



MIXED-METHOD RESEARCH IN THE HEALTH SCIENCES

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History

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Mixed-method research offers powerful tools to investigate complex systems and processes in health, education, and social science. These areas have been increasingly using complex mixed-method research designs¹. This method encompasses the complete research procedure, including philosophical assumptions, research questions, design, collection, analysis, integration and structures of presentation of data and results².

The nature of the research question guides the selection of the method. Researchers in healthcare field use a quantitative methodology to study and answer research questions on causality³, generalization, and magnitude of effect. The qualitative methodology is the choice of researchers who seek to answer research questions that explore how or why a given phenomenon occurs, to develop a theory or describe on the subjectivity of an individual experience¹.

Mixed-method research is delineated considering the strengths of each of the two approaches, quantitative and qualitative, and, due to this, it is a methodological innovation increasingly used to address contemporary issues in health services. An indication of the increased interest of this method was the publication of the first best-practices guideline on mixed-methods research in the health sciences by the National Institutes of Health. The guideline was elaborated by researchers and research Project reviewers funded by the Office of Behavioral and Social Sciences at the National Institutes of Health⁴.

Over the course of the years, several definitions of mixed methods have emerged incorporating characteristics of method, philosophy, processes, and research projects. Currently, researchers are focused on defining the essential characteristics of mixed-methods research, which are described in literature as⁵:

- a) In response to questions and hypotheses, collection and analysis of quantitative and qualitative data takes place;
- b) Rigorous procedures are used to carry out quantitative and qualitative research;

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- c) There is integration or combination of findings from quantitative and qualitative results;
- d) Procedures are developed in which data collection, analysis, and integration takes place: mixed-methods design;
- e) It reports to the theory and philosophical principles related to those procedures.

It is, therefore, pointed out that this method involves the triangulation of quantitative and qualitative data in a single project. Those approaches complement each other inasmuch as they represent words and numbers, the two fundamental languages of human communication. Among the advantages of mixed methods, it may be stated that researchers can permit the manifestation of the best of each of the methods, avoiding the possible limitations of a single approach. This methodological orientation is indicated when a data source may be insufficient to answer the research problem or when the results need to be explained and the exploratory findings need generalization⁵.

It is often argued that the quantitative approach is not able to capture the specificities in terms of what is understood of the context where the study took place. Still, researchers in this line are at the vanguard and possible or eventual subjective interpretations are rarely discussed. Qualitative research compensates for these weaknesses. However, qualitative research is seen as deficient due to the personal interpretations made by the researcher, the bias created because of this, the small number of participants, and the difficulty to generalize the results. Quantitative research, in turn, does not have those weaknesses. Thus, the combination of potentialities of one approach compensates for the weaknesses of the other. Thereby, the mixed-methods research provides more evidence for the study of a research problem than the use of one of the two approaches in an isolated manner. By using mixed methods, researchers can use all available tools, rather than confining themselves to data collection strategies commonly associated with quantitative

or qualitative research⁵.

In current specific literature⁵, ten advances in mixed-methods research are described, (along the last 5 years) to be incorporated by researchers in their projects:

- a) Include information on the skills researchers/research teams have in qualitative, quantitative, and mixed-method research;
- b) Create study aims for the qualitative, quantitative, and mixed-methods components;
- c) Write a justification for the use of mixed methods;
- d) Develop/present a mixed-methods design for the procedures chosen;
- e) Portray this design with a diagram and/or implementation matrix;
- f) Be specific about the point of integration in the design;
- g) Create tables with results of the two phases together to show integration and write inferences;
- h) Select a conceptual framework/theoretical model for the project and align it to the design;
- i) Develop/present validity (research integrity) in the design/project;
- j) Carry out multiple publications stemming from the mixed-methods project.

Regarding the theoretical perspective that guides the execution of the research project, it is important to highlight that all researchers are oriented by theories or guiding structures and postulate hypotheses in their research that may be explicit or implicit and, in this case, are not cited in texts⁵. To self-evaluate and check their own proficiency and skills in mixed-methods research, researchers can use the instrument⁶, developed and tested for such. Thus, it is possible to identify each researcher's strong points and the

areas that can still be developed and/or improved. Researchers who master one of the approaches and who come from different epistemological perspectives, often find themselves working together forming a team to conduct mixed-methods research. To improve the dynamics of these teams, it is necessary for their members to develop the capacity to articulate their own research philosophy, visions, values, and objectives. Still, it is important to facilitate group interactions by creating conditions for values to be shared through dialogue, defining objectives, and developing trust. Systematically, it is quite important to optimize the values that promote and support dialectic pluralism and participation from stakeholders in research⁷.

A big challenge for researchers who commonly work with only one of the approaches is the integration of the data and the results. This stage raises the research method to a level that would not be reached by simply putting together the results of separate research, qualitative and quantitative, conducted without full attention to integration. This challenge is described, qualitatively, as the need to produce a whole through integration that is greater than the sum of the qualitative and quantitative parts individually. Quantitatively, authors express this idea as $1 + 1 = 3$. That is, quantitative + qualitative = more than their individual components⁸⁻⁹.

Integration in mixed-methods research may occur in three distinct moments. In the study design, integration occurs through three basic projects - exploratory sequential, explanatory sequential, and convergent - and through four advanced frameworks - multi-stage or multiphasic, intervention, case study, and participatory¹⁰.

Integration at method level occurs through four approaches: “connection” of data, where a database is linked to another through sampling; “construction”, where a database informs the data collection approach of another; “fusion”, where the data from both bases are joined for analysis; “incorporation”, where data collection

and analysis may be linked in several points¹⁰.

Integration during the interpretation and presentation of results occurs through narration, data transformation and joint display, according to the methodological design chosen for the project. When researchers integrate data through narration, they describe qualitative and quantitative findings in one or more articles. There is three approaches to carry out integration in this way: a) write both qualitative and quantitative data together based on a theme or concept; b) present both types of data in a single publication, but in separate sessions; c) publish the findings in separate articles, as may occur - for example - in multiphasic or multi-stage projects, where an intervention can be carried out via Randomized Clinical Trial (RCT) and interviews. In this example, the authors published an article with the findings from the interviews¹¹, and only briefly mentioned the RCT¹², which has been previously published¹⁰.

Integration through data transformation takes place in two phases. In the first phase, a type of data must be converted into another type of data (qualitative data to quantitative or quantitative data to qualitative). For example, qualitative data can be transformed through numerical counting and variables using content analysis. In the second phase, the data transformed is then integrated with the data that has not been transformed¹⁰.

Integration of results presented through joint displays⁹, including the theory that guided the research since its conception facilitates visualization and provides insights on the analytical process of interpretation, enabling a unique form of representation or communication that is better captured visually than by isolated words. The addition of theoretical lenses to show the integration in the joint displays is a notable characteristic, considered as an advance in mixed methods⁹.

Adjustment of the integration permits coherently observing and describing the quantitative and qualitative results, confirming them, and expanding their comprehension. Disagreement may occur if the qualitative and quantitative data are inconsistent, incongruent, contradict each other, and demonstrate conflict or discrepancies between each other.

The application of integration principles and practices may help researchers to leverage the strong points of mixed methods¹⁰. Recommendations are found in literature about the best practices⁹:

- a) Identify the quantitative and qualitative results;
- b) Be consistent with the design used in the method;
- c) Be consistent with the integration methodology;
- d) Identify inferences, meta-inferences, and insights generated.

Mixed methods offer a new framework to think about health services research with the potential to generate meta-inferences and unique insights on phenomena expressed in a multifaceted manner, related to access, quality, and the safe provision of healthcare¹³. When research questions can be best answered through this method, researchers need to dedicate themselves and make careful choices to conduct the integration process. Proper attention to integration in the stages of study conception and design, method, interpretation, and presentation of results can improve the quality of mixed-methods research in the health area and generate rigorous and important evidence to improve health care, services, systems, and healthcare policies.

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