Publisher: Sapienza Grupo Editorial
R. Santa Cruz, 2187, Vila Mariana
São Paulo, Brazil
editor@sapienzaeditorial.com

Sapienza
International Journal of Interdisciplinary Studies
ISSN: 2675-9780

Virtual scenarios in nursing to improve clinical education in students

Cenários virtuais em enfermagem para melhorar a formação clínica de estudantes

Escenarios virtuales en enfermería para mejorar la formación clínica en los estudiantes

Brenda Brigitte Pombosa Bravo
https://orcid.org/0000-0002-2766-6545
Graduate Researcher, Faculty of Health Sciences. Technical University of Ambato, Ecuador
bpombosa1167@uta.edu.ec (correspondence)

José Luis Herrera López
https://orcid.org/0000-0002-2196-4875
University Professor, Faculty of Health Sciences. Technical University of Ambato, Ecuador
Jl.herrera@uta.edu.ec

ARTICLE HISTORY

Received: 23-01-2024
Revised Version: 25-03-2024
Accepted: 21-04-2024
Published: 03-05-2024

Manuscript type: Article

ARTICLE INFORMATION

Science-Metrix Classification (Domain):
Health Sciences
Main topic:
Virtual scenarios in nursing education
Main practical implications:
The main implication of the article is to provide evidence regarding technologies that are needed to improve the quality and effectiveness of professional nursing education. Considering the global need for nurses, we consider that this contribution helps to deliver insights that can guide policies and educational actions aimed at improving nursing education, mainly in developing countries.
Originality/value:
The originality of the article lies in the use of original and unpublished empirical evidence. Its epistemic value that applies in this study is to promote strategies that improve students' clinical habits through the use of scenarios that resemble the reality of practice.

ABSTRACT

Background: The evaluation of the effectiveness of virtual scenarios in the clinical development of nursing students will bring significant changes in education, especially if it refers to the practical part, since in this case it will provide the knowledge demanded by each student and will favor the clarification of doubts in a more effective and almost real way. (2) **Methods**: Research with a quantitative approach, descriptive scope and cross-sectional observational design. (3) **Results**: Through the application of a survey for nursing students of basic training in which 4 parameters were analyzed in a survey of 16 questions, the same in which questions about the application of virtual scenarios to improve their clinical training were addressed. (4) **Conclusion**: Virtual reality effectively improves knowledge in nursing education because it is more effective than other methods of education in the areas of skills, satisfaction, confidence and performance time.

Keywords: Virtual scenarios, Virtual reality, nursing, ICT, education, research, learning.

RESUMO

Contexto: A avaliação da eficácia dos cenários virtuais no desenvolvimento clínico dos estudantes de enfermagem trará mudanças significativas no ensino, principalmente se for referente à parte prática, pois neste caso proporcionará o conhecimento que cada estudante exige e ajudará a esclarecer dúvidas de uma forma mais eficaz e quase real. **(2) Métodos:** Investigação quantitativa, de âmbito descritivo e desenho observacional transversal. **(3) Resultados:** Através da aplicação de um inquérito a estudantes de enfermagem em formação básica em que foram analisados 4 parâmetros num inquérito de 16 questões, que abordava questões sobre a aplicação de cenários virtuais para melhorar a sua formação clínica. **(4) Conclusão:** A realidade virtual melhora efetivamente o conhecimento no ensino de enfermagem porque é mais eficaz do que outros métodos de ensino nas áreas de competências, satisfação, confiança e tempo de desempenho.

Palavras-chave: Realidade virtual, cenários virtuais, enfermagem, TIC, educação, investigação.

RESUMEN

Antecedentes: La evaluación de la efectividad de los escenarios virtuales en el desarrollo clínico de los estudiantes de la carrera de enfermería, aportarán cambios significativos en la educación en especial si se refiere a la parte práctica ya que en este caso brindará el conocimiento que demanda cada estudiante y favorecerá en el aclaramiento de dudas de una manera más eficaz y casi real. **Métodos**: Investigación de enfoque cuantitativo, alcance descriptivo y diseño observacional transversal. **Resultados**: Mediante la aplicación de una encuesta para los estudiantes de la carrera de enfermería de la formación básica en la cual se analizaron 4 parámetros en una encuesta de 16 preguntas, la misma en la que se abordaron preguntas sobre la aplicación de escenarios virtuales para mejorar su formación clínica. **Conclusión**: La realidad virtual mejora efectivamente el conocimiento en la educación de enfermería, debido a que es la más efectiva que otros métodos de educación en áreas de habilidades, satisfacción, confianza y tiempo de rendimiento.

Palabras clave: Escenarios virtuales, Realidad Virtual, enfermería, TIC, formación, investigación.

INTRODUCTION

Currently, new revolutions have been observed, also known as the digital era, which has influenced in a positive way due to the implementation of learning and training techniques for students in different fields. Likewise, there are several studies about digital technologies, which ensure that they are growing day by day and their research, which can be used in a favorable way, since they will allow the existence of virtual realities for the management of teaching and learning in an efficient and adequate way (Aguilar, 2020). The use of technologies for teaching includes everything that refers to the insertion of tools created technologically with the purpose that these provide a better performance in students at the time of practice, which will be beneficial for the teacher, since it allows their students to expand their knowledge and develop their practical skills, in addition, it will allow them to perform better in the practical environment once they have completed their process (Gallardo, et al., 2019).

The placement of virtual scenarios in nursing has become increasingly common since it seeks a different teaching more dynamic and innovative at the same time. This will allow us to favor the training of nurses in terms of practices, so that the learning process will be more effective and efficient for each student. The most common virtual scenarios in the nursing career are used depending on the course that the student is taking, however, the most used refers to the laboratory area that consists of simulators (mannequins) which can be pediatric, adult, elderly, etc (Rojo & Bonilla, 2020). There are also anatomical models, a virtual dissection tool for the representation of anatomy in high precision 3D (platform of real human anatomy in 3D fully segmented, which allows exploring and learning human anatomy beyond what a cadaver could offer). Digital education has had a positive impact on students in the health area as it has allowed them to expand their boundaries and generate more knowledge through practice, they have evolved new skills that allow them to perform better in their area of work, so it is vital to use virtual scenarios to provide better teaching to each of the students and benefit each teacher with the contribution provided by the same. (Gil, 2019). At the same time, it is possible that the insertion of this type of technology can have an impact on the quality of life of nursing students (Amerson, et al., 2021), since, as some evidence shows, it is necessary to encourage actions that can help improve the quality of life among nursing students (Jimenez et al., 2024).

Technology in nursing education is used in both clinical and classroom teaching to supplement learning. However, there is still a gap in its acceptance despite its upward trend. Their contribution: The findings of this study contribute to the body of knowledge on the phenomenon of the use of technology for teaching and learning in nursing education. The contribution of technology to nursing education is highlighted, but it should be emphasized that its use should be critical, reflective, based on pedagogical theories and developed by trained teachers (Vivanco, 2022). The introduction of virtual clinical simulation in nursing education has the potential to improve knowledge retention and clinical reasoning at an early stage and over time and increase satisfaction with the learning experience among nursing students. Virtual reality can effectively improve knowledge in nursing education but was no more effective than other education methods in areas of skills, satisfaction, confidence, and performance time. Further rigorous studies with a larger sample size are warranted to confirm these results. (Girão, et al., 2020). In research entitled "Technologies in nursing education, innovation and use of ICTs" of integrative review, 62 articles were analyzed, and exclusion criteria were applied, leaving 26 articles in which it was found that technologies are more widely used together with the theory taught in the classroom, online platforms and auxiliary tools make practices more realistic and dynamic for learning. (Arandojo & Martín, 2018).

Tudor, et al., (2019) reported that virtual reality is much more effective in improving knowledge in nursing education, however they were not very effective in terms of satisfaction, confidence and performance time so it was intended to conduct studies with a much larger sample size to confirm the results. Moreover, Padhila, et al., (2019) carried out a randomized controlled trial was with a pretest and 2 posttests with Portuguese nursing students who were divided into two groups: the first group used a clinical case-based learning approach with a virtual simulator, while the second group used the same approach but with a low-fidelity simulator and realistic environment in which their results were favorable since no statistical differences were found in perceptions of self-efficacy, thus, their levels of satisfaction with learning were high (Padhila, et al., 2019).

This research is aimed at determining the effectiveness of virtual scenarios in the development of clinical habits of nursing students. The reasons for conducting this research are mainly due to the problems generated in teachers when performing practical activities in virtual scenarios or using other teaching methods for the development of skills, this research is based on theories of the use of this type of tool. The importance of knowing the effectiveness lies in providing knowledge that promotes the development of skills in basic education in the nursing career (Varas, et al., 2020).

METHODOLOGY

The research study was conducted in the province of Tungurahua, in the canton of Ambato, Ecuador, among nursing students of the Technical University of Ambato, from September to December 2023. The present work has a quantitative

approach, cross-sectional observational design and descriptive scope (Sánchez & Murillo, 2021)

Population. This refers to the set of elements that contain certain characteristics to be studied (Otzen & Manterola, 2018). The population of this study is made up of nursing students, people of legal age, who belong to the basic training. The sample size for this research corresponds to 259 people with an error range of 5%, which will be selected by simple random sampling.

The technique used in this research is the survey, by means of the questionnaire "Educational Practice: Questionnaire (Student Version) / Educational Practices Questionnaire, a 16-item instrument with a five-point scale, designed to evaluate four design characteristics developed by the author of the NLN/Laerdal study. The four design features are: 1) active learning, includes 10 items; 2) collaboration, includes 2 items; 3) diversity of ways of learning, includes 2 items; 4) expectations includes 2 items. This instrument consists of two parts: a question on the presence of specific features in the simulation and another on the importance of these features for the learner. Content validity was established by ten experts in content, development, and simulation testing (Urcola, et al., 2018). The reliability of the instrument was tested using Cronbach's alpha and resulted to be 0.92 for presence of features and 0.96 for importance of features. This instrument will be applied confidentially, and the information analysis will be carried out later. The abbreviations used in the tables of results are described below.:

T/D.A: Totally disagree with the statement.
D/A: Disagree with the statement.
N.D/N.A.A: Neither disagree, nor agree with the statement
A/A: Agree with the statement.
T/A.A: Totally agree with the statement
N/A: The statement is not relevant to the simulation activity carried out.

Processing and analysis: The data will be analyzed with the Excel program and SPSS statistical platform, version 25, which is a software used to generate descriptive tables and graphs (Lázaro, Callejas & Griol, 2022). The data collection was carried out with basic training students (first, second and third semester) of the nursing career of the Technical University of Ambato, by means of a questionnaire applied through Google Forms, which included the topic, main objective of this questionnaire, informed consent and the questions mentioned in the results tables.

This research will take into account ethical aspects mentioned in the Helsinki agreement, such as respect, since there will be no discrimination of race, color, sex or ethnicity of the respondents to obtain the information, in addition, absolute privacy and confidentiality of the people who participate will be kept and finally autonomy will be applied, because each person has the right to participate or not to participate in the research. Likewise, the informed consent will be presented in which the information of the research topic will be disclosed and in case of not wishing to continue with the survey, it can be withdrawn without any problem

RESULTS AND DISCUSSION

Table 1. Active learning outcomes

Questions / Variables	T/D.A		D/A		N.D/N.A.A		A/A		T/A.A		N/A	
	Fi	%	Fi	%	Fi	%	Fi	%	Fi	%	Fi	%
Discuss ideas and concepts with the teacher and other students.	39	15.1	6	2.3	45	17.4	111	42.9	57	22	1	0.4
I actively participated in the debriefing session	35	13.5	10	3.9	52	20.1	114	44	46	17.8	2	0.8
Reflecting on during the debriefing session	31	12	10	3.9	48	18.5	120	46.3	50	19.3	0	0
Opportunities to find out if I understood the material	32	12.4	17	6.6	54	20.8	112	43.2	42	16.2	2	0.8
Comments made by the teacher before, during, or after	31	12	9	3.5	43	16.6	121	46.7	55	21.2	0	0
Clues during the simulation	23	9	17	6.6	52	20.1	124	47.9	32	12.4	10	4
discuss the objectives	29	11.2	12	4.6	51	19.7	122	47.1	44	17	1	0.4
Discuss ideas and concepts	31	12	12	4.6	53	20.5	124	47.9	39	15.1	0	0
Response to individual needs	30	11.6	7	2.7	50	19.3	123	47.5	49	18.9	0	0
Simulation activities and more productive learning time	34	13.1	6	2.3	44	17	124	47.9	51	19.7	0	0
AVERAGE	**31.5**	**12.2**	**10.6**	**4.1**	**49.2**	**19**	**119.5**	**46.1**	**46.5**	**18**	**1.6**	**0.6**

Note. Own elaboration with the research data (2024)

Regarding the active learning table, the highest percentage of respondents (46.1%) agreed with the statement, predominating in aspects such as: discussions of ideas and concepts, participation, performance and opportunities for reflection in the debriefing session, understanding of the material presented, clues in the simulation, discussion of the objectives, response to needs, activities and relation to learning time, and the lowest percentage (1.2%) stated that it is not applicable since the statement is not relevant to the simulation activity carried out, predominating in certain aspects such as: discussions of ideas and concepts, participation in the debriefing session, understanding of the material presented, clues in the simulation and discussion of the objectives. It can be seen that in the elements of active learning, the highest percentage of respondents affirm that the activities included in this variable mentioned above, clearly demonstrate that working together with the educator, allowing students to express ideas or opinions makes traditional practices become a more complementary and easier learning methodology for acquiring new skills, in addition to the fact that it requires the educator to increasingly seek to use modern ideas for teaching.

Table 2. Collaboration results

Questions / Variables	T/D.A		D/A		N.D/N.A.A		A/A		T/A.A		N/A	
	Fi	%	Fi	%	Fi	%	Fi	%	Fi	%	Fi	%
I had the opportunity to work with my colleagues during the simulation.	33	12.7	11	4.2	39	15.1	119	45.9	56	21.6	1	0.4
During the simulation my colleagues and I had to work together on the clinical scenario.	31	12	7	2.7	42	16.2	132	51	47	18.1	0	0
AVERAGE	32	12.3	9	3.4	40.5	15.6	125.5	48.5	51.5	19.8	1	0.4

Note. Own elaboration with the research data (2024)

Concerning collaboration, the highest percentage of respondents (48.5%) said that they agree with the statement, predominating in aspects such as: opportunities to work with peers and teamwork in a clinical scenario; and the lowest percentage (0.4%) said that it is not applicable since the statement is not relevant to the simulation activity carried out, predominating in certain aspects such as: opportunities to work with peers. It can be stated that in the collaboration elements, the highest percentage of respondents affirm that all the activities included in this variable are developed, based on the work among peers to develop skills that will allow them to use technologies to improve learning plus the implementation of traditional practices, to achieve the creation of a collaborative environment.

Table 3. Results of diversity of forms of learning

Questions / Variables	T/D.A		D/A		N.D/N.A.A		A/A		T/A.A		N/A	
	Fi	%	Fi	%	Fi	%	Fi	%	Fi	%	Fi	%
The simulation offered several ways to learn the material	34	13.1	8	3.1	52	20.1	126	48.6	39	15.1	0	0
This simulation has provided me with several ways of assessing learning	33	12.7	8	3.1	41	15.8	135	52.1	42	16.2	0	0
AVERAGE	33.5	12.9	8	3.1	46.5	18	130.5	50.4	40.5	15.6	0	0

Note. Own elaboration with the research data (2024)

Regarding the diversity of ways of learning, the highest percentage of respondents (50.4%) agreed with the statement, with a predominance of aspects such as: different ways of learning and different ways of valuing learning; and the lowest percentage (3.1%) disagreed with the statement, with a predominance of certain aspects such as: different ways of learning and different ways of valuing learning. It can be stated that in the elements of diversity of ways of learning, the highest percentage of respondents affirm that all the activities included in this variable, already mentioned above, are developed, therefore, they affirm that educators provide materials and techniques that allow students to recognize in a simple way the usefulness of materials presented in the simulation practices.

Table 4. Results of expectations:

Questions / Variables	T/D.A		D/A		N.D/N.A.A		A/A		T/A.A		N/A	
	Fi	%	Fi	%	Fi	%	Fi	%	Fi	%	Fi	%
The objectives of the simulation experience were clear and easy to understand.	30	11.6	8	3.1	57	22	129	49.8	35	13.5	0	0
My teacher communicated the objectives and expectations to be achieved during the simulation	32	12.4	10	3.9	40	15.4	132	51	45	17.4	0	0
AVERAGE	31	12	9	3.5	48.5	18.7	130.5	50.4	40	15.4	0	0

Note. Own elaboration with the research data (2024)

About expectations, the highest percentage of respondents (50.4%) agreed with the statement, with a predominance of aspects such as: clarity about the objectives and whether the objectives were achieved; and the lowest percentage (3.5%) disagreed with the statement, with a predominance of certain aspects such as: clarity about the objectives and whether the objectives were achieved. It can be stated that in the elements of expectations, the highest percentage of respondents affirm that all the activities included in this variable are developed; therefore, the educators clearly and concisely provide the objectives to be achieved in each simulation activity so that the students can understand the reason why they should carry out the activity.

Virtual clinical simulation and other technology-based learning approaches have gained increasing importance in nursing education in recent years. These methods seek to complement theoretical training and traditional practices through immersive experiences that allow students to develop clinical skills, work collaboratively, face diverse situations, and achieve the learning objectives set.

On the question of active learning the students surveyed agree that this methodology is promoted in nursing simulations. This agrees with Padilha et al. (2019) who found high levels of satisfaction with clinical virtual simulation-based active learning among nursing students. Likewise, Stenseth et al. (2022) reported that high-fidelity simulation with debriefing significantly improved students perceived active learning compared to traditional methods.

However, Fegran et al. (2023) found no differences in self-regulated learning between students exposed to low- and high-fidelity simulation. This may be because debriefing, and not just the type of simulator, is the critical factor for effective active learning. In any case, more research is needed to elucidate the precise mechanisms by which clinical simulation promotes active learning. The results of this study provide additional evidence of the positive impact of simulation on student activation, although longitudinal studies are needed to establish causal relationships. (Høegh, et al., 2023).

In addition, students stated that the simulation promoted collaboration. This is consistent with the findings of Stenseth et al. (2022), who reported that teamwork simulation improved interprofessional collaboration as perceived by nursing students. Also, Høegh-Larsen et al. (2023) identified in their integrative review that simulation can facilitate collaborative learning by exposing students to complex clinical environments that require teamwork.

However, they found no significant differences in collaborative skills between students exposed to high-fidelity and low-fidelity simulation. This is partially contradicted by the findings of this research. Further studies are needed to determine the precise impact of simulation characteristics on collaborative outcomes. Fegran et al. (2023). In addition, it is necessary to consider contextual factors in Latin America that could limit the effectiveness in promoting teamwork. The positive results of this study contribute to the evidence on the potential of simulation to improve collaboration, but more robust experimental designs are needed to establish causal relationships. (Mohamed, 2023).

Regarding the diversity of ways of learning the students stated that the simulation provided multiple ways of learning and assessing learning. This is consistent with Rutherford-Hemming et al. (2019), who reported a greater presence of characteristics associated with learning diversity during nursing simulations compared to traditional activities. Likewise, Bozkurt et al. (2023) found that simulations facilitated student-centered education, allowing for personalized experiences according to individual needs. However, they caution that the use of simulation alone does not guarantee formative flexibility, being key to align objectives, methodologies, and forms of assessment. Similarly, it has been found that certain student populations may benefit more from forms of simulation than others Berga, et al. (2021).

Also, students stated that the goals and expectations of the simulation were clear and achievable. This is consistent with Padilha et al. (2019), who found a positive perception of the educational value of virtual clinical simulations among nursing students. Likewise, Stenseth et al. (2022) reported that high-fidelity simulations clarified clinical performance expectations among students.

However, Raeisi et al. (2019) warn that inadequate guidance on pre-simulation learning objectives may limit its effectiveness among students. Similarly, unmet expectations regarding simulation training have been found to generate dissatisfaction among students Bozkurt & Gazarian (2023). Thus, effective communication of purpose and standards is essential for simulation. More research is needed to clarify the best strategies for aligning student expectations with expected learning outcomes Fegran et al. (2023).

CONCLUSIONS

A common feature of all the results of the article is that the advance in technology represents a great opportunity for teaching, since it will bring significant changes in education, especially if it refers to the practical part, since in this case it will provide the knowledge that each student demands and will favor the clarification of doubts in a more effective and almost real way. The use of technology greatly influences traditional education and there is a debate about the advantages and disadvantages, so this article allows to clarify what are the advantages of using virtual scenarios that will provide better student learning and optical understanding.

The content of reported research is varied, because each research brings something novel to this article. Therefore, there is a need for new research with guidelines on research reporting and implementation of artificial intelligence-based technologies in nursing. In addition, it is imperative to integrate basic knowledge of artificial intelligence-related technologies and their applications into nursing education, and interventions are needed to increase the inclusion of nurses throughout the research and technology development process.

The methodological limitations of this study are mainly based on the sample size because it was very extensive for the realization of this study, this implies that the time spent for the realization of all activities was extensive, also the method of analysis should be modified to perform a complete analysis for the choice in terms of specificity, speed, etc. These shortcomings should be recognized for future research Avello, et al. (2019)

It is also necessary to consider that the next research should focus on the practical part among peers, since in the collaboration results table it was observed that a certain percentage stated that they did not work as a team, it is necessary to investigate whether teamwork favors or hinders learning, skills and attitudes of students, this would be a problem to investigate.

REFERENCES

Aguilar F. (2020). Del aprendizaje en escenarios presenciales al aprendizaje virtual en tiempos de pandemia. Estud Pedagógicos Valdivia, *46(3)*, 213-223. http://www.scielo.cl/scielo.php?script=sci_abstract&pid=S0718-07052020000300213&lng=es&nrm=iso&tlng=es

Amerson, R., Fisher, B., Bible, J., Burgess, L., Ravan, L., & Ward, L. (2021). Nursing education amid a pandemic: mental health in a time of virtual learning. *Nurse Educator*, *46*(4), 255-260.

Arandojo Morales, María Isabel, & Martín Conty, José Luis. (2018). Las TIC en la enfermería docente. *11*(2). http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1988-348X2017000200010&lng=es&tlng=es.

Avello Martínez, Raidell, Rodríguez Monteagudo, Mabel A., Rodríguez Monteagudo, Pavel, Sosa López, Dailyn, Companioni Turiño, Bárbara, & Rodríguez Cubela, Rodrigo Leandro. (2019). ¿Por qué enunciar las limitaciones del estudio?. *MediSur*, *17*(1), 10-12. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1727-897X2019000100010&lng=es&tlng=es.

Berga K-A, Vadnais E, Nelson J, Johnston S, Buro K, Hu R, et al. (2021). Blended learning versus face-to-face learning in an undergraduate nursing health assessment course: A quasi-experimental study. Nurse Educ Today, *96(104622),* 104622. http://dx.doi.org/10.1016/j.nedt.2020.104622

Bozkurt SA, Samia R, Gazarian PK. (2023). Using standardized patient simulation in undergraduate nursing education: A scoping review. Clin Simul Nurs, *74,* 3–18. http://dx.doi.org/10.1016/j.ecns.2022.10.003

Fegran L, ten Ham-Baloyi W, Fossum M, Hovland OJ, Naidoo JR, van Rooyen D (R M, et al. (2023). Simulation debriefing as part of simulation for clinical teaching and learning in nursing education: A scoping review. Nurs Open, *10(3),* 1217–33. http://dx.doi.org/10.1002/nop2.1426

Gallardo Córdova, Katherina Edith, Ramos Monobe, Arcelia, Camacho Gutiérrez, Dulce, & Gil Rendón, María Eugenia. (2019). Evaluación de los estudiantes: las prácticas institucionales y docentes vistas desde el marco de estándares internacionales. *Apertura (Guadalajara, Jal.)*, *7(2),* 73-85. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1665-61802015000200073&lng=es&tlng=es.

Gil Olivera NA. (2019). Ambiente virtual de aprendizaje: beneficios y ventajas para enseñanza del francés como L2. Rev Bol Redipe, *8(11),* 91-99. https://revista.redipe.org/index.php/1/article/view/852

Girão, A.L. Araújo, Cavalcante, M.L. Silva Nunes, Oliveira, I. Costa Lima de, Aires, S. Freitas, Oliveira, S.K. Paz de, & Carvalho, R.E. Fontenele Lima de. (2020). Tecnologías en la enseñanza en enfermería, innovación y uso de TICs: revisión integrativa. *Enfermería universitaria*, *17(4),* 475-489. Epub 24 de septiembre de 2021

Høegh-Larsen AM, Gonzalez MT, Reierson IÅ, Husebø SIE, Hofoss D, Ravik M. (2023). Nursing students' clinical judgment skills in simulation and clinical placement: a comparison of student self-assessment and evaluator assessment. BMC Nurs, *22(1).* http://dx.doi.org/10.1186/s12912-023-01220-0

Jiménez, D. A., Medina, M. E., Ortigoza, A., & Barrios, C. J. C. (2024). Estilos de vida de los estudiantes de Enfermería de una institución pública de Tucumán, Argentina. *Ibero-American Journal of Health Science Research*, *4*(1), 52-58. https://doi.org/10.56183/iberojhr.v4i1.606

Lázaro-Alvarez, Niurys, Callejas-Carrión, Zoraida, & Griol-Barres, David. (2022). Utilización del software SPSS para identificar factores predictivos de deserción estudiantil. *Luz*, *21*(1), 38-50. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1814-151X2022000100038&lng=es&tlng=es.

Mohamed AM. (2023). Impact of simulation in Nursing Education: A Review Article. http://dx.doi.org/10.6084/m9.figshare.22179904

Otzen, Tamara, & Manterola, Carlos. (2018). Técnicas de Muestreo sobre una Población a Estudio. *International Journal of Morphology*, *35(1),* 227-232. http://dx.doi.org/10.4067/S0717-95022017000100037.

Padilha JM, Machado PP, Ribeiro A, Ramos J, Costa P. (2019). Correction: Clinical virtual simulation in nursing education: Randomized controlled trial. J Med Internet Res, *21(6),* e14155. http://www.jmir.org/2019/6/e14155/

Raeisi A, Rarani MA, Soltani F. (2019). Challenges of patient handover process in healthcare services: A systematic review. Journal of Education and Health Promotion, *8*. http://dx.doi.org/10.4103/jehp.jehp_460_18

Rojo M, Bonilla M. (2020). COVID-19: La necesidad de un cambio de paradigma económico y social. CienciAmérica, *9(2),* 77-88. https://cienciamerica.edu.ec/index.php/uti/article/view/288

Rutherford-Hemming T, Alfes CM, Breymier TL. (2019). A systematic review of the use of standardized patients as a simulation modality in nursing education. Nurs Educ Perspect, *40(2),* 84–90. http://dx.doi.org/10.1097/01.nep.0000000000000401

Sánchez Molina, Arturo Alexander, & Murillo Garza, Angélica. (2021). Enfoques metodológicos en la investigación histórica: cuantitativa, cualitativa y comparativa. *Debates por la historia, 9(2),* 147-181. https://doi.org/10.54167/debates-por-la-historia.v9i2.792

Stenseth HV, Steindal SA, Solberg MT, Ølnes MA, Mohallem A, Sørensen AL, et al. (2022). Simulation-based learning supported by technology to enhance critical thinking in nursing students: Protocol for a scoping review. JMIR Res Protoc, *11(4),* e36725. http://dx.doi.org/10.2196/36725

Tudor Car, L., Soong, A., Kyaw, B. M., Chua, K. L., Low-Beer, N., & Majeed, A. (2019). Educación digital de las profesiones sanitarias sobre las guías de práctica clínica: una revisión sistemática por la colaboración de la Educación en Salud Digital. *BMC medicina*, *17*(1), 139. https://doi.org/10.1186/s12916-019-1370-1

Urcola-Pardo, Fernando, Ruiz de Viñaspre, Regina, Orkaizagirre-Gomara, Aintzane, Jiménez-Navascués, Lourdes, Anguas-Gracia, Ana, & Germán-Bes, Concepción. (2018). La escala CIBISA: herramienta para la autoevaluación del aprendizaje práctico de estudiantes de enfermería. *Index de Enfermería*, *26*(3), 226-230. http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1132-12962017000200023&lng=es&tlng=es.

Varas H, Suárez W, López C, Valdés M. (2020). Educación virtual: factores que influyen en su expansión en América Latina. Utopía Prax Latinoam, *25(Esp.13),* 21-40. https://www.redalyc.org/journal/279/27965287003/html/

Vialart Vidal, María Niurka, & Medina González, Inarvis. (2020). Desafíos de los docentes de enfermería ante los entornos virtuales de enseñanza aprendizaje. *Revista Cubana de Enfermería*, *36*(1), e3106. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-03192020000100015&lng=es&tlng=es

Vivanco AA. (2022) Teleducación en tiempos de COVID-19: brechas de desigualdad. CienciAmérica Rev Divulg Científica Univ Tecnológica Indoamérica, *9(2).* http://portal.amelica.org/ameli/jatsRepo/367/3671638019/html/index.html

Contribution of each author to the manuscript:

	% of contribution of each author	
Task	**A1**	**A2**
A. theoretical and conceptual foundations and problematization:	50%	50%
B. data research and statistical analysis:	50%	50%
C. elaboration of figures and tables:	50%	50%
D. drafting, reviewing and writing of the text:	50%	50%
E. selection of bibliographical references	50%	50%
F. Other (please indicate)	-	

Indication of conflict of interest:

There is no conflict of interest

Source of funding

There is no source of funding

Acknowledgments

There is no acknowledgments