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Development of clinical competence in nursing in simulation: the perspective of Bloom's taxonomy

Desenvolvimento de competência clínica em enfermagem na simulação: perspectiva da taxonomia de Bloom

Desarrollo de la competencia clínica en enfermería por simulación: perspectiva de la taxonomia de Bloom

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ABSTRACT

Objectives: to investigate the scientific evidence on the use of Bloom's taxonomy for developing competence in nursing professionals and students in clinical simulation. **Methods:** integrative review of the National Library of Medicine (NLM), National Institutes of Health (NIH), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Latin American and Caribbean Literature in Health Sciences (LILACS), Web of Science and SCOPUS databases, using the Rayyan application. **Results:** a total of 871 studies were identified; four composed the sample. The development of clinical competence occurred through the coordination of knowledge, skills, and attitudes. To develop the cognitive domain, the objectives of knowledge and comprehension of the Bloom's taxonomy were mobilized. The psychomotor domain required development of the skills demanded by the proposed clinical care. The affective domain was developed through will and motivation to learn. **Conclusions:** it is possible to develop clinical competence in nursing by adopting Bloom's taxonomy in each phase of clinical simulation.
Descriptors: Education, Nursing; Simulation Training; Clinical Competence; Learning; Classification.

RESUMO

Objetivos: investigar as evidências científicas existentes sobre a utilização da taxonomia de Bloom para o desenvolvimento de competência em profissionais e estudantes de enfermagem na simulação clínica. **Métodos:** revisão integrativa nas bases *National Library of Medicine* (NLM), *National Institutes of Health* (NIH), *Cumulative Index to Nursing and Allied Health Literature* (CINAHL), Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS), *Web of Science* e SCOPUS com apoio do aplicativo *Rayyan*. **Resultados:** identificaram-se 871 estudos, e quatro compuseram a amostra. O desenvolvimento de competência clínica ocorreu articulando-se conhecimentos, habilidades e atitudes. Para desenvolver o domínio cognitivo, foram mobilizados os objetivos conhecer e compreender da taxonomia de Bloom. Para contemplar o domínio psicomotor, foi necessário desenvolver as habilidades demandadas no atendimento clínico proposto. O domínio afetivo foi desenvolvido por vontade e motivação para aprender. **Conclusões:** é possível desenvolver competência clínica em enfermagem adotando a taxonomia de Bloom em cada fase da simulação.
Descritores: Educação em Enfermagem; Treinamento por Simulação; Competência Clínica; Aprendizagem; Classificação.

RESUMEN

Objetivos: investigar las evidencias científicas existentes sobre la utilización de la taxonomía de Bloom para el desarrollo de competencias en profesionales y estudiantes de enfermería usando la simulación clínica. Métodos: revisión integrativa en las bases *National Library of Medicine* (NLM), *National Institutes of Health* (NIH), *Cumulative Index to Nursing and Allied Health Literature* (CINAHL), Literatura Latinoamericana y del Caribe en Ciencias de la Salud (LILACS), *Web of Science* y SCOPUS con el apoyo del aplicativo *Rayyan*. **Resultados:** se identificaron 871 estudios, cuatro hicieron parte de la muestra. El desarrollo de competencia clínica se consiguió articulando conocimientos, habilidades y actitudes. Para desarrollar el dominio cognitivo, fueron movilizados los objetivos conocer y comprender de la taxonomía de Bloom. Para contemplar el dominio psicomotor, fue necesario desarrollar las habilidades determinadas en la atención clínica propuesta. El dominio afectivo fue desarrollado por el deseo y motivación para aprender. **Conclusiones:** es posible desarrollar competencia clínica en enfermería adoptando la taxonomía de Bloom en cada etapa de la simulación.
Descriptores: Educación en Enfermería; Entrenamiento Simulado; Competencia Clínica; Aprendizaje; Clasificación.

INTRODUCTION

In the process of teaching and learning in nursing, some tasks are easier to accomplish than others, and the mechanism chosen to facilitate them is the key to overcoming this challenge[1]. Thus, the nursing professor should become a mentor, and not only a knowledge provider[2-3].

The adoption of educational methodologies that aim to reduce the distance between what is taught and what, in fact, occurs in practice, is encouraged. This can be facilitated by improving the clinical competence of nurses and nursing students[2].

The development of clinical competence is not a new theme in nursing. It has been presented under different meanings, focusing on different educational discussions, particularly in the international context. The concept and assessment mechanisms of clinical competence are the protagonists of this discussion[4].

To be competent is to have a set of knowledge, skills, and attitudes that is characteristic of the human being. When focused on the individual's education and professional experiences, to be competent is to be able to act responsibly and be recognized by others. This includes mobilizing, integrating, and transferring knowledge, resources, and skills to a certain professional context[5]. Clinical competence in nursing is knowledge supported by a combination of cognitive, psychomotor, and affective/attitudinal skills, properly applied to a given situation[4].

The Taxonomy of Educational Objectives was published in 1956, with the aim of aligning the attributes necessary for the development of competence in professionals. It was characterized by a structure of hierarchical organization of educational objectives, resulting from the work of a multidisciplinary committee of experts from different universities in the United States, led by Benjamin Samuel Bloom, and popularized as Bloom's taxonomy[1].

The classification proposed by Bloom divided learning into three major domains: cognitive, encompassing intellectual learning; psychomotor, involving the skills of performing tasks by means of the motor system; and affective, relating to aspects of awareness and gradation of values[1].

The cognitive domain is associated with learning and mastering knowledge. In this domain, the objective was grouped into six categories, presented as a hierarchy of complexity, from the simplest to the most complex. Ascending to a new category requires adequate performance in the previous one. The categories of this domain are: knowledge, comprehension, application, analysis, synthesis, and evaluation[6]. The psychomotor domain is about doing, that is, what is related to manual or physical abilities. The categories of this domain are: perception, set, guided response, mechanism, complex responses, adaptation, and organization[1]. The affective dominion is about the feeling facing an object, person, or situation, including relationships, postures, feelings, attitudes, responsibilities, and satisfaction. The categories of this process include: receptivity, response, valuing, organization, and internalization of values[1].

From this perspective, clinical simulation is an active and innovative strategy of teaching and learning, which enables the articulation of the cognitive, psychomotor, and affective domains[7]. It can be supported by Bloom's taxonomy, as a pedagogic mechanism for the development of nursing competence. Greater scientific depth is required, given the lack of studies that approach such a relationship, and the difficulty of identifying well delineated studies that explore the development of nursing competence, approaching the assessment of the triad of knowledge, skills and attitudes from a global perspective[8].

This review was motivated by the intent of understanding the development of clinical competence in nursing professionals and students during simulation, using Bloom's taxonomy, based on the articulation of cognitive, psychomotor, and affective domains and the stages of this teaching and learning strategy[9].

OBJECTIVES

To investigate the scientific evidence on the use of Bloom's taxonomy for development of competence in nursing professionals and students during clinical simulation.

METHODS

Study type

This was an integrative literature review. This method enables a comprehensive exploration of the subject of the study, and contributes to the organization of a knowledge framework for practice, based on scientific evidence in health[10].

Methodological procedures

The following steps were accomplished: identification of the subject and formulation of a guiding research question; definition of inclusion and exclusion criteria for studies; definition of information to be extracted from selected articles; evaluation of studies included in the integrative review; interpretation of results; and, presentation of the knowledge synthesis[10].

Data collection and organization

After defining the research theme, the guiding question was developed using the patient-intervention-outcomes (PIO) strategy. The correspondent to the acronym "P" was established as students and health professionals; to the "I", the use of Bloom's taxonomy in clinical simulation; and to the "O", the development of competence. The following question was raised: What evidence is available in the literature on the use of Bloom's taxonomy for the development of clinical competence in health professionals and students during clinical simulation?

Primary studies that satisfied the guiding question, published in scientific journals, electronically available were established as inclusion criteria for the sample definition. There were no limits on language or year of publication. Literature reviews, case studies, dissertations, theses, monographs, and abstracts published in event annals were excluded.

The search for studies was conducted between August and October of 2019, in the following databases: National Library of Medicine (NLM), National Institutes of Health (NIH), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Latin American and Caribbean Literature in Health Sciences (LILACS), Web of Science, and SCOPUS. In order to give more specificity and drive the search strategy exactly to the intended object of study,

the term "Bloom's Taxonomy" was used as keyword. The search strategy included limits specific to each database, and validated by a librarian; the descriptors and keywords are shown in Chart 1.

Chart 1 - Characteristics of the process for searching for studies that composed the sample of this integrative review, São Paulo, São Paulo, Brazil, 2019

Database	Descriptors and keywords	Search strategy
PubMed® and SCOPUS	MeSH "Nursing"; "Simulation Training"; "Clinical Competence"; keywords: "Bloom taxonomy"	(Nursing OR Nursings AND "Simulation Training" OR "Training, Simulation" OR "Interactive Learning" OR "Learning, Interactive" AND "Bloom taxonomy" AND "Clinical Competence" OR "Competency, Clinical" OR "Competence, Clinical" OR "Clinical Competency" OR "Clinical Competencies" OR "Competencies, Clinical" OR "Clinical Skill" OR "Skill, Clinical" OR "Skills, Clinical" OR "Clinical Skills")
CINAHL	"Students, Nursing"; Nurses; Simulations; "Clinical Competence" keywords: "Bloom Taxonomy"	"Students, Nursing" AND Nurses AND Simulations AND "Bloom Taxonomy" AND "Clinical Competence" OR "Nursing Skills"
LILACS	DeCS "Students, Nursing"; Nurses; Simulation; "Clinical Competence" keywords: "Bloom Taxonomy" and its versions in Portuguese and Spanish	"Students, Nursing" AND Nurses AND Simulation AND "Bloom taxonomy" AND "Clinical Competence" "*Estudiantes de Enfermería*" AND "*Enfermeras* y *Enfermeros*" AND *Simulación* AND "*Taxonomía de Bloom*" AND "*Competencia Clínica*" "*Estudantes de Enfermagem*" AND "*Enfermeiras e Enfermeiros*" AND *Simulação* AND "*Taxonomia de Bloom*" AND "*Competência Clínica*"
Web of Science	Nursing; "Simulation Training"; "Clinical Competence"; keywords: "Bloom Taxonomy"	TS=(Nursing AND Simulation* Training* AND Bloom* Taxonomy* AND Clinical* Competence*)

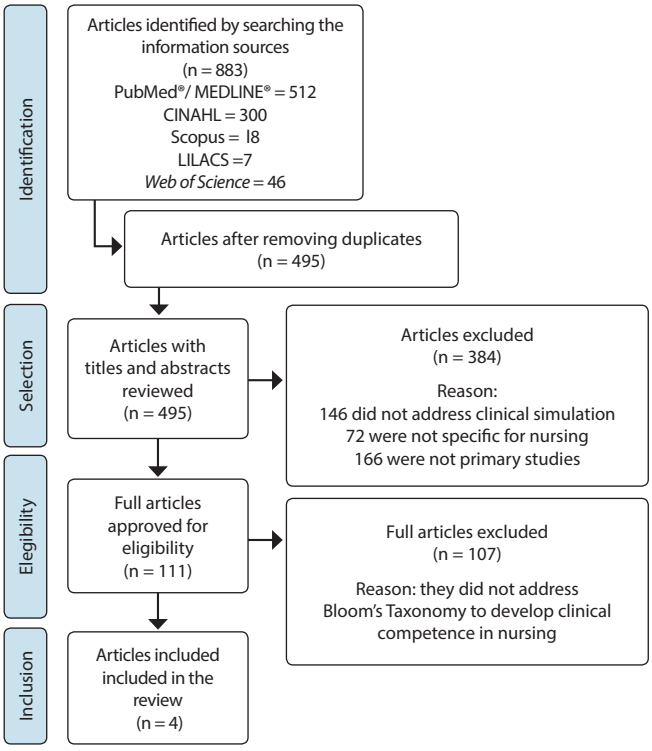
Note: MESH – Medical Subject Headings; DeCS – Health Sciences Descriptors; CINAHL – Cumulative Index to Nursing and Allied Health Literature; LILACS – Latin American and Caribbean Health Sciences Literature.

Data analysis

A total of 883 studies were identified and submitted to the first selection stage, by applying the defined inclusion and exclusion criteria. The studies were selected by two professionals, independently, who read titles and abstracts, applied the Rayyan review, which eliminates duplicate articles and facilitates triage, and used a reliable semi-automation process, which incorporates a high level of usability and effectiveness in the selection process[11].

The nine studies that generated divergence among the researchers were sent to a third individual, who evaluated the inclusion or exclusion. A complete reading of the article was completed to define the final sample. Due to the incipiency of studies that used Bloom's Taxonomy for development of competence in health professionals and students in clinical simulation, an analysis of the references of the included articles was performed. However, no new reference was added for the final analysis. Thus, of the 883 studies identified a priori, four composed the final sample.

The data collected from the articles. using a validated instrument[12], included the following items: identification of the article with title, authors, country, language, and year of publication; objectives; methodological design; results; and, classification of the level of evidence[13]. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[14] recommendations, configured by a 27-item checklist and a four-step flowchart, was adopted for this research, with the intention of improving the integrative literature review and pondering the quality of each article[14]. Therefore, the selection of studies was demonstrated according to PRISMA[14] (Figure 1).



Note: CINAHL – Cumulative Index to Nursing and Allied Health Literature; LILACS – Latin American and Caribbean Health Sciences Literature.

Figure 1 - Studies selected to compose the sample of the integrative review, according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), São Paulo, São Paulo, Brazil, 2019

RESULTS

Four primary studies were considered eligible for the final sample of this integrative review, and are presented in Chart 2.

Chart 3 demonstrates the phases of clinical simulation and the relationship with Bloom's taxonomy to develop nursing competence, by means of the distribution of each action, corresponding to the three domains of the proposed taxonomy.

Chart 2 - Characterization of the studies included in the integrative review, São Paulo, São Paulo, Brazil, 2019

Reference and language	Objectives	Method	Results/Conclusion/Level of evidence
Negri et al.[15] Portuguese	To create and validate a high-fidelity clinical simulation scenario on nursing care for patients with a colostomy, using Bloom's taxonomy.	A descriptive study on creating and establishing face and content validity of a high-fidelity clinical simulation scenario for nursing care of colostomy patients. The scenario was constructed based on Bloom's taxonomy and, after it was structured, it was tested by a group of third- and fourth-year nursing students in a clinical simulation laboratory of a public university.	The clinical simulation scenario was properly validated and was able to identify relevant contributions to adjust the simulated activity and to test the debriefing, with the support of a checklist. The results show that Bloom's taxonomy contributes to the success in the development of knowledge, skills, and attitudes in nursing. Level of evidence 6.
Founds et al.[16] English	To develop simulated high-fidelity clinical experiences for nursing students on prepartum obstetric scenarios, using Bloom's taxonomy.	A descriptive study, conducted at the University of Pittsburgh School of Nursing. A group of professors developed a protocol with several scenarios for clinical simulation using Bloom's taxonomy.	Nursing professors developed and evaluated the execution protocol for clinical simulation using Bloom's taxonomy for the development of cognitive, psychomotor, and affective skills of the students, considered elements for the development of clinical competence in nursing. It was concluded that this model can facilitate the process for other people who wish to explore simulation as an educational method in nursing. Level of evidence 6.
Simkins et al.[17] English	To develop a teaching strategy to prepare nursing students for professional practice, by means of clinical simulation using Bloom's taxonomy.	Quasi-experimental study conducted in an American nursing university with second year undergraduate students. Two groups were formed: the first participated in a simulation scenario with a patient with gastrointestinal bleeding; the second had a scenario with a patient with peritonitis.	Both groups developed clinical competence in the proposed scenarios. The students reached the highest-level objectives contained in Bloom's taxonomy, which proved to be a valuable tool for the teaching and learning process. Furthermore, students were satisfied with the simulation. Level of evidence 3.
Krautscheid[18] English	To develop and implement, using Bloom's taxonomy, a high-fidelity simulation to solve ethical dilemmas related to nursing.	A descriptive, quantitative study conducted in a nursing school course at an American university.	The students reported that the educational strategy used increased confidence in ethical decision making and the overcoming of fears. Thus, the simulation assisted by Bloom's taxonomy goes beyond the improvement of the cognitive and psychomotor domains, also improving the affective ability of the students. Level of evidence 6.

Chart 3 - Clinical simulation phases and articulation with Bloom's taxonomy to develop nursing competence, São Paulo, São Paulo, Brazil, 2019

Clinical simulation phases			
Bloom's taxonomy domains	First phase – Preparation (divided into pre-simulation and prebriefing/briefing)	Second phase - Participation (execution of the simulated scenario)	Third phase - Debriefing (reflection of the experience)
Cognitive domain: actions in a hierarchical order, from minor to major complexity for learning: knowledge, comprehension, application, analysis, synthesis, and evaluation.	Pre-simulation: (1) Knowledge: memorize the contents previously received; (2) Comprehension: print the meaning of the contents; interpret the knowledge acquired on the subject of simulation. Prebriefing/ briefing: (1) Knowledge: memorize the contents previously sent; (2) Comprehension: print meaning to the contents, interpret the knowledge acquired[15-16].	1) Comprehension: print meaning, interpret knowledge; (2) Application: use the learning in the scenario; (3) Analysis: analyze the elements, facts, events, and postures[15-16].	(1) Knowledge: memorizing and retaining of knowledge; (2) Comprehension: printing, meaning, interpreting knowledge; (3) Synthesis: articulating with the adopted theoretical reference; (4) Application: transferring knowledge to real situations; (5) Analysis: analyzing elements, facts, events, and postures; (6) Evaluating: evaluating weak and strong points, what is taken to practice[15].
Psychomotor domain - actions in a hierarchical order, from minor to major complexity for learning: perceiving, obtaining conducted response, automating, obtaining complex response, adapting, and organizing.		(1) Perceiving: recognizing the essential movements related to the proposed simulation; (2) Obtaining conducted response: developing a technical skill; (3) Mechanism: performing the skill automatically; (4) Obtaining complex response: obtaining agility and motor coordination; (5) Adapting: improvising movements (knowing how to act coherently and technically); (6) Organizing: acting spontaneously according to the acquired skill[15-17].	

To be continued

Chart 3 (concluded)

Clinical simulation phases			
Bloom's taxonomy domains	First phase – Preparation (divided into pre-simulation and prebriefing/briefing)	Second phase - Participation (execution of the simulated scenario)	Third phase - Debriefing (reflection of the experience)
Affective domain - actions in hierarchical order, from minor to major complexity for learning: receptivity, response, valuing, organization, and internalization of values	Pre-simulation: (1) Receptivity: willingness and attention to learning; (2) Response: participate actively and with satisfaction Pre-briefing/briefing: (1) Receptivity: willingness and attention to learning; (2) Response: participating actively and satisfactorily[15-18].	Participation: (1) Receptivity: willingness and attention to learning; (2) Response: participating actively and satisfactorily[15,17].	Debriefing: (1) Receptivity: willingness and attention to learning; (2) Responding: participating actively and satisfactorily; (3) Valuing: making a commitment to learning; (4) Organization: valuing each learning; (5) Internalization: transferring learning to practice[15-18].

DISCUSSION

Studies which address the adoption of Bloom's taxonomy in nursing for the development of clinical competence through simulation are rare, in spite of the variability of scientific research that uses clinical simulation as a teaching and learning strategy, which is verified by the sample size of this study.

The selected publications are from 2011, 2016, 2017, and 2019. Most of them were published by American universities[16-18]; just one is Brazilian[15]. One study is quasi-experimental[17], the majority are descriptive[15-16,18] with a low level of evidence, which suggests the need to explore Bloom's taxonomy as a mechanism that supports the development of nursing competence during clinical simulation, by means of well-designed scientific research[17].

Bloom's taxonomy is a theoretical-methodological reference that: comprehends the cognitive domains, referring to knowledge; indicates the improvement of skills, referring to psychomotor; and addresses feelings, satisfaction, disposition, and values, referring to affective. When this triad is articulated during a nursing simulation, considering the educational objectives of each domain and working them into each stage of the simulation, it becomes possible to evaluate the development of the individual's clinical competency[19-20].

This study identified, initially, the actions or objectives related to Bloom's taxonomy, which must be valued to develop the first component of the triad of clinical competence in nursing: cognitive knowledge. The first stage of the simulation, named preparation, is divided into pre-simulation and pre-briefing/briefing. In both, the actions that must be approached to develop knowledge are knowing and understanding[21].

In the pre-simulation, didactic materials referring to the theme to be experienced in the proposed simulation scenario are sent using different forms and technologies. Using the flipped class strategy[22], the participant is previously sensitized to the subject, knowing and understanding the context in which it will be approached. In pre-briefing/briefing, all information regarding the scenario to be experienced is made available, and if the preparation stage is adequately performed in a clinical simulation, the individual's cognitive knowledge already begins to be improved[23].

A literature review study (2016) aiming to propose the adoption of the educational objectives of Bloom's taxonomy, investigated its use for the development and assessment of clinical competence in students. The authors concluded that the use of Bloom's taxonomy is a valuable pedagogical resource to develop knowledge, skills, and attitudes, in addition to solving simple and complex problems, in all social fields[24].

The development of cognitive knowledge will continue, during the phase of participation in clinical simulation, as long as the following actions are involved, as described by Bloom's taxonomy: comprehension, application, and analysis. The participant of the simulation understands, during the course of the experience, how to act when confronted with the situation, applies his knowledge to solve it in the most pertinent manner possible, and analyzes whether his knowledge is sufficient to perform that clinical care[23,25].

The debriefing, in turn, addresses all aspects of the cognitive domain in Bloom's taxonomy, as this reflection process leads to knowledge retention, comprehending the context, articulating theory and practice, synthesizing and evaluating learning, configuring itself as a powerful tool to assist in the development of nursing knowledge[26-27].

The psychomotor domain, the second component in the triad of nursing clinical competence, massively contributes to the participation phase in the simulation, during the experience in the specific scenario. In this phase, the participant is able to perceive the abilities necessary for completing the scenario, practicing his motor skills, improvising, and organizing his attitudes: objectives proposed by Bloom's taxonomy[28].

This statement is confirmed by a descriptive, exploratory study developed at a public Brazilian university, which aimed to identify the development of psychomotor skills in 17 nursing students, by means of clinical simulation. When a simulation is properly planned, and the educational objectives are valued, the students felt supported and safe to develop their skills and acquire the clinical practice[29].

Regarding the affective domain, the third and final component of the triad for competence training in nursing, it is necessary to develop the will and motivation to learn, using the actions of receiving and responding, already during the stages of pre-simulation, pre-briefing/briefing, and participation, as indicated by Bloom's taxonomy[30].

A study conducted at an American university intended to identify gaps and weaknesses in the development of nursing students' affective domains for trust, decision-making, and health care for patients. Bloom's taxonomy was used to plan and support the clinical simulation strategy, as a mechanism of competence development. The students obtained an increase in their

confidence and satisfaction, and the simulation associated with Bloom's taxonomy can go beyond the acquisition of the cognitive and psychomotor domains, producing congruence between knowledge, the act, and the feeling in the nursing student[18].

The debriefing phase is fundamental to developing the affective domain in a clinical simulation participant, as it involves all the actions determined by Bloom's taxonomy (receive, respond, value, organize, and internalize), which demonstrates the importance of debriefing for the development of clinical nursing competence[31].

Debriefing, integrated into the educational objectives in a clinical simulation, is helpful in the development of the affective domain in students and professionals, by valuing their emotions in three aspects: their role in teamwork and decision making; their function during the implementation of health care, aiming at emotional competence; and the sensitization of the individuals' own emotions. These aspects are facilitated when debriefing instructors; teachers and facilitators are usually trained to value the emotions of participants during debriefing[32].

Bloom's taxonomy can be used as a facilitating mechanism and theoretical-methodological framework in nursing simulation, to obtain the development of clinical competence in its participants. It encompasses the cognitive, psychomotor, and affective criteria, demonstrated by a set of educational objectives. This contributes to planning of the clinical simulation and development of instruments that aim to evaluate whether the participant, in this pedagogical strategy, developed clinical competence in nursing[33].

Study limitations

The main limitation identified in this study was the scarcity of articles on the development of clinical nursing competence in clinical simulation, using Bloom's taxonomy. This made it difficult to understand and expose the scientific evidence regarding the proposed objective, which reinforces the need for further studies in this context for nursing.

Contributions to the nursing area

This research contributes to teaching, research, and nursing care, especially because the results present the combination of the clinical simulation stages and the objectives or actions relevant to each domain of Bloom's taxonomy. This facilitates the use of this theoretical-methodological reference for teachers, researchers, and nurses who aim to develop clinical competence in nursing students and professionals. As it is still a theme of limited exploration, this integrative review addresses a valuable knowledge framework, to support the development of clinical simulation as a strategy for the teaching and learning process in nursing, for competence development.

CONCLUSIONS

Scientific studies that address the relationship between Bloom's taxonomy and the development of clinical competence in nursing clinical simulation were identified. The distribution of the educational objectives of each domain of the taxonomy was defined, to enable the development of competence in nursing simulation.

In order to develop the cognitive domain, the objectives must be known and understood, at the stage of preparing clinical simulation; the objectives must be understood, applied, and analyzed, at the stage of participation. The debriefing included all the objectives proposed by Bloom's taxonomy to develop knowledge in nursing, which are: knowledge, comprehension, application, analysis, synthesis, and evaluation.

To improve the psychomotor domain, the participation phase of the clinical simulation has a great contribution, enabling the participant to perceive the skills necessary for performing the scenario. It enables them to train, improvise, and organize their actions and attitudes, in a pertinent and skillful way, for the scenario experienced in the simulation.

The affective domain is developed in the first stages of the clinical simulation, when the determination and motivation to learn from the individual are valued and intensified during debriefing, which involves all the actions determined by Bloom's taxonomy during the reflective process. This justifies the importance of debriefing for the development of clinical competence in nursing.

The competency clinic in nursing can be developed by adopting Bloom's taxonomy and appropriately using its educational objectives, in each phase of the clinical simulation, facilitating the improvement of nursing knowledge, skills, and attitudes. Further research, methodologically well designed, using Bloom's taxonomy for development of nursing competence in clinical simulation is needed.

REFERENCES

1. Adams NE. Bloom's taxonomy of cognitive learning objectives. J Med Lib Assoc. 2015;103(3):152-3. doi: 10.3163/1536-5050.103.3.010
2. Ching HY, Silva EC. The Use of Bloom's taxonomy to develop competences in students of a business undergraduate course. JIBE. 2017;(1):10153. doi: 10.5465/AMBPP.2017.10153abstract
3. Almalkawia I, Jesterb R, Terrya L. Exploring mentors' interpretation of terminology and levels of competence when assessing nursing students: an integrative review. Nurse Educ Today. 2018;69:95-103. doi: 10.1016/j.nedt.2018.07.003
4. Weeks KW, Coben D, O'Neill D, Jones A, Weeks A, Brown M, et al. Developing and integrating nursing competence through authentic technology-enhanced clinical simulation education: pedagogies for reconceptualising the theory-practice gap. Nurse Educ Pract. 2019;37:29-38. doi: 10.1016/j.nepr.2019.04.010
5. Le Boterf G. De la competénce: essai sur un attacteur étrange. Paris: Editions d'Organizition; 1999.
6. Kang YN, Chang CH, Kao CC, Chen CY, Wu CC. Development of a short and universal learning self-efficacy scale for clinical skills. PLoS One. 2019;14(1):e0209155. doi: 10.1371/journal.pone.0209155

7. Parry M, Fey MK. Simulation in Advanced Practice Nursing. Clin Simul Nurs. 2019;26:1-2. doi: 10.1016/j.ecns.2018.11.004
8. Kim BN, Myung JK. Analysis of knowledge in nursing management educational objectives based on Anderson's Revision of Bloom's Taxonomy. J Korean Acad Nurs Adm. 2019;25(3):198-207. doi: 10.11111/jkana.2019.25.3.198
9. Costa GO, Rocha HA, Moura Jr LG, Medeiros FC. Taxonomy of educational objectives and learning theories in the training of laparoscopic surgical techniques in a simulation environment. Rev Col Bras. 2018;45(5):e1954. doi: 10.1590/0100-6991e-20181954
10. Mendes KD, Silveira RC, Galvão CM. Integrative literature review: a research method to incorporate evidence in health care and nursing. Texto Contexto Enferm. 2008;17(4):758-64. doi: 10.1590/S0104-07072008000400018
11. Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan a web and mobile app for systematic reviews. Syst Rev. 2016;5(1):210. doi: 10.1186/s13643-016-0384-4
12. Ursi ES, Galvão CM. Perioperative prevention of skin injury: an integrative literature review. Rev Latino-Am Enfermagem. 2006;14(1):124-31. doi: 10.1590/S0104-11692006000100017
13. Melnyk BM, Fineout-Overholt E. Evidence-based practice in nursing & healthcare: a guide to best practice. 2. ed. Philadelphia: Wolters Kluwer Health/Pippincott Williams & Wilkins; 2011.
14. Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA Group. Preferred reporting items for systematic reviews and metaanalyses: the PRISMA statement. PLoS Med. 2009;6(7):e1000097. doi: 10.1371/journal.pmed.1000097
15. Negri EC, Pereira Jr GA, Cotta Filho CK, Franzon JC, Mazzo A. Construction and validation of simulated scenario for nursing care to colostomy patients. Texto Contexto Enferm. 2019;28:e20180199. doi: 10.1590/1980-265X-TCE-2018-0199
16. Founds SA, Zewe G, Scheuer LA. Development of high-fidelity simulated clinical experiences for baccalaureate nursing students. J Prof Nurs. 2011;27(1):5-9. doi: 10.1016/j.profnurs.2010.09.002
17. Simkins IL, Jaroneski LA. Integrated simulation: a teaching strategy to prepare prelicensure nursing students for professional practice—the students' perspective. Teach Learn Nurs. 2016;11: 15-9. doi: 10.1016/j.teln.2015.08.003
18. Krautscheid LC. Embedding microethical dilemmas in high-fidelity simulation scenarios: preparing nursing students for ethical practice. J Nurs Educ. 2017;56(1):55-8. doi: 10.3928/01484834-20161219-11
19. Lejonqvist GB, Eriksson K, Meretoja R. Evaluating clinical competence during nursing education: a comprehensive integrative literature review. Int J Nurs Pract. 2015;22(2):142-51. doi: 10.1111/ijn.12406
20. Immonen K, Oikarainen A, Tomietto M, Kääriäinen M, Tuomikoski AM, Kaučič BM, et al. Assessment of nursing students' competence in clinical practice: a systematic review of reviews. Int J Nurs Stud. 2019;100:103414. doi: 10.1016/j.ijnurstu.2019.103414
21. Adesoji FA. Bloom Taxonomy of Educational Objectives and the modification of cognitive levels advances in social. Sci Res J. 2018;5(5):292-7. doi: 10.14738/assrj.55.4233
22. Deng F. Literature Review of the Flipped Classroom. Theory and Practice in Language Studies. 2019;9(10):1350-6. doi: 10.17507/tpls.0910.14
23. Tyerman J, Luctkar-Flude M, Graham L, Coffey S, Olsen-Lynch E. A Systematic Review of Health Care Presimulation. Clin Simul Nurs. 2019;27:12-25. doi: 10.1016/j.ecns.2018.11.002
24. Oliveira AP, Pontes JN, Marque MA. The Use of Bloom Taxonomy in the Context of Competent Assessment. Pleiade [Internet]. 2016 [cited 2019 Jun 5];10(20):12-22. Available from: https://pleiade.uniamerica.br/index.php/pleiade/article/view/306/423
25. Flood LS, Higbie J. A comparative assessment of nursing students' cognitive knowledge of blood transfusion using lecture and simulation. Nurse Educ Pract. 2016;16(1):8-13. doi: 10.1016/j.nepr.2015.05.008
26. Roh YS, Kim M, Issenberg B. Perceived Competence and Training Priorities of Korean Nursing Simulation Instructors. Clinl Simul Nurs. 2019;26:54-63. doi: 10.1016/j.ecns.2018.08.001
27. Bortolato-Major C, Mantovani MF, Felix JV, Boostel R, Silva AT, Morera JA. Debriefing evaluation in nursing clinical simulation: a cross-sectional study. Rev Bras Enferm. 2019;72(3):788-94. doi: 10.1590/0034-7167-2018-0103
28. Voskoglou MG. A Markov Chain Application on the Levels of the Bloom's Taxonomy of Learning Objectives. Am J Educ Res. 2019;7(3):294-8. doi:10.12691/education-7-3-15
29. Costa RR, Medeiros SM, Martins JC, Dias VR. Perceptions of nursing students on the structural dimensions of clinical simulation. Sci Med. 2019;29(1):e32972. doi: 10.15448/1980-6108.2019.1.32972
30. Stephens M, Ormandy P. An evidence-based approach to measuring affective domain development. J Prof Nurs. 2019;35(3):216-23. doi: 10.1016/j.profnurs.2018.12.004
31. Moran V, Wunderlich R, Rubbelke C. Simulation: best practices in nursing education. Springer. 2018.
32. Carvalho-Filho MA, Schaafsma ES, Tio RA. Debriefing as an opportunity to develop emotional competence in health profession students: faculty, be prepared. Sci Med. 2018;28(1):ID28805. doi: 10.15448/1980-6108.2018.1.28805
33. Sadeghi A, Oshvandi K, Moradi Y. Explaining the inhibitory characteristics of clinical instructors in the process of developing clinical competence of nursing students: a qualitative study. J Family Med Prim Care. 2019;8(5):1664-70. doi: 10.4103/jfmpc.jfmpc_34_19