

The Singularity Challenge: Case-Based Research in Medical Education.

El desafío de la singularidad: la investigación basada en casos en la educación médica.

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Abstract : This article provides a systematization of the Case-Based Research (CBR) methodology within the framework of Medical and Health Sciences Education. CBR is a methodology that emphasizes the in-depth study of individual cases in order to obtain a detailed and contextualized understanding of the investigated phenomena, which makes it a tool of epistemic value for medical education. Objective: Identify the foundations of the CBR, design, rigor criteria and specific aspects of its scientific communication. Methods: Through a review, synthesis of literature and good practices, guidance is offered to researchers on how to implement CBR. Conclusion: CBR is a valuable methodology in medical and health sciences education, but its implementation requires rigorous design, established quality criteria, and effective scientific communication.

Keywords : Case-Based Research, Health Sciences Education, Clinical Cases, Qualitative Research

Resumen: Este artículo entrega una sistematización de la metodología de la Investigación Basada en Casos (IBC) en el marco de la Educación Médica y en Ciencias de la Salud (ECS). La IBC es una metodología que enfatiza el estudio en profundidad de casos individuales con el fin de obtener una comprensión detallada y contextualizada de los fenómenos investigados, lo que la convierte en una herramienta de valor epistémico para la ECS. Objetivo: Identificar los fundamentos de la IBC, diseño, criterios de rigor y aspectos específicos de su comunicación científica. Métodos: A través de una revisión, síntesis de la literatura y buenas prácticas, se ofrece una orientación a los investigadores sobre cómo implementar la IBC. Conclusión: La IBC es una metodología valiosa en la educación en médica y de ciencias de la salud, pero su implementación requiere un diseño riguroso, criterios de calidad establecidos y una comunicación científica efectiva.

Palabras clave: Investigación Basada en Casos, Educación en Ciencias de Salud, Casos clínicos, Investigación cualitativa

1. Introduction

Health Sciences Education has progressively evolved towards approaches more oriented to understanding educational practice. This has driven the need to implement research methodologies that reflect this path. In this sense, case-based research (CBI) has been consolidated as a relevant approach, allowing the analysis and understanding of educational and health phenomena in real, complex and contextual situations (1).

Since the origins of medicine and education, case studies have been used as a pedagogical tool for learning and for the description of certain singularities, especially in

the treatment of problems and challenges faced. It provides, in this line, a framework to explore in depth the interactions between students, professionals, teachers, patients and the health care system (2). In the educational context, CBR has made it possible to analyze the impact of interventions and policies in specific spatio-temporal contexts, in addition to offering a solid basis for the generation of theories and transferring knowledge to other environments (3).

This article offers a methodological guide for CBR in the field of health sciences education, highlighting its usefulness and applicability in various educational situations. For example, CBR has been used effectively to investigate the experiences of nursing students in clinical placements, providing detailed insight into their learning process and training dynamics (54). Likewise, in the evaluation of medical simulation tools, the CBR has allowed an in-depth analysis of how students develop surgical skills, revealing key aspects for the improvement of these educational technologies. Furthermore, its application in the study of innovative teaching methods, such as in pharmacology courses, has facilitated a richer understanding of the effectiveness of new pedagogical strategies. These examples, as will be seen later in this article, illustrate how CBR provides a detailed and contextual perspective in educational research, contributing significantly to the improvement of teaching practice in health sciences.

Finally, we must explain that this article had the assistance of artificial intelligence for its construction in regards to the writing. In order to preserve academic integrity and honesty, several specific measures were implemented. An exhaustive review was carried out on all the content generated by the AI, ensuring that the ideas and linguistic formulations respected the principles of originality and did not incur plagiarism. To do this, software specialized in detecting textual similarities was used, complemented by a critical evaluation by the authors to guarantee the adequacy and relevance of the content in the specific academic context. In essence, ChatGPT 4 was used for academic writing and the prompt used corresponds to "Improve writing fluency and composition". Additionally, a detailed record of AI contributions was kept, clearly differentiating between human and machine-generated input, to maintain transparency and traceability of the writing process. These safeguards ensure that, although artificial intelligence was used as an auxiliary tool, the final wording of the article faithfully reflects the authorship and academic rigor required in our discipline.

2. Methods

To conduct this narrative review, a search was conducted in key academic databases such as PubMed, Scopus, and ERIC, focusing on terms such as "case-based research," "health sciences education," and "medical education." Articles published in the last 10 years and in English or Spanish were selected. Additionally, research methodology manuals were consulted for a deeper understanding of the CBR.

During the process, strengths and weaknesses inherent to the narrative review methodology were identified. Among the strengths, this methodology allows for a holistic and contextual understanding of a topic, facilitating the integration of a wide range of perspectives and types of data. This is particularly useful in complex, multifaceted fields such as health sciences education. However, a notable weakness is its potential subjectivity, as the selection and analysis of articles may be influenced by the reviewer's perspectives. Additionally, narrative review may not be as systematic as other forms of review, such as meta-analysis, which could affect the generalizability of findings. Aware of these limitations, an effort has been made to address and minimize subjectivity through clear article selection criteria and a balanced and critical analysis of them, with the aim of

providing a comprehensive, guiding and useful vision on the application of the CBR in health sciences education.

3. Results

CBR Basics

CBR is a methodological approach that allows the detailed study of a single entity or phenomenon in its real context, with the aim of exploring and understanding the underlying factors and processes (4). From an epistemological point of view, CBR can adopt various perspectives; There is no predefined idea about the nature of knowledge, rather its epistemological position depends on the nature of the problem and the objectives of the research (5). However, understanding its evolution over time is relevant, as it provides an understanding of the conceptual framework, methodology and associated techniques. This allows you to appreciate how data collection and analysis techniques have been refined, as well as understand best practices developed over time. In short, knowledge of the evolution of CBR strengthens the ability of researchers to design and carry out rigorous research (table 1).

Table 1. Evolution of the CBR

Period	Description	Authors	Challenges	Ref
1960-1970	CBR emerges as a distinct qualitative approach in the social and educational sciences.	Glaser and Strauss (6), Stake (7)	Establish the validity and reliability of the CBR in comparison to other research approaches.	6
1980-1990	Consolidation of the CBR and development of theoretical and methodological frameworks for its design, analysis and interpretation.	Yin (8), Eisenhardt (9)	Address the subjectivity and generalizability of CBR findings.	8
1990-2000	Expansion of CBR across multiple disciplines and contexts, including ECS.	Merriam (10), Stake (2)	Integrate diverse theoretical and methodological perspectives in the design and conduct of case studies.	11
2000-2010	Greater emphasis on the rigor, validity and transferability of CBR and the use of information technologies.	Flyvbjerg (12), Creswell (13)	Develop specific quality and ethical criteria for CBR and adapt to technological evolution.	12
2010-2022	Diversification of CBR in terms of epistemological approaches, data collection methods and analysis strategies.	Thomas (14), Baxter and Jack (15)	Address the complexity and interdisciplinarity of CBR and respond to current demands and challenges.	14

The literature describes at least four types of cases: single case, multiple case, nested case and longitudinal case. The single case corresponds to the study of a specific case, which can be representative, extreme, or critical (16), such as: the experience of an innovation in the learning of basic sciences. Multiple cases correspond to a type of study that involves several independent cases to compare and contrast findings and improve generalization (17). Here, the researcher assumes that the object of study is found or carried by different subjects. For example, a comparison of different pedagogical

approaches in teaching clinical skills. The nested case, whose study is a main case and one or more related secondary cases, which are used to explore specific aspects of the main case (14). An example could be the evaluation of a mentoring program in the context of a medical school. And finally the longitudinal case, whose objective is the study of a case over time, in order to explore changes, evolution and development (1). Monitoring the learning experience of kinesiology students throughout their training after a curricular innovation could be a model.

CBR is distinguished from other qualitative methods primarily by its focus on the in-depth study of particular cases, rather than identifying patterns or themes across a broader range of contexts or individuals (4). This is why CBR collects data from a variety of sources (including interviews, documents, observations and records), rather than relying on one or two main data sources. The analysis in CBR is detailed and case-specific and often includes comparative analysis between cases when multiple cases are examined (5). Finally, the findings in CBR are presented in a way that highlights the spatiotemporal context and complexity of the case (2), integrating the perspectives of the participants and the researcher, which is different from other qualitative methods that may focus on highlighting themes. or common patterns, seeking their generalization (1). Table 2 shows a comparison with other qualitative methods.

Table 2. Differences between CBR and other qualitative methods.

Research method	Analysis unit	Advantages	Limitations
Case-based research (1, 5)	Single case or multiple cases	Depth in analysis, contextualization, exploration of causality, data triangulation.	Limited generalization, time and resource intensive
Ethnographic studies (6, 18)	Cultural group or community	Deep understanding of culture, practices and beliefs, immersion in context.	Limited access, researcher bias, limited generalizability.
Action research (19, 20)	Change process in a specific environment	Active participation, practical improvement, situated knowledge, transformation	Researcher biases, conflicts of interest, limited generalization
Phenomenological (21, 22)	Individual experiences	Captures the essence of lived experience, rich description, empathy	Subjective interpretation, limited generalization, time intensive
Grounded theory (23, 24)	Ongoing social process	Generation of theories from data, rigor, inductive approach	Time intensive, researcher biases, limited generalization

From an epistemological point of view, CBR can adopt various positions, such as postpositivist, interpretive, constructivist and critical (15). This is a crucial element since the case methodology does not impose a particular notion of knowledge, and constructivist and/or positivist approaches can coexist.

Selection, definition and data collection strategies

Case selection and definition are fundamental aspects in CBR, since they determine the scope and focus of the study (15, 20). The choice of case must be based on theoretical and practical considerations that allow the research problem to be addressed effectively (25). In this sense, it is

essential to clearly define the case selection criteria, which may include its relevance, accessibility, representativeness, and learning potential (1, 2, 26). Researchers may choose to study a single case or multiple cases, depending on their objectives and research questions (1). Furthermore, it is important to take into account the unit of analysis of the case, which can be an individual, group, organization, event, and must be clearly delimited to facilitate data collection and analysis (27). Consequently, it must be understood that the unit of analysis carries the object of study and is not the object itself. A key feature of CBR is the utilization of multiple data sources and collection methods to ensure validity and triangulation of findings. When designing the data collection strategy, it is important to consider the following dimensions (28, 29):

- Data sources : CBR can include a wide variety of data sources, such as documents, records, observations, interviews, questionnaires, and audiovisual material. The selection of data sources should be based on the research questions and the characteristics of the case (29, 30).
- Collection methods : Researchers can employ various data collection methods, such as participant or non-participant observation, open-ended or semi-structured interviews, self-administered or guided questionnaires, and analysis of documents or records (31). It is essential to combine different collection methods to ensure triangulation and validation of findings (30). The epistemic horizon to take into account is the deep understanding of the phenomenon.
- Participants : The selection of participants in the CBR must be carefully planned, taking into account criteria of relevance, diversity, and accessibility (32). In some cases, it may be necessary to employ sampling techniques, such as purposive, convenience, or snowball sampling, to identify and select the most suitable participants (33).
- Temporality : Data collection can be carried out at a specific moment or over time, depending on the objectives and research questions (34). It is important to design a work plan that allows data collection to be carried out in a systematic, flexible and adaptive manner (35).
- Data presentation : It is crucial to present the data in a way that reflects the richness and complexity of the phenomenon studied. Researchers should structure their data communication by highlighting how each collection method contributes to the overall understanding of the case. For example, the results of observations, both participants and non-participants, can be presented through descriptive narratives that illustrate the context and interactions observed. Open-ended or semi-structured interviews can be summarized and analyzed to highlight recurring themes and patterns, while questionnaire data can be presented in the form of tables or graphs to facilitate quantitative interpretation. Analysis of documents and records should be integrated to provide additional background and evidence. The presentation should focus on how the articulation of these methods leads to an enriched and multidimensional understanding, emphasizing triangulation as a means to validate and provide robustness to the findings.

Analysis and interpretation

The analysis and interpretation of data in the CBR involves a systematic and rigorous process of exploration, synthesis and theorization of the information collected. This process is based on the principles of the qualitative research approach, characterized by its emphasis on deeply understanding human experiences, perceptions and behaviors within specific contexts. Within the framework of CBR, the qualitative method enables a detailed immersion in individual cases, allowing the exploration of the meaning and complexity of the situations studied. Through this approach, we seek to capture the richness and depth of the cases, understanding that each one presents a unique and multifaceted reality that contributes to the broader understanding of the phenomenon under study. In this way, CBR supported by qualitative methods becomes a powerful tool to unravel and understand the dynamics and particularities that define each case, offering valuable and contextualized perspectives that are fundamental for applied research and the generation of relevant knowledge in the field. study (30).

At least six key elements must be considered: 1) the preparation and organization of data (37); 2) the inductive and/or deductive analysis approach, in which pre-existing theories or concepts are applied to the case (38, 39); 3) triangulation and validation of findings, which increases the credibility and reliability of the study (40, 41); 4) synthesize and theorize the findings (42, 43); 5) the transfer of knowledge and its applicability, which allows discussing the implications of the findings for practice, research and training, as well as considering their limitations and challenges (44, 45); and, finally, 6) the reflexivity and rigor of the researcher, on which the quality and validity of the research depend (2, 11, 46). Other relevant elements that contribute to the quality of the CBR are shown in table 2.

Research publication

The adequate description of an CBR in a scientific article is essential to guarantee its rigor, transparency and applicability in the field of medical education. The key sections are traditional, although a particular focus is required in certain aspects. In the introduction, the context, justification and objectives of the research, as well as the research questions and hypotheses, should be clearly established (47). Furthermore, it is crucial to present a brief and updated review of the relevant literature and discuss the contribution of the study to knowledge and practice in the field (1), especially highlighting its singularities. In the methodology section, it is necessary to describe in detail, among other aspects, the selection and definition of the case, the design of the data collection strategy and the analysis and interpretation of the data (1, 48). It is essential to provide sufficient information to allow evaluation and replication of the study by other researchers (49). Results should be presented in a clear, coherent and rigorous manner, using tables, graphs and narrative to communicate the findings and their relevance in relation to the research questions (50). It is relevant to highlight both patterns and discrepancies in the data, and discuss possible explanations and limitations of the findings (51, 52). In the discussion, the findings of the study should be integrated with existing literature and theory in the field (theoretical application), establishing connections and contrasts between the results and previous work (1, 5, 52). It is also essential to discuss the implications of the findings for practice, research and training in health sciences, as well as recognize and address the limitations and challenges of the study. In the conclusion, the main findings and contributions of the study should be summarized, establish future perspectives and recommendations for research and practice in the field of ECS (1, 5).

Illustrative examples

To demonstrate the usefulness and applicability of CBR in ECS, several studies that have applied this methodology effectively are presented below. Each example highlights different aspects and benefits of CBR, and together, they provide a comprehensive view of how this approach can be used to address a variety of issues and contexts in the area of ECS.

The study "The flipped classroom in medical education: A new standard in teaching" (53) presents a research strategy focused on the review and analysis of experiences and studies related to the implementation of the flipped classroom model in medical education, specifically in the context of the COVID-19 pandemic. This highlights the CBR's ability to deepen the understanding of innovative teaching strategies.

On the other hand, the case "A Case-Centered Approach to Nursing Ethics Education: A Qualitative Study" (54) used a qualitative research strategy focused on the exploration of the perspectives and experiences of students in relation to the teaching of ethics in nursing education. To achieve this objective, educational sessions focused on cases were carried out, where students applied the four themes method to analyze and discuss specific ethical situations. This allowed students to enhance empathy, reflection and ethical reasoning, illustrating in turn the usefulness of CBR to investigate creative teaching methods and their impact on student results.

The study "The Use of Simulation in Dental Education: A Case Study" (55) focuses on the evaluation and comparison of simulation technologies used in preclinical dental education. This research addresses the transition from traditional simulators to more advanced technologies, such as simulation based on virtual reality, favoring the acquisition and development of clinical skills in dental students, and, in turn, highlights the capacity of CBR to explore the effectiveness of practical teaching techniques.

Finally, the study "Learning occupational therapy practice using standardized patients in a practical examination – experiences of students and teachers" (56) uses a mixed research strategy to examine the results of a pedagogical improvement project in relation to a practical examination with patients standardized for occupational therapy students, surveying students and conducting a focus group of teachers responsible for the development and implementation of the exam. The case shows how this experience is capable of replicating the authentic clinical environments in which students will find themselves in field work, and shows the applicability of CBR in the study of professional training in health sciences.

These illustrative examples demonstrate the versatility and potential of CBR in ECS, spanning a diversity of contexts, topics and disciplines.

4. Discussion

CBR in the field of medical and health education presents both significant challenges and opportunities. One of the key challenges is the selection of cases that are truly representative of the situations of interest, given that the variability in experiences and contexts in the health field can be considerable. Furthermore, data collection in this area often involves detailed and sensitive clinical information, requiring a careful approach to ensure data quality and integrity while respecting ethical and privacy standards.

Another important challenge is the integration of quantitative and qualitative data. The need to combine these two types of data to obtain a comprehensive understanding of the phenomenon under study can be complex and researchers must address this issue effectively. Furthermore, triangulation of data and validation of findings can be complicated in case-based studies due to the lack of clear reference points. Researchers should look to multiple sources of evidence and methods to robustly support their results.

On the opportunity side, CBR allows for a deep and contextualized exploration of complex situations in medical and health education. This can lead to a richer understanding of the factors at play and provide valuable insights for improving practice and decision making.

Furthermore, methodological flexibility is an important advantage. Investigators have the ability to adapt data collection and analysis methods to the specific needs of each case, allowing them to address diverse questions effectively. CBRs can also be hypothesis generators and contribute to theory development, which is valuable for advancing the field of medical and health education.

In summary, case-based research in medical and health education presents significant methodological challenges, but also offers significant opportunities for deeper understanding and substantial improvement in practice and policy in this critical field.

5. Conclusions

- Recognition of the CBR in Research in Medical and Health Education:

- Case-Based Research (CBI) has acquired considerable recognition in the field of Medical and Health Education research due to its ability to provide a thorough and contextualized analysis of specific phenomena related to clinical practice and the training of health professionals. health. This methodology has become a valuable tool to understand complex and challenging situations that researchers in Medical and Health Education address in their studies.
- Challenges in the Implementation of CBR in Medical and Health Education Research:
 - Despite its benefits, the implementation of CBR in Health and Medical Education Research poses significant challenges. One of the key challenges is creating authentic cases that reflect realistic situations in the field of health and medicine. This involves designing cases that are relevant and representative of the medical and health practice being investigated. Furthermore, the investment of time and resources in developing authentic cases can be considerable, raising issues of feasibility within Health and Medical Education research settings.
- Benefits of CBR in Medical and Health Education Research:
 - Despite these challenges, CBR offers significant benefits in Health and Medical Education Research. This methodology provides an enriching approach to research and improve the training of future health professionals and to address issues of clinical and health care relevance. To make the most of CBR in this context, it is essential to understand its theoretical foundations and follow a rigorous design that ensures the authenticity of the cases and the relevance of the research objectives.
- Effective Scientific Communication in Medical and Health Education Research:
 - An essential part of CBR in Medical and Health Education Research is the effective communication of case-based research results. Sharing findings in a way that is accessible and meaningful to the academic community and health professionals is essential. This involves using clear language and presenting the results in a way that can influence clinical practice and decision-making in the health field.
- Continuous Evolution of the CBR in Medical and Health Education Research:
 - It is expected that CBR will continue to evolve and adapt to address the emerging needs of Health and Medical Education Research. This includes a focus on integrating interprofessional approaches, fostering collaboration between different disciplines of health and medicine. Additionally, the development of clinical research and evidence-based decision-making skills will be promoted, which will be essential to advance research in this ever-changing field.

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References

1. Yin RK. Case study research and applications: Design and methods. 6th ed. Publisher: SAGE Publications, Los Angeles, California, 2018.
2. Stake RE. The art of case study research. Thousand Oaks. SAGE Publications; nineteen ninety five.
3. Chaverra Fernández BE, Gaviria Cortés DF, González Palacio EV. Case study as a methodological alternative in research in physical education, sport, and physical activity. Conceptualization and application. *Digital Challenges* 2019; 35:422–427. <http://doi.org/10.47197/retos.v0i35.60168>.
4. Patton MQ. Qualitative research & evaluation methods: Integrating theory and practice. 4th ed. The Angels. SAGE Publications; 2015.
5. Stake, RE Multiple case study analysis. The Guilford Press, New York, NY, 2006.
6. Glaser, BG, & Strauss, AL The discovery of grounded theory: Strategies for qualitative research. Aldine Transaction, New Brunswick, NJ, 1968.

7. Stake RE. The case study method in social inquiry. *Educ Res.* 1978; 7:5-8. <https://doi.org/10.3102/0013189X007002005>.
8. Yin, RK Case study research design and methods (1st ed.). Sage Publications, Beverly Hills, CA, 1984.
9. Eisenhardt KM. Building theories from case study research. *Acad Manage Rev.* 1989; 14(4): 532-50. <https://doi.org/10.2307/258557>.
10. Merriam, SB Qualitative research and case study applications in education. Jossey-Bass, San Francisco, CA, 1998.
11. Finlay, L., & Gough, B. Reflexivity: A practical guide for researchers in health and social sciences. Wiley-Blackwell, Chichester, England, 2008.
12. Flyvbjerg B. Five misunderstandings about case-study research. *Qual Inq.* 2006; 12 (2): 219-45. <https://doi.org/10.1177/1077800405284363>.
13. Creswell, JW Qualitative inquiry and research design: Choosing among five approaches (2nd ed.). SAGE Publications, Thousand Oaks, CA, 2007.
14. Thomas G. A typology for the case study in social science following a review of definition, discourse, and structure. *Qual Inq.* 2011; 17(6): 511–521. <https://doi.org/10.1177/1077800411409884>
15. Baxter P, Jack S. Qualitative case study methodology: Study design and implementation for novice researchers. *Qual Rep.* 2008; 13(4): 544-559. <https://doi.org/10.46743/2160-3715/2008.1573>.
16. Yin, RK Case study research design and methods (4th ed.). Sage Publications, Beverly Hills, CA, 2009.
17. Creswell, JW, & Poth, CN Qualitative inquiry and research design: Choosing among five approaches (4th ed.). SAGE Publications, Thousand Oaks, CA, 2018.
18. Reeves, S., Kuper, A., & Hodges, BD Qualitative research methodologies: ethnography. *BMJ.* 2008; 337: a1020. <https://doi.org/10.1136/bmj.a1020>.
19. Kemmis, S., & McTaggart, R. Participatory action research: Communicative action and the public sphere. Sage Publications, London, UK, 2005.
20. Stringer, ET Action research. Sage Publications, Los Angeles, CA, 2013.
21. Smith, J.A., Flowers, P., & Larkin, M. Interpretative Phenomenological Analysis: Theory, Method and Research. Sage Publications, London, UK, 2009.
22. Creswell, JW, & Poth, CN Qualitative inquiry and research design: Choosing among five approaches (3rd ed.). SAGE Publications, Thousand Oaks, CA, 2009.
23. Charmaz, K. Constructing grounded theory. SAGE Publications, Thousand Oaks, CA, 2014.
24. Glaser, BG, & Strauss, AL Discovery of grounded theory: Strategies for qualitative research. Routledge, London, UK, 2017.
25. Ragin, C.. "Casing" and the process of social inquiry. In CC Ragin & HS Becker (Eds.) What is a case? Exploring the foundations of social inquiry. Cambridge University Press. 1992. p. 217-226.
26. Denscombe, M. The good research guide: For small-scale social research projects (4th ed.). Open University Press, Maidenhead, UK, 2010.
27. Silverman, D. Qualitative research (4th ed.). SAGE Publications, Thousand Oaks, CA, 2016.
28. Seawright, J., & Gerring, J. Case selection techniques in case study research: A menu of qualitative and quantitative options. *Political Research Quarterly.* 2008; 61(2): 294-30. <https://doi.org/10.1177/1065912907313077>.
29. Eisner, EW The enlightened eye: Qualitative inquiry and the enhancement of educational practice. Macmillan Publishing Company. New York, NY, 1991.
30. Maxwell, JA Qualitative research design: An interactive approach (3rd ed.). SAGE Publications. Thousand Oaks, CA, 2012.
31. Guba, EG, & Lincoln, YS Fourth generation evaluation. SAGE Publications. Thousand Oaks, CA, 1989.
32. Tracy, SJ Qualitative quality: Eight "big-tent" criteria for excellent qualitative research. *Qualitative Inquiry.* 2010; 16(10): 837-851. <https://doi.org/10.1177/1077800410383121>
33. Smith, JA, & Osborn, M. Interpretative phenomenological analysis. In JA Smith (Ed.), *Qualitative psychology: A practical guide to research methods* (2nd ed.). SAGE Publications. 2008. p. 53-80. <http://dx.doi.org/10.1002/9780470776278.ch10>
34. Shenton, AK Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information.* 2004; 22 (2): 63-75. <http://doi.org/10.3233/EFI-2004-22201>

35. Morse, JM "Designing funded qualitative research." In NK Denzin & YS Lincoln (Eds.), Handbook of qualitative research, pp. 220-235. SAGE Publications. Thousand Oaks, CA, 1994.
36. Malterud, K. Qualitative research: Standards, challenges, and guidelines. The Lancet. 2001; 358 (9280), 483-488. [https://doi.org/10.1016/S0140-6736\(01\)05627-6](https://doi.org/10.1016/S0140-6736(01)05627-6).
37. Donmoyer, R. Generalizability and the single-case study. In R. Gomm, M. Hammersley, & P. Foster (Eds.), Case study methods. SAGE Publications. 2000. p. 45-68. <https://doi.org/10.4135/9780857024367>.
38. Neale, J., Allen, D., & Coombes, L. Qualitative research methods within the addictions. Addiction. 2005; 100 (11): 1584-1593. <https://doi.org/10.1111/j.1360-0443.2005.01230.x>.
39. Noble, H., & Smith, J. Issues of validity and reliability in qualitative research. Evidence-Based Nursing. 2015; 18(2): 34-35. <https://doi.org/https://doi.org/10.1136/eb-2015-102054>.
40. Creswell, JW, & Miller, DL Determining validity in qualitative inquiry. Theory Into Practice. 2000; 39(3): 124-130. https://doi.org/10.1207/s15430421tip3903_2.
41. Lombard, M., Snyder-Duch, J., & Bracken, C. Content analysis in mass communication: Assessment and reporting of intercoder reliability. Human Communication Research. 2002; 28 (4): 587-604. <https://doi.org/10.1111/j.1468-2958.2002.tb00826.x>.
42. Merriam, SB Qualitative research: A guide to design and implementation (3rd ed.). Jossey-Bass. San Francisco, CA, 2009.
43. Miles, MB, & Huberman, AM Qualitative data analysis: An expanded sourcebook (2nd ed.). SAGE Publications. Thousand Oaks, CA, 1994.
44. Bazeley, P., & Jackson, K. Qualitative data analysis with NVivo. SAGE Publications. Thousand Oaks, CA, 2013.
45. Sandelowski, M. Combining qualitative and quantitative sampling, data collection, and analysis techniques in mixed-method studies. Research in Nursing & Health. 2000; 23 (3): 246-255. [https://doi.org/10.1002/1098-240X\(200006\)23:3%3C246::AID-NUR9%3E3.0.CO;2-H](https://doi.org/10.1002/1098-240X(200006)23:3%3C246::AID-NUR9%3E3.0.CO;2-H).
46. Guba, EG, & Lincoln, YS Competing paradigms in qualitative research. In NK Denzin & YS Lincoln (Eds.), Handbook of Qualitative Research, 2 (2): 105-117. SAGE Publications. Thousand Oaks, CA, 1994.
47. Creswell, JW Research design: Qualitative, quantitative, and mixed methods approaches. Sage Publications. Thousand Oaks, CA, 2013.
48. Merriam, SB, & Tisdell, EJ Qualitative research: A guide to design and implementation. Jossey-Bass. San Francisco, CA, 2015.
49. Stake, RE "Qualitative case studies." In NK Denzin & YS Lincoln (Eds.), pp. 435-454. Sage Publications. Thousand Oaks, CA, 2005.
50. Corbin, J., & Strauss, A. Basics of qualitative research: Techniques and procedures for developing grounded theory (3rd ed.). SAGE Publications. 2008. <https://doi.org/10.4135/9781452230153>.
51. Morse, JM Critical analysis of strategies for determining rigor in qualitative inquiry. Qualitative Health Research. 2015; 25 (9): 1212-1222. <https://doi.org/10.1177/1049732315588501>.
52. Alvesson, M., & Sköldbberg, K. Reflexive methodology: New views for qualitative research (2nd ed.). SAGE Publications. 2009.
53. Phillips J, Wiesbauer F. The flipped classroom in medical education: A new standard in teaching. Trends in Anaesthesia and Critical Care. 2022;42:4-8. <https://doi.org/10.1016/j.tacc.2022.01.001>.
54. Lee W, Choi S, Kim S, Min A. A Case-Centered Approach to Nursing Ethics Education: A Qualitative Study. Int J Environ Res Public Health. 2020;17(21):7748. <https://doi.org/10.3390/ijerph17217748>.
55. Buchanan, JA Use of simulation technology in dental education. Journal of Dental Education. 2001; 65 (11): 1225-1231. <https://doi.org/10.1002/j.0022-0337.2001.65.11.tb03481.x>.
56. Turesson C, Lindh Falk A. Learning occupational therapy practice using standardized patients in a practical examination - experiences of students and teachers. Scand J Occup Ther. 2023; 30(4):425-434. <https://doi.org/10.1080/11038128.2021.1974549>.

