

A SIMULAÇÃO NO ENSINO DE ENFERMAGEM: UMA ANÁLISE CONCEITUAL

SIMULATION IN NURSING TEACHING: A CONCEPTUAL ANALYSIS

SIMULACIÓN EN EDUCACIÓN DE ENFERMERÍA: UN ANÁLISIS CONCEPTUAL

Raphael Raniere de Oliveira Costa¹, Soraya Maria de Medeiros², José Carlos Amado Martins³, Bertha Cruz Enders⁴, Ana Luisa Brandão de Carvalho Lira⁵, Marília Souto de Araújo⁶

RESUMO

Objetivo: analisar o conceito simulação no ensino de enfermagem. **Método:** trata-se de uma análise de conceito, seguindo o método de Walker e Avant, na qual foi realizada uma revisão integrativa da literatura nas bases de dados *Scientific Electronic Library Online*, Base de Dados de Enfermagem e Literatura Latino-americana e do Caribe em Ciências da Saúde (LILACS). Amostra final foi de 17 estudos. **Resultados:** O conceito elaborado para simulação no ensino de enfermagem foi: uma estratégia de ensino que utiliza-se de tecnologias, replicando cenários simulando a prática, em ambiente controlado e realista, onde o estudante participa ativamente do processo de ensino e aprendizagem, almejando praticar exaustivamente, aprender, refletir e avaliar produtos e processos. **Conclusão:** os achados auxiliam na construção de instrumentos de pesquisas e a compreensão na área de investigação do fenômeno estudado.

Descritores: Simulação; Ensino de enfermagem; Formação de conceito.

ABSTRACT

Objective: to analyze the concept of simulation in nursing teaching. **Method:** this is a concept analysis, following the Walker and Avant method, in which an integrative review of the literature was carried out in the databases *Scientific Electronic Library Online*, *Database of Nursing and Latin American and Caribbean Literature in Health Sciences (LILACS)*. Final sample was from 17 studies.

Results: The concept developed for simulation in nursing teaching was: a teaching strategy that uses technologies replicating scenarios simulating the practice, in a controlled and realistic environment, where the student participates actively in the teaching and learning process, aiming to practice comprehensively, to learn, reflect and evaluate products and processes. **Conclusion:** the findings help in the construction of research instruments and the understanding in the research area of the phenomenon studied.

Descriptors: Simulation; Education, nursing; Concept formation.

RESUMEN

Objetivo: analizar el concepto simulación en la educación de enfermería. **Método:** se trata de un análisis de concepto, siguiendo el método de Walker y Avant, en la que se llevó a cabo una revisión integradora de la literatura en las bases de datos *Scientific Electronic Library*, Base de Datos de Enfermería y Literatura Latinoamericana y de Caribe en Ciencias de la Salud (LILACS). La muestra final fue de 17 estudios. **Resultados:** el concepto desarrollado para la simulación en la educación de enfermería fue: una estrategia de enseñanza que utiliza la tecnología replicando escenarios con simulación de la práctica, en un entorno controlado, realista, donde el estudiante participa activamente del proceso de enseñanza y aprendizaje, con el objetivo de practicar ampliamente, el aprendizaje, reflexionar y evaluar los productos y procesos. **Conclusión:** los resultados ayudan a construir instrumentos de investigación y conocimiento en el campo de la investigación del fenómeno estudiado.

Descriptorios: Simulación; Educación en enfermería; Formación de concepto.

¹Graduado em Enfermagem. Doutor em Enfermagem pela Universidade Federal do Rio Grande do Norte. Docente da Escola Multicampi de Ciências Médicas do Rio Grande do Norte - UFRN. ²Graduada em Enfermagem. Doutora em Enfermagem pela Universidade de São Paulo de Ribeirão Preto. Docente do Departamento de Enfermagem da Universidade Federal do Rio Grande do Norte - UFRN. ³Graduado em Enfermagem. Doutor em Ciências de Enfermagem pela Universidade do Porto/Portugal. Professor Coordenador na Escola Superior de Enfermagem de Coimbra /Portugal - ESEnC. ⁴Graduada em Enfermagem. Doutora em Enfermagem pela Texas Womans University/Dallas/USA. Professora Titular do Departamento de Enfermagem da Universidade Federal do Rio Grande do Norte - UFRN. ⁵Graduada em Enfermagem. Doutora em Enfermagem. Docente do Departamento de Enfermagem da Universidade Federal do Rio Grande do Norte - UFRN. ⁶Graduada em Enfermagem. Mestranda do Programa de Pós-Graduação em Enfermagem da Universidade Federal do Rio Grande do Norte - UFRN.

Como citar este artigo:

Costa RRO, Medeiros SM, Martins JCA, et al. Simulation in nursing teaching: A Conceptual Analysis. *Revista de Enfermagem do Centro-Oeste Mineiro*. 2018;8:e1928. [Access _____]; Available in: _____. DOI: <http://dx.doi.org/10.19175/recom.v7i0.1928>

INTRODUCTION

Although incipient in many countries, the simulation is an expanding strategy in the context of the training of future nursing professionals. Its use runs through the idea of a more complex training that meets the needs of today's increasingly demanding labor market⁽¹⁾. Among the demands of the labor market in nursing, there is the quality of care⁽²⁾.

In nursing education, simulation is a strategy that has been gaining adherents. From 2010, there is an expansion in studies related to this strategy. Countries such as the United States, Australia, and the United Kingdom have been prominent in the production of knowledge about this phenomenon⁽¹⁾.

It is valid to consider that this strategy has been used in several Nursing teaching contexts. A review of the literature pointed out its use in undergraduate and postgraduate studies and also in permanent and continuing education⁽¹⁾. In Brazil, it is possible to identify its use also at the middle level, in the training of nursing technicians⁽³⁾.

Simulation is a strategy used in several areas of knowledge. Its use has been reported in distinct areas such as in aviation (the pioneers of realistic simulation), in law and in different disciplines of health and nursing. When considering the wide use and applicability of simulation in Nursing teaching, it is perceived a variety of concepts used to characterize this strategy. Simulation, clinical simulation, realistic simulation and simulation in health are some nomenclatures that have been referenced in the literature.

Because it is a strategy coming from other areas of knowledge and, when considering the recent character of its application in nursing teaching, it is valid to understand the use of the concept of simulation in the context of Nursing teaching.

In the context of the production of Nursing knowledge, when clarifying a concept that is still vague, it can be contributed to the construction of affirmations or hypotheses that allow a precise reflection on the relationship between concepts and construction and analysis of theories. Also, the construction of self-knowledge is of fundamental relevance for the maintenance and reaffirmation of Nursing as a science⁽⁴⁾.

Thus, identifying the elements of the concept under analysis is an important step in this process of knowledge construction. For the data collection, the following guiding question was constructed: how

does the literature characterize the simulation concept applied to nursing teaching? Thus, the objective of this study was to analyze the simulation concept in nursing teaching.

METHODS

This is a conceptual study based on the method of analysis proposed by Walker and Avant⁽⁴⁾. The authors point out eight steps for the conceptual analysis:

1 - Selection of the concept: the selection of the concept is a step that must be done carefully. It is important to choose concepts that are little explored in some areas of knowledge and also reflect in the interest of the researcher⁽⁴⁾.

2 - Determination of the objectives of the analysis: it is a step that must be decided by the researcher. There are different objectives that can be considered from the analysis, such as clarifying the meaning of an existing concept, developing an operational definition, developing a research tool, among others⁽⁴⁾.

3 - Identification of possible uses of the concept: Using several sources of search and knowledge, this step aims to understand the nature of the concept. This identification is not limited to specific literatures (such as nursing or medical). Also, this literature review helps to understand or validate the final choice of attributes and provides evidence for the analysis⁽⁴⁾.

4 - Identification of attributes: determining the attributes of defining a concept is a fundamental step of concept analysis. In this step, the effort is to show the set of attributes that are most often associated with the concept⁽⁴⁾.

5 - Identification of a model case: a model case is a way of exemplifying the use of the concept. This case demonstrates all the attributes of definition of the concept, they can be real, found in the literature or created by the author⁽⁴⁾.

6 - Identification of additional cases: the additional cases are cases that are not exactly the same as the concept⁽⁴⁾.

7 - Identification of antecedents and consequents: antecedents are the events that must occur before the occurrence of the concept. The consequents are the results of the concept⁽⁴⁾.

For the construction of this analysis, an integrative review of the literature was carried out. For the review, the following steps were used: identification of the research question and purpose of the study, literature search, data evaluation, data analysis and presentation^(5,6).

For the selection of the articles, there was a search in the databases Scientific Electronic Library Online (SciELO), Database of Nursing (BDENF) and Latin American and Caribbean Literature in Health Sciences (LILACS), using Descriptors in Health Sciences (DeCS) and Medical Subject Headings (MeSH), respectively: simulation, teaching, nursing education (simulation, teaching, and nursing education). The search of the studies published from 2010 to 2015 was carried out in January 2016.

The following inclusion criteria were used: articles in Portuguese, Spanish or English; free and available texts that address the simulation in nursing education (undergraduate, secondary and/or postgraduate). Articles with title or abstract that did not associate the word "simulation" with nursing teaching - because it is

an analysis of the concept in the context of nursing - editorials, theses, and dissertations were excluded.

For the identification of attributes, antecedents, and consequents, some guiding questions were created: attributes: How is the concept of simulation defined in nursing teaching? What are the particularities that the concept under analysis presents? Background: What events contribute to the proximity and existence of the concept of simulation in nursing teaching? Consequents: What resulted after applying the concept of simulation in nursing teaching?

For the analysis of the material a thorough search and reading of the analyzed material was carried out. Figure 1 summarizes the search process and the number of articles selected according to each database searched.

Figure 1 – Process of search of the studies and final selection. Natal, 2016.

Database	Crossing	Number of articles from the crossing	Application of the inclusion criteria	Partial sample	Final sample
SCIELO	(simulation) AND (teaching) AND (education, nursing)	15	5	6	17
	(simulation AND (teaching) AND (nursing education)	5	1		
LILACS	(simulation) AND (teaching) AND (nursing education)	27	10	10	
BDENF	(simulation) AND (teaching) AND (nursing education)	19	1	1	

Source: The author (2016).

After searching the manuscripts, the data was organized into spreadsheets in Excel. The spreadsheets were organized from the coding of the included articles, attributes, antecedents and consequent and the contents were analyzed from the content analysis of Bardin⁽⁷⁾.

RESULTS AND DISCUSSION

The analyzed studies were published between 2010 and 2015, with the highest frequency in 2011 (29%) and in 2015, (29%), corresponding to 58% of the sample. Regarding the origin of the manuscript, most manuscripts are from Brazil (76%), followed by Portugal (12%), Mexico (6%) and the United States (6%).

Also, most of the studies reported the use of simulation at undergraduate level in nursing (82%). Only 12% of the manuscripts referred to the use of this tool in the middle level and 6% in the postgraduate in nursing.

Identification of possible uses of the concept

The literature review allowed identifying that the concept of simulation in nursing teaching is used in several areas of knowledge of this discipline. The variety of understanding and definition is emphasized. However, other studies included in the literature review did not clarify the concept or definition employed. In Figure 2, some definitions of the analyzed concept are presented.

Figure 2 - Presentation of definitions of the concept of simulation in nursing teaching present in the literature. Natal, 2016.

Reference	Definition
Santos MC, Milk MCL, Heck RM. The possibility of acupuncture contribution in the teaching of clinical simulation in nursing. Rev. Gaúcha Enferm. (Online). 2011; 32 (1): 185-188.	"A protected space that simulates scenarios of the practice of health care for small groups of nursing students, where students perform care in simulated patients, perform procedures on mannequins and/or dolls, among other problematizing and clinical pedagogical activities"
Santos MC, Milk MCL. The evaluation of learning in the practice of nursing simulation as teaching feedback. Rev. Gaúcha Enferm. (Online). 2010; 31 (3): 552-556.	"Protected spaces that simulate scenarios of the practice of healthcare. The students perform care in simulated patients, perform procedures on mannequins and/or dolls and are monitored by a teacher-facilitator who evaluates the performance of the skills aimed at the profile of the professional to be formed"
Smithburger PL, et al. <i>Advancing interprofessional education through the use of high fidelity human patient simulators. Pharmacy Practice (Internet)</i> . 2013; 11(2):61-65.	"Activity or event that replicates the practice"
Costa RROC, et al. The use of simulation in the context of education and training in health and nursing: an academic reflection. Revista Espaço para a Saúde. 2015; 16(1): 59-65.	"A methodology that reproduces real situations allowing the student an active role in acquiring the concepts needed to understand and solve the problem, while the teacher adopts a posture as a leader or facilitator"
Salvador PT, et al. Technology in nursing teaching. Revista Baiana de Enfermagem Salvador. 2015; 29(1): 33-41.	"A unique technological tool for the qualification of nurses' education, especially in aspects related to clinical situations, which both involve risks to human beings while they do not have a certainty of experience for the students"
Barreto DG, et al. Realistic simulation as a teaching strategy for undergraduate nursing course: integrative review. Revista Baiana de Enfermagem, Salvador. 2014; 28(2): 208-214.	"Technique or a technology and focuses on the recreation of real-life situations. It aims to enable students to perform hands-on or acquire skills in a safe environment"
Silveira RCP, Robazzi MLCC. Models and innovations in nursing teaching laboratories. R. Enferm. Cent. O. Min. 2011; 1(4):592-602.	"Technique in which a simulator is used, in which the simulator is an object or partial or total representation of a task to be replicated"
Sanino GEC. The use of simulation in nursing in the Nursing Technical Course. J. Health Inform. 2012 Dezembro; 4 (Número Especial - SIENF 2012): 148-51.	"Technique, not technology, to replace or extend actual experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive way"

Source: The author (2017).

The simulation in nursing teaching is used in different areas of knowledge and in different levels of training. The fundamental nursing⁽⁸⁻⁹⁾, clinical nursing⁽²⁻¹⁰⁻¹¹⁻¹²⁻¹³⁻¹⁴⁾, teaching of nursing techniques and procedures^(2-8-11-15- 16-17) and first aid⁽³⁾ are highlighted among the areas of training.

The concepts presented reflect some convergences and divergences. The convergences surround the simulation design as a learning trigger that uses a space that simulates practice scenario⁽⁹⁻¹⁰⁻¹¹⁻¹³⁻¹⁸⁻¹⁹⁾. Also, these spaces allow for errors without risking patient health, enhancing the safety and enhancement of their clinical skills⁽¹¹⁻¹⁵⁻²⁰⁾.

The divergences point to a disagreement between the conceptions of technique^(3,9,20), technology⁽²⁰⁾, methodology⁽⁸⁾, strategy⁽¹⁴⁾, activity⁽¹⁶⁾ and tool^(1,3,18,21). From this identification, the extraction of the set of attributes most often associated with the concept was held.

Attributes

The identified attributes were space that simulates the practice; realism; use of

mannequins; feedback; repetition; technic or technology; controlled environment; active participation of the student; practice; learn; evaluate; technological tool^(2, 3, 8, 9, 10-19, 21, 22).

The nursing laboratory is a space commonly used for simulations⁽⁹⁾. Low-technology simulators, standard patients, desktop-based simulators, complex task simulators, and patient simulators are some of the features that can be used in simulations⁽²³⁾. Realism is directly related to the choices of tools, mannequins and the scenario constructed for the simulation⁽²⁴⁾.

As a technique, the simulation is divided into different stages: informative session, introduction to the environment, informative meeting about the simulator, theory entry, informative meeting about the scenario, simulation session, and debriefing⁽²⁴⁾. In these steps, the student is inserted into scenarios that he or she can find in actual practice, is familiar with the resources available, practices and solves

problem situations and reflects on their performance.

The control of the environment allows the student to train and acquire skills considering the errors without compromising patient safety⁽³⁾. In this process of teaching and learning, it is considered the use of active teaching methodologies, where the student becomes the protagonist of learning⁽²⁵⁾.

The debriefing, moment of the post-experience reflection, is a stage in which all the students can discuss about the scene experienced. At that time, students have the opportunity to explore the scenarios they have experienced, helping them to consolidate the information they have gained, identify and reflect on the areas in which they can improve⁽²⁶⁾.

Identification of additional cases

Model case

After the dialogue about immunization of adults, a group of students is gathered in a space that replicates the vaccine room of a health unit. The space features a refrigerator with replicas of immunobiological, thermal boxes, gloves, syringes, record books, vaccine card and other materials that are commonly found in adult vaccinations. Students thoroughly train the timing of the vaccine record, from hypothetical cases;

apply doses in low technology simulators and have a tutor to get any doubts during this process. After learning the techniques and procedures, students are invited to solve a case proposed by the tutor. In the situation, the students solve the case, reflect on their performance in the scenario and evaluate the moment, their resourcefulness in consolidating the studied content and the experience that will lead to the real practice.

Contrary case

After the discussion on adult immunization, a group of students is directed to review the content provided by the tutor. After reviewing the content that was given in the classroom, students are invited to go to the internship to make applications of doses of immunobiological in the health unit and consolidate the studied content.

Background and Consequences of the Simulation Concept

When identifying the uses of the concept of simulation applied to nursing teaching, the antecedents and consequents of the analyzed concept were extracted. Figure 3 summarizes the findings from the literature review.

Figure 3 - Background and consequents of the concept of simulation in nursing teaching identified in the literature. Natal, 2016.

Simulation in nursing teaching	
Antecedents	Differentiated training; patient safety; scientific evidence; gaps in training; ethical and legal precepts; planning; innovative strategies; active methodologies; nursing education; meaningful learning; nursing laboratory; experiential learning.
Consequents	Development of skills and abilities; critical and reflective thinking; self-confidence; clinical experiences; self-efficacy; minimization of errors; excellence training; motivation and self-esteem; interdisciplinarity; student performance improvement; theoretical-practical dialogue; trouble solving; autonomy; independence; decision making; affective, cognitive and psychomotor evaluation; skills training; student satisfaction; active learning; decreased fear.

Source: The author (2017).

In the current context, as a pedagogical strategy, simulation has been referenced in the development of skills and abilities in nursing students⁽²⁷⁾. In this perspective, several studies have shown the contribution and comprehensiveness of the simulation in nursing teaching.

Regarding the possibility of replicating scenarios that reproduce the practice allows nursing students to expand their possibilities of experiencing their future contexts of action. These experiences may be important and encourage meaningful learning⁽¹⁸⁾.

The realism of the scenarios reproduced will depend on the resources available in nursing schools. Besides the structural issues, it is important to have a qualified technical team and teachers with knowledge about the technique and the stages of the simulation⁽²⁴⁾.

Simulation of low-technology simulators, standard patients, desktop-based simulators, complex task simulators and patient simulators are some of the features that can be used in simulations⁽²³⁾. Depending on the objective outlined, the teachers and the team responsible for the format and composition of these

scenarios select and enable the necessary equipment for the execution of the simulation.

It is important to emphasize that one of the changes in nursing education is the emphasis on the development of the critical spirit, the ability to analyze, evaluate, question, investigate, diverge, argue and experiment⁽²⁷⁾. These changes aim to respond to changes in the world of work today and the demands of the health sector⁽¹⁷⁾. Also, issues such as patient safety, the new training requirements of health professionals, ethical and legal issues and the diversity of technologies contribute to the development of the abovementioned capacities⁽²⁾.

Regarding the results of the use of simulation in nursing education, the literature has evidenced significant contributions in the teaching and learning process. A survey conducted at the University of Pittsburgh in the United States found that students who attended simulation sessions achieved improvements in critical thinking skills throughout the nursing course⁽²⁹⁾.

Another study from South Africa found that students perceive simulation with standard patients as a tool that fills the gap between theory and practice and can apply the acquired theoretical knowledge from the simulation. In addition, the study identified that the students identify their own potentialities and fragilities from the reflection of the scenarios experienced⁽³⁰⁾.

In Brazil, a survey conducted in 2014 also showed that the simulation is a strategy that generates satisfaction among students. In the same research, it was also observed that the simulation provides a previous experience of the practice, that this tool allows to think critically and to reflect on the practice and contributes to relate theory to practice⁽³¹⁾.

When considering the scope and use of simulation in nursing teaching, as well as its recent insertion and diffusion in the training of nursing professionals, it is important to know the concepts and characteristics attributed to the phenomenon analyzed.

From this perspective, it is necessary to clarify concepts that can contribute to nursing teaching and, consequently, to practice since the identification of the elements of a concept can be fundamental for the organization of knowledge and, therefore, facilitate its applicability in care settings⁽³²⁾.

Also, the continuous analysis of concepts from other disciplines and that are incorporated by nursing is a relevant condition to understand the phenomenon, its applicability and particularity in nursing and, consequently, to establish its specific field⁽³²⁾.

Definition

Based on the analysis performed, simulation in nursing teaching is identified as a teaching technique that uses technologies to replicate scenarios that simulate the practice, in a controlled and realistic environment, where the student participates actively in the teaching and learning process with the purpose of practicing comprehensively, learning, reflecting and evaluating products and processes.

CONCLUSION

The conceptual analysis identified the concept of simulation in nursing teaching. From an integrative review of the literature, it was identified that the attributes, antecedents, and consequents were the most pointed in the literature. From this analysis, it was possible to identify that the concept studied involves space that simulates the practice; realism; use of mannequins; feedback; repetition; technic or technology; controlled environment; active participation of the student; practice; learn; evaluate; technological tool. From the analysis of these attributes, a definition was created.

As a limitation of the study, the small number of international studies is considered. Also, studies were available in only three databases. Further research is recommended using other descriptors and databases. Despite these limitations, the research brought important contributions from the identification of attributes, antecedents, and consequents.

Also, because it is derived from other areas of knowledge, the study may provide support for better understanding, application, and use of simulation as a teaching technique and teaching tool in the context of Nursing teaching. Thus, this expanded understanding may contribute to the improvement of teaching and learning processes, reflecting in a better professional qualification. In addition, clarification of this concept may facilitate the development of research tools in the research area of the phenomenon studied for the organization of knowledge in this area of research, for the construction of nursing statements, affirmations and theories of Nursing.

REFERENCES

1. Jorge BM, Almeida RGS, Souza Junior VD. Tendências atuais na investigação em simulação. In: Martins JCA. A simulação no ensino de enfermagem. Coimbra: Unidade de Investigação em Ciências da Saúde: Enfermagem, Escola Superior de Enfermagem de Coimbra; 2014. p. 259-276.
2. Martins JCA, Mazzo A, Baptista RCN, Coutinho VRD, Godoy S, Mendes IAC, et al. A experiência clínica simulada no ensino de enfermagem: retrospectiva histórica. *Acta Paul Enferm.* 2012;25(4):619-25. DOI: [10.1590/S0103-21002012000400022](https://doi.org/10.1590/S0103-21002012000400022)
3. Sanino GEC. O uso da simulação em enfermagem no Curso Técnico de Enfermagem. *J Health Inform.* 2012;4(nesp):148-51. Available in: <http://www.jhi-sbis.saude.ws/ojs-jhi/index.php/jhi-sbis/article/view/247>
4. Walker L, Avant KC. Concept analysis. In: Walker L, Avant KC. *Strategies for theory construction in nursing.* 5th ed. Prentice Hall; 2011. p. 35-50.
5. Whittemore R, Knafk K. Methodological issues in nursing research the integrative review: Updated methodology. *J Adv Nursing.* 2005 Dec;52(5):546-53. DOI: [10.1111/j.1365-2648.2005.03621.x](https://doi.org/10.1111/j.1365-2648.2005.03621.x)
6. Whittemore R. Combining evidence in nursing research: methods and implications. *Nurs Res.* 2005 Jan/Feb;54(1):56-62. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/15695940>
7. Bardin L. *Análise de conteúdo.* Lisboa: Edições 70; 1977.
8. Oliveira SNO, Prado ML, Kempfer SS. Utilização da simulação no ensino da enfermagem: Revisão integrativa. *Rev Min Enferm.* 2014 abr/jun;18(2):487-95. DOI: [10.5935/1415-2762.20140036](https://doi.org/10.5935/1415-2762.20140036)
9. Silveira RCP, Robazzi MLCC. Modelos e inovações em laboratórios de ensino em enfermagem. *R Enferm Cent O Min.* 2011 out/dez;1(4):592-602. DOI: [10.19175/recom.v0i0.138](https://doi.org/10.19175/recom.v0i0.138)
10. Santos MC, Leite MCL, Heck RM. A possibilidade de contribuição da acupuntura no ensino da simulação clínica em enfermagem. *Rev Gaúcha Enferm.* 2011 mar;32(1):185-8. DOI: [10.1590/S1983-14472011000100024](https://doi.org/10.1590/S1983-14472011000100024)
11. Marmol MT, Braga FTMM, Garbiri LM, Moreli L, Santos CB dos, Carvalho EC de. Curativo de cateter central em simulador: Efeito da presença do tutor ou da aprendizagem autoinstrucional. *Rev Latino-Am Enfermagem* 2012;20(6):1134-1141. DOI: [10.5935/1415-2762.20140036](https://doi.org/10.5935/1415-2762.20140036)
12. Alvarez AG, Dal Sasso GTM. Aplicação de objeto virtual de aprendizagem, para avaliação simulada de dor aguda, em estudantes de enfermagem. *Rev Latino-Am Enfermagem* 2011 mar/abr;19(2): 229-37. Available in: http://www.scielo.br/pdf/rlae/v19n2/pt_02
13. Salvador PT, Martins CCF, Alves KYA, Pereira MS, Tourinho FSV. Tecnologia no ensino de enfermagem. *Ver Baiana Enfermagem* 2015 jan/mar;29(1):33-41. DOI: [10.18471/rbe.v29i1.9883](https://doi.org/10.18471/rbe.v29i1.9883)
14. Pina-Jimenez I, Amador-Aguilar R. La enseñanza de la enfermería con simuladores, consideraciones teórico-pedagógicas para perfilar un modelo didáctico. *Enferm Univ.* 2015 jul/set;12(3):152-9. DOI: [10.1016/j.reu.2015.04.007](https://doi.org/10.1016/j.reu.2015.04.007)
15. Goes FSN, Fonseca LMM, Camargo RAA de, Hara CYN, Gobbi JD, Stabile AM. Elaboração de um ambiente digital de aprendizagem na educação profissionalizante em enfermagem. *Cienc Enferm.* 2015 abr;21(1):81-90. DOI: [10.4067/S0717-95532015000100008](https://doi.org/10.4067/S0717-95532015000100008)
16. Smithburger PL, et al. Advancing interprofessional education through the use of high fidelity human patient simulators. *Pharm Pract.* 2013 Apr;11(2):61-5. Available in: <https://www.ncbi.nlm.nih.gov/pubmed/24155851>
17. Teixeira INAO, Felix JVC. Simulação como estratégia de ensino em enfermagem: revisão de literatura. *Interface* 2011 out/dez;15(39):1173-84. DOI: [10.1590/S1414-32832011005000032](https://doi.org/10.1590/S1414-32832011005000032)
18. Costa RRO, Medeiros SM de, Martins JCA, Menezes RMP, Araújo MS de. O uso da simulação no contexto da educação e formação em saúde e enfermagem: uma reflexão acadêmica. *Rev Espaço Saúde.* 2015 jan/mar;16(1):59-65. DOI: [10.22421/1517-7130.2015v16n1p59](https://doi.org/10.22421/1517-7130.2015v16n1p59)
19. Santos MC, Leite MCL. A avaliação das aprendizagens na prática da simulação em Enfermagem como feedback de ensino. *Rev Gaúcha Enferm* 2010 set;31(3): 552-6. DOI: [10.1590/S1983-14472010000300020](https://doi.org/10.1590/S1983-14472010000300020)
20. Barreto DG, et al. Simulação realística como estratégia de ensino para o curso de graduação em enfermagem: Revisão integrativa. *Rev Baiana Enferm.* 2014 maio/ago28(2):208-14. Available in: <https://portalseer.ufba.br/index.php/enfermagem/article/viewFile/8476/8874>
21. Almeida RGS, Mazzo A, Martins JCA, Pedersoli CE, Fumincelli L, Mendes IAC. Validação para a língua portuguesa da simulation design scale.

Texto Contexto - Enferm. 2015;24(4):934-40. DOI: [10.1590/0104-0707201500004570014](https://doi.org/10.1590/0104-0707201500004570014)

22. Waterkemper R, Prado ML do. Estratégias de ensino-aprendizagem em cursos de graduação em Enfermagem. Av Enferm. 2011 Jul/Dic;29(2):234-46. Available in: <http://www.bdigital.unal.edu.co/35461/1/35793-142613-1-PB.pdf>

23. Pazin FA, Scarpelini S. Simulação: Definição. Rev Medicina. 2007 abr/jun;40(2):162-6. Available in: http://revista.fmrp.usp.br/2007/vol40n2/2_simulacao_definicao.pdf

24. Araújo ALLS, Quilici AP. O que é simulação e por que simular. In: Quilici AP, Abrão KC, Timerman S, Gutierrez F (Orgs). Simulação clínica do conceito a aplicabilidade. São Paulo: Editora Atheneu, 2012. p. 1-16.

25. Baptista RCN, Martins JCA, Pereira MFCR, Mazzo A. Students' satisfaction with simulated clinical experiences: Validation of an assessment scale. Rev. Latino-Am. Enfermagem. 2014 set/out;22(5):709-715. DOI: [10.1590/0104-1169.3295.2471](https://doi.org/10.1590/0104-1169.3295.2471)

26. Arthur C, Levett-Jones T, Kable A. Quality indicators for the design and implementation of simulation experiences: A Delphi study. Nurse Educ Today 2013 Nov;33(11):1357-61. DOI: [10.1016/j.nedt.2012.07.012](https://doi.org/10.1016/j.nedt.2012.07.012).

27. Berragan L. Simulation: An effective pedagogical approach for nursing? Nurse Educ Today 2011 Oct;31(7):660-3. DOI: [10.1016/j.nedt.2011.01.019](https://doi.org/10.1016/j.nedt.2011.01.019)

28. Lima MAC, Cassiani SHB. Pensamento crítico: Um enfoque na educação de enfermagem. Rev Latino-Am Enfermagem 2000 jan;8(1):23-30. DOI: [10.1590/S0104-11692000000100004](https://doi.org/10.1590/S0104-11692000000100004)

29. Kelly SH. Evaluation methods used in simulation: a survey of faculty and student perceptions in an undergraduate nursing program [tese]. Pittsburgh (PA): School of Education the University of Pittsburgh; 2014.

30. Botma Y. Nursing student's perceptions on how immersive simulation promotes theory-practice integration. IJANS. 2014;1:1-5. DOI: [10.1016/j.ijans.2014.04.001](https://doi.org/10.1016/j.ijans.2014.04.001)

31. Costa RRO. A simulação realística como estratégia de ensino-aprendizagem em enfermagem [dissertação]. Natal (RN): Universidade Federal do Rio Grande do Norte; 2014.

32. Fernandes MGM, Nóbrega MML, Garcia TR, Macêdo-Costa KNF. Análise conceitual: Considerações metodológicas. Rev Bras Enferm.

2011 jan;64(6):1150-6. DOI: [10.1590/1413-81232017221.13522015](https://doi.org/10.1590/1413-81232017221.13522015)

Note: This work is part of the construction of the theoretical reference of the research project titled "Efficacy of realistic simulation in the teaching of immunization of adults in the context of nursing graduation", under development of the Graduate Program in Nursing, Federal University of Rio Grande do Norte - UFRN.

Received in: 20/04/2017

Approved in: 11/05/2018

Mailing address:

Raphael Raniere de Oliveira Costa

Street Pedras Grandes, 1982 - Potengi

ZIP CODE: 59.110-010 – Natal/RN - Brazil

E-mail: raphaelraniere@hotmail.com