological training*

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Introduction

Contemporary educational research is characterized by a diversity of methodological approaches that aim to address complex teaching and learning problems. Among these, qualitative, quantitative, and mixed research constitute the main frameworks for addressing knowledge production. However, in academic practice, methodological confusion is often observed, affecting the validity and clarity of studies, especially in the distinction between qualitative and mixed methods.

One of the most common mistakes is assuming that the use of Likert-type scale surveys, a widely used instrument for measuring perceptions and attitudes, automatically renders research quantitative or even mixed. This confusion stems from the misconception that simply coding subjective responses into numerical values guarantees a quantitative approach. However, data analysis extends beyond the form of collection; it largely depends on the epistemological logic that guides the study (Creswell & Creswell, 2018).

Qualitative research, for example, is not defined by the absence of numbers, but rather by its focus on understanding meanings, processes, and experiences within specific contexts (Flick, 2014). Quantitative research, in contrast, seeks to establish relationships between variables through measurement and statistical analysis, which allows findings to be generalized to broader populations (Hernández-Sampieri & Mendoza Torres, 2018). Mixed research, on the other hand, involves the intentional and complementary integration of both approaches, combining quantitative and qualitative data to generate a more comprehensive understanding of the phenomenon (Creswell & Plano, 2018).

In the field of education, this methodological distinction is particularly relevant, since the choice of approach not only conditions the data collection techniques, but also the interpretation of the results and the conclusions that can be drawn. When a researcher uses perception surveys and limits their analysis to frequencies or averages, the study remains in the quantitative realm, even though the source of information comes from subjective experiences. Only when narrative, interpretive, and statistical analyses are incorporated in a coordinated manner can one properly speak of a mixed design.

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This article aims to critically analyze the conceptual and methodological differences between qualitative, quantitative, and mixed research in the field of education. It also aims to highlight common errors in the classification of approaches, thereby providing clarity and guiding researchers toward more rigorous methodological decisions. In this way, it seeks to contribute to the strengthening of scientific production in education, thereby avoiding confusion that can limit the quality of studies.

Materials and methods

This research is conducted using a qualitative approach, given that its purpose is not numerical measurement or generalization of results, but rather the understanding and critical analysis of how qualitative, quantitative, and mixed approaches are conceptualized and differentiated in educational research. It is a narrative and critical review of the literature, which allows for the collection, organization, and interpretation of theoretical and methodological contributions from various academic sources. Unlike a systematic review, which seeks to exhaust all available sources following strict protocols, a narrative review allows for the selection and critical analysis of those works that are most relevant to the objective of the study (Baumeister & Leary, 1997). The critical review, in particular, is not limited to describing the characteristics of each methodological

approach, but also examines the most frequent conceptual confusions, providing an interpretative and propositional analysis in the field of educational research.

Search criteria and source selection

The bibliographic search was conducted between July and August 2025, prioritizing books and manuals from recognized publishers specializing in research methods and approaches in the field of education.

The search terms used in Spanish and English were:

- *investigación cualitativa en educación / qualitative research in education*
- *investigación cuantitativa en educación / quantitative research in education*
- *investigación mixta en educación / mixed methods in education*
- *errores metodológicos / methodological errors*
- *escalas Likert en investigación educativa / Likert scales in educational research*

Sources were included under the following criteria:

1. Publications between 2010 and 2025 to ensure topicality.
2. Widely circulated books and methodology manuals (Creswell, Flick, Hernández-Sampieri, Denzin & Lincoln).
3. Articles in journals indexed in Scopus, WoS, or ERIC.

Unpublished theses, blog posts, and non-peer-reviewed literature were excluded, except in the case of recognized methodological reference manuals.

Analysis procedure

The information collected was organized into three main thematic categories, in line with the objectives of the article:

1. Definitions and characteristics of qualitative, quantitative, and mixed research in education.
2. Most used methodological approaches and designs in each type of research.
3. Frequent conceptual and practical errors in the classification of approaches.

Subsequently, a comparative and critical analysis of the selected sources was carried out. To this end, reading matrices were developed to identify points of convergence, divergence, and gaps in the literature. The results of this process are presented in the discussion section to provide an integrative and reflective synthesis that guides researchers in the correct methodological delimitation of their studies.

Results

Qualitative research in education

Qualitative research focuses on understanding educational phenomena from the participants' perspective and within their natural context. Its main purpose is to explore meanings, perceptions, and experiences, rather than measuring variables (Flick, 2014). This approach enables a deeper understanding of complex processes, such

as motivation, classroom interaction, or identity construction, in foreign language learning. Denzin & Lincoln (2013) point out that: "Qualitative research is a situated activity that places the observer in the world... qualitative researchers study things in their natural environments, attempting to understand or interpret phenomena in terms of the meanings people give them."

The most common techniques include interviews, focus groups, participant observation, and document analysis, which generate narrative and descriptive data. The study is usually inductive, that is, interpretations and categories are constructed from the data collected (Denzin & Lincoln, 2013). In education, this approach is valuable for capturing the voices of students and teachers, as well as understanding phenomena that traditional metrics fail to explain.

In the field of education, qualitative research becomes a valuable tool for capturing the voices of students and teachers, understanding phenomena that traditional metrics fail to explain, and generating pedagogical proposals that are more attuned to the realities of different school contexts. In addition, it promotes the visibility of experiences that would otherwise remain invisible in quantitative reports, such as the narratives of students with specific educational needs, perceptions about the use of technologies in learning, or cultural practices that affect educational processes.

Quantitative research in education

Unlike qualitative research, quantitative research focuses on testing hypotheses and analyzing relationships between variables through objective measurement and the use of rigorous statistical procedures. This approach is based on an epistemological foundation associated with positivism, which conceives of reality as something observable, measurable, and susceptible to explanation through general laws. Therefore, it privileges objectivity, validity, reliability, and the possibility of generalizing results (Hernández-Sampieri & Mendoza Torres, 2018).

In educational research, this approach has enabled the identification of trends in student behavior, correlations between learning factors, significant differences between groups, and the impact of variables such as teaching methods, technological resources, or socioeconomic conditions on academic performance (Creswell & Creswell, 2018).

The most used instruments include structured questionnaires, standardized tests, mass surveys, and measurement scales, which enable the accurate and systematic collection of numerical data. The data are then analyzed using descriptive and inferential statistical techniques, such as regression analysis, hypothesis testing, analysis of variance (ANOVA), or structural equation modeling, which provide empirical evidence to support conclusions (Muijs, 2010).

One of the main strengths of quantitative education research is that it enables comparisons between different contexts and populations, which is essential for decision-making in educational policy, curriculum design, and institutional evaluation processes. Additionally, this approach helps ensure accountability in education systems by providing indicators of quality and equity based on verifiable evidence (Johnson & Christensen, 2019).

However, it is essential to acknowledge that quantitative research, while effective in explaining the "what" and "how much" aspects of educational phenomena, may have limitations when exploring the "how" and "why" aspects that are often addressed in greater depth through a qualitative approach.

Mixed research in education

Mixed research emerges as a response to the limitations of traditional approaches, complementarily integrating the strengths of qualitative and quantitative methods. Its fundamental purpose is to offer a more comprehensive view of educational phenomena, leveraging the explanatory power of statistical data and the interpretive depth of the narratives and experiences of the actors involved. According to Creswell & Plano (2018), a mixed study requires an intentional combination of quantitative and qualitative data to generate a more comprehensive understanding of an educational phenomenon.

Tashakkori & Teddlie (2015) emphasize that mixed research does not consist solely of adding approaches, but rather of integrating them strategically to answer complex questions that would be difficult to address with a single paradigm. Thus, mixed methodology is framed within an epistemological pragmatism, which recognizes that reality can be studied from multiple perspectives and that the validity of knowledge depends on its usefulness and applicability in real contexts.

There are several mixed designs, including:

- Sequential exploratory: begins with qualitative data to discover categories, patterns, or hypotheses, which are then tested and further developed through quantitative analysis. This design is instrumental in innovative educational studies, such as research on new teaching practices (Creswell & Plano, 2018).
- Sequential explanatory: begins with quantitative data showing general trends, which are complemented with qualitative information to explain the results in greater depth (Creswell, 2014). This type of design is commonly employed in the evaluation of educational programs or policies.
- Convergent parallel: both approaches are applied simultaneously and then integrated into the final interpretation, allowing findings to be compared and triangulated from different perspectives (Fetters et al., 2013).

In the field of education, mixed studies are instrumental when it is necessary to understand both measurable results, such as academic performance, standardized test results, or school attendance levels, and the perceptions and experiences that accompany these results, including motivations, attitudes, learning barriers, and sociocultural factors. Greene (2007) emphasizes that the strength of this approach lies in its ability to "expand and enrich the understanding of complex phenomena through the juxtaposition and integration of different forms of evidence."

Thus, mixed research in education is presented as a robust methodological tool that not only strengthens the validity and reliability of findings but also provides depth and practical applicability, essential elements in educational decision-making and the improvement of pedagogical policies and practices.

Common errors in classifying approaches

A common mistake in educational research is to confuse the research approach with the type of instrument used. It is often assumed that the use of perception surveys with Likert scales automatically makes the study quantitative or mixed.

The Likert scale enables the collection of opinions, attitudes, or perceptions, which are inherently qualitative in nature. Each response can be coded numerically, for example, "strongly agree = 5," to facilitate data organization, but this does not transform the research into quantitative research, nor does it alter its epistemological approach (Joshi et al., 2015; Cohen et al., 2018). What determines the approach is how the information is analyzed and the type of knowledge that is sought to be generated:

- If the analysis focuses on interpreting meanings, experiences, and perceptions, the study maintains a qualitative approach, even when data is presented numerically to summarize trends or frequencies (Flick, 2014).
- If the analysis is limited to describing or contrasting data using descriptive or inferential statistics, the study is classified as quantitative, since the purpose is to measure and compare variables (Cohen, Manion & Morrison, 2018).
- For a study to be truly mixed, it is necessary to combine both analyses intentionally, integrating quantitative results with qualitative interpretations that account for the meanings behind the numbers (Creswell & Plano, 2018; Tashakkori & Teddlie, 2015).

This misunderstanding reflects a lack of solid methodological training and can lead to research being presented as mixed without meeting the required epistemological and technical criteria. It is therefore essential that researchers understand the nature of the instrument, the form of analysis, and the purpose of the study, ensuring the correct classification of the approach and the validity of the findings.

Table 1: Classification of the findings.

Approach	Key features	Instruments / Techniques	Data analysis	Common mistakes in practice	Source
Qualitative	Understands phenomena from the perspective of participants; focuses on meanings and experiences in their natural context.	Interviews, focus groups, participant observation, document analysis.	Interpretive and inductive; construction of categories and patterns.	Believing that numerical coding automatically transforms the study into a quantitative one; assuming that using Likert scales makes the approach quantitative.	Creswell & Poth (2018); Hernández-Sampieri & Mendoza (2018).
Quantitative	Seeks to measure variables, hypotheses, test and generalize results.	Closed questionnaires, standardized tests, measurement scales.	Statistics: averages, percentages, correlations, hypothesis testing.	Interpreting coded qualitative responses as if they were quantitative evidence; applying perception surveys without rigorous statistical analysis.	Johnson & Christensen (2019); Cohen, Manion & Morrison (2018).

Approach	Key features	Instruments / Techniques	Data analysis	Common mistakes in practice	Source
Mixed approach	Intentionally integrates qualitative and quantitative methods to complement analysis.	Interviews; questionnaires; observation; standardized tests.	Combination of statistical and qualitative analysis with phased integration.	Presenting a study as mixed without true integration; coding qualitative data and calling it mixed without interpretive analysis.	Creswell & Plano Clark (2018); Tashakkori & Teddlie (2015).

These findings have significant implications for educational research. First, they underscore the need for researchers to clearly understand the epistemological and methodological criteria of each approach before designing their study. Second, they show the importance of selecting instruments that are consistent with the chosen approach, avoiding confusion that could distort the nature of the research. Finally, they highlight the need for solid methodological training that enables researchers to properly integrate qualitative and quantitative methods in mixed studies, when appropriate.

Conclusions

Education research requires a clear and rigorous understanding of the differences between qualitative, quantitative, and mixed approaches, not only in the selection of instruments, but mainly in the epistemological logic that underpins them. The correct delimitation of these approaches guarantees the validity and reliability of the findings, avoiding confusion such as the indiscriminate use of Likert surveys or the numerical coding of opinions without an in-depth analysis to support a quantitative or mixed approach.

It is important to note that even if numerical coding is used in opinion, "yes or no," or perception questions, and responses are counted to determine how many people shared the same opinion, this does not automatically imply that the research is quantitative in nature. The simple collection and counting of numerical responses correspond to a descriptive analysis, which allows us to know how many responded in a certain way, but does not necessarily involve inferential statistical analysis or the formulation of hypotheses that allow the results to be generalized to a larger population. In other words, simply describing frequencies does not constitute a complete quantitative approach; the key lies in the type of analysis and the purpose of the study, which, in the case of the quantitative approach, seeks to relate variables, make predictions, or test hypotheses from a statistical perspective, not simply count responses.

Researchers must have a solid methodological background and an explicit justification for the approach they choose, since the choice of method will determine not only the data collection and analysis techniques, but also the interpretation of the results. The effective integration of qualitative and quantitative data in mixed studies enriches the understanding of complex educational phenomena, providing a more complete and contextualized view that strengthens decision-making in educational policies and practices.

Recognizing common mistakes and properly understanding when to apply each approach contribute to the quality of educational research, promoting more rigorous and consistent scientific production. Researchers are invited to continue developing their methodological knowledge, promoting the conscious and strategic use of data collection and analysis techniques, so that studies can effectively contribute to the advancement of knowledge and the improvement of educational systems.

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