REVISTA **ENFERMAGEM ATUAL** IN DERME

EDUCATIONAL TECHNOLOGIES FOR TEACHING SEMIOLOGY AND SEMIOTECHNIQUES IN NURSING DURING SOCIAL DISTANCING: INTEGRATIVE REVIEW

TECNOLOGÍAS EDUCATIVAS PARA LA ENSEÑANZA DE SEMIOLOGÍA Y SEMIOTECNICAS EN ENFERMERÍA DURANTE EL DISTANCIA SOCIAL: REVISIÓN INTEGRATIVA

TECNOLOGIAS EDUCACIONAIS PARA O ENSINO DE SEMIOLOGIA E SEMIOTÉCNICA EM ENFERMAGEM NO DISTANCIAMENTO SOCIAL: REVISÃO INTEGRATIVA

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ABSTRACT
Objective: to map the educational technologies used to support the teaching of semiology and semiotechniques in nursing during the social distancing caused by the COVID-19 pandemic. **Method:** an integrative literature review was carried out by searching the MEDLINE, CINAHL, Scopus and Library, information Science & Technology Abstract databases, with the guiding question: what are the educational technologies used to support the teaching of semiology and semiotechniques in nursing during the social distancing caused by the COVID-19 pandemic? **Results:** the sample consisted of seven articles, regarding the type of technology, educational videos were predominant, about the contents covered, it was found wound care, application of ventrogluteal intramuscular injection, indirect blood pressure measurement, bed bath, strategies effective prevention, management, treatment and control of arterial hypertension, critical thinking through the application of the nursing process, patient safety skills. **Final considerations:** it is concluded that the educational technologies used to support the teaching of Semiology and Semiotechniques during social distancing were: two applications, communication technology using WhatsApp Messenger; a high-fidelity simulation and three educational videos. The use of these technologies enabled the continuity of teaching and the inclusion of the discipline of Semiology and Semiotechniques, being essential for the continuity of the teaching-learning process in times of social distancing, such as the COVID-19 pandemic.
Keywords: Educational Technology; Physical Distancing; Distance Education; Nursing Education; Nursing.

RESUMEN
Objetivo: mapear las tecnologías educativas utilizadas para apoyar la enseñanza de semiología y semiotecnicas en enfermería durante el distanciamiento social provocado por la pandemia de COVID-19. **Método:** se realizó una revisión bibliográfica integradora de la literatura mediante la búsqueda en las bases de datos MEDLINE, CINAHL, Scopus y Library, Information Science & Technology Abstract, con la pregunta orientadora: ¿qué tecnologías educativas se utilizan para apoyar la enseñanza de semiología y semiotecnicas en enfermería durante el distanciamiento social provocado por la pandemia del COVID-19? **Resultados:** la muestra estuvo conformada por siete artículos, en cuanto al tipo de tecnología, predominaron los videos educativos, sobre los contenidos abordados, se encontró cuidado de heridas, aplicación de inyección intramuscular ventroglútea, toma indirecta de presión arterial, baño en cama, estrategias efectivas de prevención, manejo, tratamiento y control de la hipertensión arterial, pensamiento crítico mediante la aplicación del proceso de enfermería, habilidades de seguridad del paciente. **Consideraciones finales:** se concluye que las tecnologías educativas utilizadas para apoyar la enseñanza de Semiología y Semiotecnicas durante la distancia social fueron: dos aplicaciones, tecnología de comunicación mediante WhatsApp Messenger; una simulación de alta fidelidad y tres videos educativos. El uso de estas tecnologías permitió la continuidad de la enseñanza y la inclusión de la asignatura de Semiología y Semiotecnicas, siendo fundamentales para la continuidad del proceso de enseñanza-aprendizaje en tiempos de distancia social, como la pandemia del COVID-19.
Palabras clave: Tecnología Educacional; Distanciamiento Físico; Educación a Distancia; Educación en Enfermería; Enfermería.

RESUMO
Objetivo: mapear as tecnologias educacionais utilizadas para apoiar o ensino de semiologia e semiotécnica em enfermagem durante o distanciamento social ocasionado pela pandemia de COVID-19. **Métodos:** realizou-se revisão integrativa da literatura por meio de busca nas bases de dados MEDLINE, CINAHL, Scopus e Library, information Science & Technology Abstract, com a questão norteadora: quais as tecnologias educacionais utilizadas para apoiar o ensino de semiologia e semiotécnica em enfermagem durante o distanciamento social ocasionado pela pandemia de COVID-19? **Resultados**: a amostra foi composta por sete artigos, quanto ao tipo de tecnologia, vídeos educativos foram predominantes, acerca dos conteúdos abordados, encontrou-se cuidado de feridas, aplicação de injeção intramuscular ventroglútea, medida indireta da pressão arterial, banho no leito, estratégias efetivas de prevenção, manejo, tratamento e controle da hipertensão arterial, pensamento crítico por meio da aplicação do processo de enfermagem, habilidades de segurança do paciente.
Considerações finais: Conclui-se que as tecnologias educacionais utilizadas para apoiar o ensino de Semiologia e Semiotécnica durante o distanciamento social foram: dois aplicativos, tecnologia de comunicação utilizando *WhatsApp Messenger*; uma simulação de alta fidelidade e três vídeos educativos. O uso dessas tecnologias possibilitou a continuidade do ensino e a inclusão da disciplina de Semiologia e Semiotécnica, sendo imprescindíveis para continuidade do processo de ensino-aprendizagem em tempos de distanciamento social, como na pandemia da COVID-19.
Palavras-chave: Tecnologia Educacional; Distanciamento Físico; Educação à Distância; Educação em Enfermagem; Enfermagem.

INTRODUCTION

In Brazil, the first Higher Education Institutions (HEI) with undergraduate courses in Nursing began to emerge since the year 1890[1]. In 2020, there were registered in the electronic system for monitoring the processes that regulate national education, e-MEC (Ministry of Education, Eletronic-MEC), about 1,180 institutions that offered undergraduate courses in Nursing. Of these, 1,172 in the face-to-face modality, with 181,994 authorized vacancies and eight in the distance learning (DE) modality, with 82,240 vacancies[2-3].

With the Coronavirus Disease 19 (COVID-19) pandemic, teaching remotely was exceptional, instituting the implementation of non-face-to-face classes mediated through the use of technology[4]. Therefore, the institutions and their managers had to (re)invent themselves and adapt the teaching method.

The teaching in a virtual way was necessary due to the emergency scenario, and one of its challenges is to make the user feel inside the environment, from navigation and interaction with the teacher. It is noteworthy that for the training of nursing professionals it was considered an obstacle, since it was necessary to introduce dynamic methodologies directed to a theoretical and practical reality in a virtual way[5].

Moreover, this new scenario has shown that nursing is in constant transition, and it is possible to observe that technological tools are important factors for the evolution of practical classes, resources offered through digital platforms can generate learning effectiveness and empower students in decision-making when facing a problem[6-7].

Undergraduate nursing courses include in their curricula the discipline of semiology and semiotechniques, which is essential for students to build knowledge for the practice of care in environments where nursing professionals are inserted. It is a theoretical-practical discipline, whose students learn the reality through simulated or real activities[8].

Among the strategies used, laboratory practices with the use of realistic simulation and practices in health services, which allow the visualization, development of skills and experience of the real scenario, stand out. A study demonstrates efforts in teaching semiology and clinical reasoning through methods different from the traditional ones, introducing practical guides, courses in virtual learning environments, educational videos and games, simulations, and virtual learning objects[9].

There are several studies that relate to new technologies in distance education, thus, with the pandemic of COVID-19 and its restrictions, ideas that could facilitate student learning were put into practice. In this context, the subject of semiology and semiotechniques experienced difficulties in the teaching-learning process, due to its theoretical and practical nature, but it was seen that the use of different educational technologies could help in this learning process.

Therefore, this study aims to map the educational technologies used to support the teaching of semiology and semiotechniques in

nursing during the social detachment occasioned by the COVID-19 pandemic.

METHODS

This is an integrative literature review, which is a method to unite knowledge and incorporate the results of significant studies into practice. Its purpose is to present the general concepts and steps for the preparation of an integrative literature review, based on the most recent scientific evidence[10].

To carry out an integrative review, it is necessary to follow six steps: 1) identification of the theme and selection of the research hypothesis or question for the integrative review; 2) establishment of criteria for inclusion and exclusion of studies/sampling or literature search; 3) definition of the information to be extracted from the selected studies/study categorization; 4) assessment of the studies included in the integrative review; 5) interpretation of results, and 6) presentation of the review/knowledge synthesis[10].

The research question was constructed based on the PICo strategy (P-population: nursing students, descriptors: "Nursing students" OR Students; I-interest: educational technologies, descriptors: "Educational technology" OR "Digital technology" OR "Simulation training"; Co-context: teaching semiology and semiotechnics during social distancing, descriptors: "Nursing education" OR Teaching OR "Education, Nursing"), which resulted in the following guiding question: what are the educational technologies used to support the teaching of semiology and semiotechnics in nursing during social distancing caused by the COVID-19 pandemic?

To operationalize the search, controlled descriptors were selected, after consulting the Health Science Descriptors (DeCS) vocabularies and databases in the area of health sciences and technological sciences, according to Chart 1.

Chart 1 - Search strategy adopted in each database.

Database	Search Strategy
MEDLINE	(mh:("nursing students")) OR (mh:(students)) AND (mh:("educational technology")) OR (mh:("digital technology")) OR (mh:("Simulation training")) AND (mh:("nursing education")) OR (mh:(teaching)) OR (mh:("education, nursing")) AND (fulltext:("1")) AND (year_cluster:[2020 TO 2022])
CINAHL	MH "Nursing students" OR MH students AND MH "Educational technology" OR MH "Digital technology" OR MH "Simulation training" AND MH "Nursing education" OR MH Teaching OR MH "education, nursing" Limitadores - Texto completo; Data de publicação: 20200101-20221231 Tipo de

	documentos: revistas acadêmicas
SCOPUS	(KEY ("Nursing students") OR KEY (students) AND KEY ("Educational technology") OR KEY ("Digital technology") OR KEY ("Simulation training") AND KEY ("Nursing education") OR KEY (teaching) OR KEY ("Education, Nursing")) AND (LIMIT-TO (OA , "all")) AND (LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2020)) AND (LIMIT-TO (DOCTYPE, "ar"))
Library, information Science & Technology Abstracts	MH "Nursing students" OR MH students AND MH "Educational technology" OR MH "Digital technology" OR MH "Simulation training" AND MH "Nursing education" OR MH Teaching OR MH "education, nursing" Limiters - Full text; Publication date: 20200101-20221231; Document types: Academic journals

Source: Authors, 2022.

The searches took place from March to June 2022, resulting in 1,158 articles. For each database, an export file was generated for the EndNote reference manager to remove duplicates. The material was selected by reading the titles and abstracts blind by two independent researchers using the free web-based review program Rayyan Qatar Computing Research Institute (Rayyan QCRI), resulting in 1,123 articles for the 1st stage of analysis. After the exclusion stage of 1,090 articles, 62 (5.5%) conflicts were identified, so there was a meeting between the two researchers with a third experienced researcher in the field for their resolution and consensus.

Then, in the 2nd stage of analysis, a critical analysis of 33 full articles was performed by two independent blinded researchers, again using the Rayyan QCRI. As for the criteria for choosing the articles, full articles with open access, published in scientific journals between the years 2020 and 2022, were included. Studies that did not answer the guiding question were excluded. It is noteworthy that this time interval was chosen due to the updating of evidence on the investigated theme and due to the social distance caused by the pandemic of COVID-19.

The step of analyzing the articles included in the review was initiated with the translation, reading, and interpretation of the results. The characterization of the article was performed by extracting the following information: author/country of affiliation, methodological design, educational technologies used to support the teaching of semiology and semiotechnics in nursing, content addressed, and level of evidence. Then, the synthesis of materials and methods and main results was performed to extract the educational technologies used to support the teaching of semiology and

semiotechnics in nursing during social distancing.

The level of evidence is classified as: Level I - systematic review or meta-analysis of randomized controlled trials; Level II - well-designed randomized controlled trials; Level III - well-designed clinical trials without randomization; Level IV - well-designed cohort and case-control studies; Level V - systematic review of descriptive and qualitative studies; Level VI - descriptive or qualitative study; and Level VII - opinion of authorities and/or reports[11].

RESULTS

The entire process of identification, selection, eligibility, and inclusion is shown in Figure 1.

Figure 1- Flowchart of the article selection process.
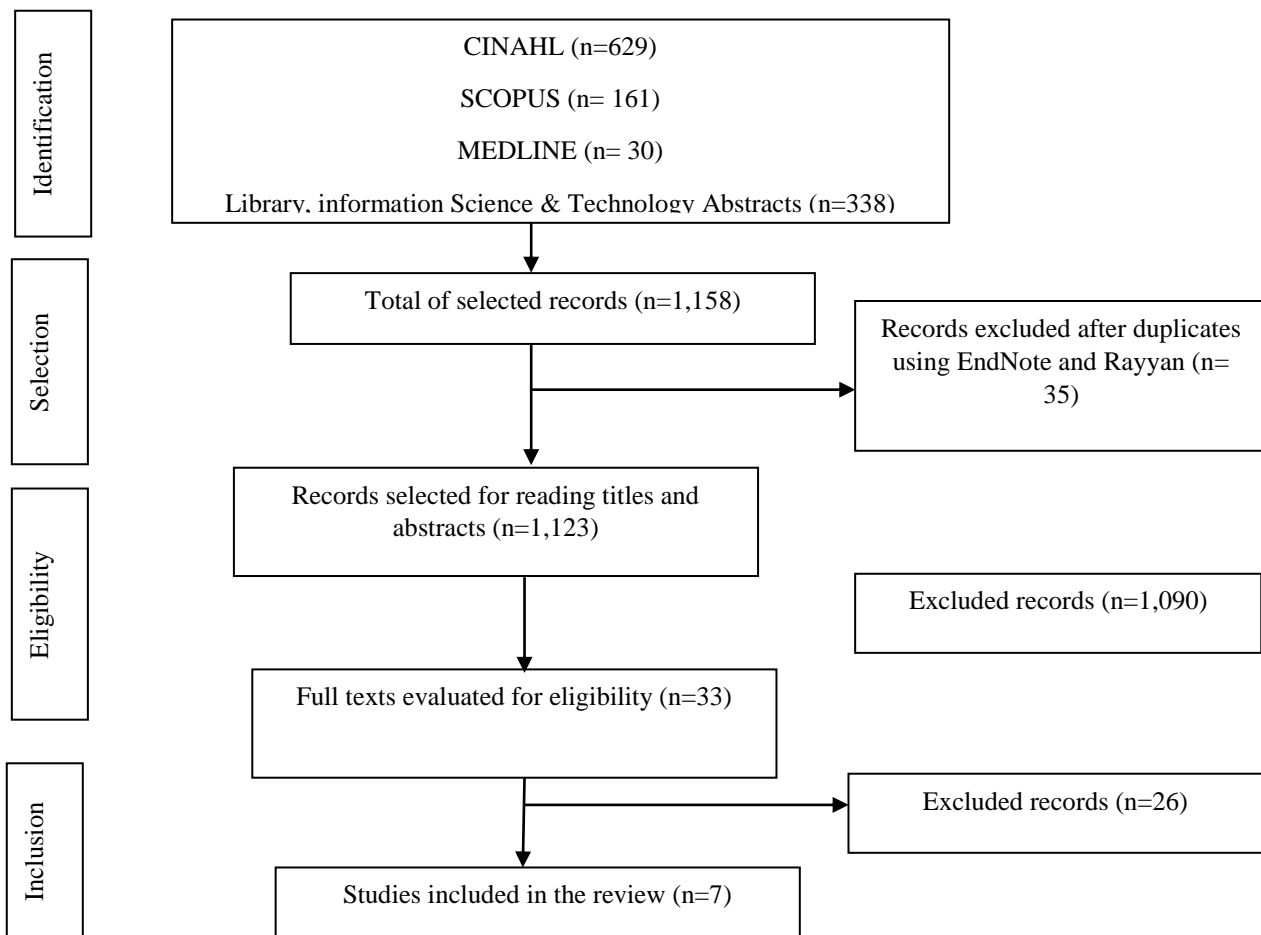
Source: adapted from PRISMA. Cuité, Paraíba, Brazil, 2022.

The sample was composed of 7 articles, with authors from different places, one from England[12], one from Turkey[13], one from South Africa[14], one from New Zealand[15], and three from Brazil[16-17-18].

Regarding the methodological design, it was observed that most of the studies were of the methodological study type, two[17-18], one of the descriptive study type[14] one expert opinion[12], one randomized experimental study[13], one integrative literature review[15] and one quasi-experimental research[16].

Regarding the type of technologies and the content covered, the following were identified as to the type of technologies: two apps[12,14], one communication technology using WhatsApp Messenger[13], one high-fidelity simulation[15]; three educational videos [16-17-18].

As for the content covered, one can highlight wound care[12], application of ventrogluteal intramuscular injection[13], indirect blood pressure measurement[16], bed bath[17], effective strategies for prevention, management, treatment, and control of hypertension[18], critical thinking through the application of the nursing process, patient safety skills[14-15].

In Chart 2, there is the characterization of the articles with author/country relationship, methodological design, educational technologies used to support the teaching of semiology and semiotechnics in nursing, content covered, and level of evidence.

Chart 2 - Characterization of the primary studies included in the integrative review.

Author/Country	Methodological design	Educational technologies used to support the teaching of semiology and semiotechnics in nursing	Content covered	Level of Evidence
Adderley[12] England	Experts Opinion	Mobile digital technology with digital imaging capable of interfacing with other essential data systems, and	Use of technology in favor of lower limb wound care and surgical wound care, as a way to promote the health of the individual	VII

		the implementation of a cellular form of a digital wound management system.	providing improved quality of care.	
Bayram, et al.[13] Turkey	Randomized experimental study	WhatsApp Messenger.	The use of WhatsApp Messenger as a learning tool for ventrogluteal intramuscular injection application.	II
Bester, et al.[14] South Africa	Descriptive study	Information communication technology (information technology: hardware, software to store, process, and retrieve data; communication technology: electronic systems that enable communication between individuals and	It addresses the use of information communication technologies in nursing education and its importance in training nurses with critical thinking and forward-looking knowledge to make accurate choices in life-threatening situations.	VI

		groups.		
Bowen-Withington, et al.[15] New Zealand	Integrative literature review	High-fidelity simulation using computerized human patient simulation manikins.	Use of computer simulation technology as a strategy to increase nursing students' clinical skills, maximizing learning and providing, above all, patient safety.	VI
Cividanes, et al.[16] Brazil	Quasi-experimental research of the before-and-after type	Video.	Use of an educational video demonstrating the technique of indirect blood pressure measurement with the oscillometric method.	III
Lopes, et al.[17] Brazil	Methodological study	Video.	Elaboration and validation of a video about the bed bath, contributing to the professional formation and the	VI

			improvement of knowledge and abilities of nursing students.	
7-Caetano, et al.[18] Brazil	Methodological and descriptive study	Vídeo.	Construction of a video with creative, interactive, dynamic and attractive content capable of providing effective strategies for prevention, management, treatment and control of hypertension in screening settings.	VI

Source: Authors, 2022.

DISCUSSION

Most studies had Brazilian researchers as researchers. Technology-mediated learning has gained emphasis and space to facilitate the teaching process, and Brazil has been standing out with the use of educational technologies in the health field[19].

Thus, after the suspension of classes in some institutions, training began for faculty members to learn how to use platforms for remote teaching[7]. The results obtained in 13 studies, it was observed that the institutions located in the Northeast and Southeast regions were the first to adhere to remote teaching in Brazil[20].

As a result of this situation, the Ministry of Education, through Ordinance No. 343 of March 17, 2020, provided for the replacement of classroom classes by digital classes for the duration of the COVID-19 pandemic. This same ordinance emphasizes that it is the responsibility of educational institutions to define the subjects that may be replaced, the availability of tools for students that allow the monitoring of the

contents offered, as well as the performance of assessments during the period of authorization[4].

However, online education goes beyond videoconferences and sharing of videos, materials and power point. It will be effective if it provokes active learning in students, providing the possibility to write, read, question, analyze and solve problems, creating new learning situations[21]. In this perspective, it is essential that institutions have a working knowledge of technological resources before committing to the use of technologies, because the effective use of technology services may be associated with the technological readiness of an organization[22].

To enter this field of the computerization of educational tools, especially in Brazilian nursing education, besides financial investment, there is an urgent need for a body of human resources skilled in the handling of such technologies. Distance education (EaD in Portuguese) in Brazil is often seen as a modality that promotes more autonomy, and the proper planning of activities are able to stimulate students more than traditional lectures, by keeping them connected and strengthening their skills with technologies in this digital society[23].

Among the publications focused on technologies in nursing education, the methodological and descriptive studies stood out, for having more flexible methods and lower costs to be developed. In a descriptive study, it highlights the great importance of the relationship and connectivity of active methodologies to support teachers and scholars in this moment of remote teaching, which

impacts everyone and leads them to search for didactic and pedagogical alternatives to maintain the quality in the teaching and learning processes[24].

As for the methodological study, the literature also corroborates the prevalent type found in this study. This information refers to support for the nursing process in construction and validation studies, because these are tools that are in a broad process of technological development, in which experts have come to validate these studies[25].

Regarding the level of evidence, the level VI[14-15-17-18] was highlighted, however systematic reviews of randomized clinical trials have the best level of scientific evidence, corresponding to two studies[13,16] of this work. Notably, considering the importance of the clinical issue to define the appropriate study design to answer your research question is necessary, because it subsidizes the clinical practice of health professionals, promoting the integration of clinical experience to the best available evidence, considering the safety of interventions and ethics in all actions[26].

With the advent of the pandemic of COVID-19, due to the restrictions of distance, virtual teaching environments with simulation of practices and improvement of techniques for performing nursing procedures were an alternative to replace face-to-face practices, ensuring the safety of students and the continuity of learning[27].

In this way, the use of educational technologies in recent years has been approached

in the sense of being a more didactic way used as a teaching-learning methodology, benefiting individual users and providing adequate results in terms of learning[28].

In addition, they reduce the distance between student and teacher, make access easier and more flexible for different people, and stimulate autonomy and reflection on their own learning, since it involves the student in an articulated process of strategies and resources related to the use of technology[29].

However, the insertion of digital technologies in everyday school life is still, at the same time, a factor of closeness and distance, and therefore a great challenge for teachers, since, although many resources of these technologies are accessible to students and teachers, little movement is perceived to integrate them into the pedagogical practices of teaching and learning in everyday school life[30].

It is worth mentioning that technological evolution has reached higher education, especially in nursing education, as an efficient support strategy capable of optimizing teaching practice by ensuring the teacher the essential mission of being a facilitator in the learning process and, when differentiated and modern activities are inserted into traditional classes, the use of technology favors the dynamics of the learning process[31].

For the development of this study, the educational technologies used were according to the content addressed in each article, serving to present in a more accessible and simplified way what matches the text, facilitating teaching and

remote learning during the pandemic of COVID-19. These technologies ranged from videos, to low-cost simulators, to digital and communication technologies.

The pandemic period of COVID-19 presented among the main pedagogical strategies used in remote teaching the use of videos, representing 86.1%, followed by dialogical exposure (58.3%), use of slides (50%) and audios (47.2%)[32]. This data supports the same results found in this study, with video being the most used type of technology. These methods add positively to the teaching of students, because only the theoretical classes are not sufficient for the retention and absorption of knowledge[17].

In view of this, using new technologies is a methodological teaching modality that enables the understanding during health training in the nursing field, reproducing educational experiences passed on through virtual media, such as videos with simulations of practical procedures, online games, WhatsApp and Telegram groups[33].

Regarding problematization and realistic simulation, it evidences that the application of Problem-Based Learning Simulation (S-PBL in Portuguese) is a method in which nursing students experience the problem-solving process through interactions with a human patient simulator in an environment with clinical characteristics similar to reality[34]. Moreover, the promotion of critical and reflective teaching has made simulation one of the most used strategies, since it favors increased student

participation; integration between disciplines and insertion in diversified scenarios of professional practice[35].

It is also noteworthy the importance of emphasizing the dynamic approach of how to perform the blood pressure measurement through videos and simulations, so that the student feels more secure to perform the procedure on a real patient, when necessary. This method is important because it represents not only the force that directs the perfusion by the human body, but also reflects a part of the cardiac work[36].

Another subject that deserves to be approached by the students with more caution is the improvement of instructive measures of the bed bath to the restrained patient. This procedure aims to promote individual comfort and maintain skin integrity by promoting physiological circulation and hydration. It is characterized as a complex technique and contributes to a humanized care as needed, in order to ensure that its objectives are achieved without harm to those who receive it[37].

Themes that portray the need for students to have a critical look at routine situations are essential for the formation of a professional with holistic vision, able to situate themselves and maintain control in circumstances of risk. Moreover, it is expected that students learn beyond critical thinking, it is necessary to promote practical experiences so that they are able to evidence the decision-making process in the daily life of being and doing Nursing[38].

Another topic to be mentioned is the need to include technological activities as a strategy

for improvement, in order to provide learning and patient safety. For example, one can cite the use of online applications as an instructional tool for the practice of intramuscular injection, specifically ventrogluteal, which even though it is a safer route, because it has greater thickness of the gluteal muscle ventricles, is free of blood vessels and important nerves in both adults and children and has less thickness of subcutaneous tissue compared to other application sites, it is still unknown by many professionals and poorly used[39].

Aware of the importance of Semiology and Semiotechnics in the training of future nurses, it is understood that it is essential to reflect on its teaching in the undergraduate course, so that through analysis, there are permanent changes regarding the training of nurses who will be in professional practice in the coming years. One of these changes is the reduction in the number of students per teacher, because a large class size probably hinders the progress of a problematizing teaching, and dialogue becomes rarer, with negative repercussions on the processes of reflection and humanization. Thus, the importance of interaction and communication among the subjects participating in the educational process is unquestionable[40].

FINAL CONSIDERATIONS

It was concluded that the educational technologies used to support the teaching of Semiology and Semiotechnics during the social distance were: two applications, communication technology using WhatsApp Messenger, a high-

fidelity simulation and three educational videos. In addition, it was observed that the use of technologies enabled the continuity of teaching and the inclusion of the discipline of Semiology and Semiotics, thus, they were essential to the continuity of the teaching-learning process in times of social isolation due to the COVID-19 pandemic.

Another point brings reference to the inequality of access to the internet and/or computers by the group of low-income students, becoming even more evident during the pandemic, which resulted in absences of this portion of the student population in classes and, consequently, repercussions in the learning process. Therefore, it is unacceptable that institutions, especially public ones, give inaccessible classes precisely to their lower-income students.

However, it can be considered that the continuity of teaching for the training of future nursing professionals through the expansion of access and technological tools as an educational aid was extremely necessary in the pandemic period in the face of the teaching-learning process.

It is worth pointing out that the development of this work was limited to the scarcity of studies, since it is a recently approached theme, which made it difficult and restricted the search.

REFERENCES

1. Nóbrega SMT, Almeida MI, Barbosa ES. Ensino de Enfermagem no Ceará: registros e reflexões sobre os primeiros cursos. Rev Cocar [Internet]. 2021[cited 2022 Set 05];15(32):1-20. Disponível em: http://177.70.35.171/index.php/cocar/article/view/4171

2. Cruz JR, Lima DDCBP. Trajetória da educação a distância no Brasil: políticas, programas e ações nos últimos 40 anos. JPE [Internet]. 2019[cited 2022 Set 05];13(13):1-19. Disponível em: https://revistas.ufpr.br/jpe/article/view/64564/42115

3. Lira ALBC, Adamy EK, Teixeira E, Silva FV. Nursing education: challenges and perspectives in times of the COVID-19 pandemic. Rev Bras Enferm. 2020;73:e20200683. Doi: https://doi.org/10.1590/0034-7167-2020-0683

4. Ministério da Educação (BR). Portaria Nº 343, de 17 de março de 2020: dispõe sobre a substituição das aulas presenciais por aulas em meios digitais enquanto durar a situação de pandemia do Novo Coronavírus - COVID-19 [Internet]. 2020 [cited 2022 Set 05]. Disponível em: https://pesquisa.in.gov.br/imprensa/jsp/visualiza/index.jsp?data=18/03/2020&jornal=515&pagina=39

5. Pissaia LF, Monteiro S, Costa AEK. Ensino em enfermagem: reflexões sobre a utilização de mapas conceituais na prática acadêmica. Rev Soc Dev. 2020;9(1):e162911703. Doi: http://dx.doi.org/10.33448/rsd-v9i1.1703

6. Silveira MDS, Cogo ALP. Contribuições das tecnologias educacionais digitais no ensino de habilidades de enfermagem: revisão integrativa. Rev Gaúcha Enferm. 2017;38(2):e66204. Doi: https://doi.org/10.1590/1983-1447.2017.02.66204

7. Melo EBM, Leite MCF, Filetti FM, Oliveira ERA, Furieri LB, Fiorese M. Use of technology in the teaching of nursing semiology and semiotechnique. Rev Baiana Enferm. 2019;33(33):1-9. Doi: https://doi.org/10.18471/rbe.v33.33859

8. Melo GSM, Tibúrcio MP, Freitas CCS, Vasconcelos QLDAQ, Costa IKF, Torres GV.

Semiotics and Semiology of Nursing: evaluation of undergraduate students' knowledge on procedures. Rev Bras Enferm. 2017;70(2):249-56. Doi: http://dx.doi.org/10.1590/0034-7167-2016-0417

9. Gadioli B, Fulquini FL, Kusumota L. Construction and validation of a virtual learning object for the teaching of peripheral venous vascular semiology. Esc Anna Nery. 2018;22(4):e20180043. Doi: https://doi.org/10.1590/2177-9465-EAN-2018-0043

10. Sousa LMM, Marques-vieira CMA, Severino SSP, Antunes AVA. Metodologia de revisão integrativa da literatura em enfermagem. Rev Invest Enferm [Internet]. 2017[cited 2022 Set 05];(21):17-26. Disponível em: http://www.sinaisvitais.pt/images/stories/Rie/RIE21.pdf#page=17

11. Pompeo DA, Rossi LA, Galvão CM. Revisão integrativa: etapa inicial do processo de validação de diagnóstico de enfermagem. Acta Paul Enferm. 2009;22(4):434-8. Doi: https://doi.org/10.1590/S0103-21002009000400014

12. Adderley U. Promoting digital, data-driven wound care. JCN [Internet]. 2021[cited 2022 Set 05];35(4):20-1. Disponível em: file:///C:/Users/josel/Downloads/promoting-digital-data-driven-wound-care%20(1).pdf

13. Bayram SB, Caliskan N, Gulnar E, Kurt Y. Whats App Supported Training on the Administration of Injection into the Ventrogluteal Site. International Journal of Caring Sciences [Internet]. 2020[cited 2022 Set];13(3):1725. Disponível em: http://internationaljournalofcaringsciences.org/docs/22_bayram_original_13_3.pdf

14. Bester P, Smit K, De Beer M, Myburgh PH. When online learning becomes compulsory: Student nurses' adoption of information communication technology in a private nursing education institution. Curationis. 2021;44(1):e1-e9. Doi: https://doi.org/10.4102/curationis.v44i1.2152

15. Bowen-Withington J, Zambas S, Macdiarmid R, Cook C, Neville S. Integration of high-fidelity simulation into undergraduate nursing education in Aotearoa New Zealand and Australia: An integrative literature review. Nursing Praxis in Aotearoa New Zealand. 2020;36(3):37-50. Doi: https://doi.org/10.36951/27034542.2020.013

16. Cividanes TA, Oliveira IM, Costa BCP, Sudré MRS, Daniel ACQG, Veiga EV. Educational video on blood pressure measurement: impact on nursing students' knowledge. BJDV. 2022;8(4):28887-905. Doi: https://doi.org/10.34117/bjdv8n4-401

17. Lopes JL, Baptista RCN, Domingues TAM, Ohl RIB, Barros ALBL. Development and validation of a video on bed baths. Rev Latino-Am Enferm. 2020;28:e3329. Doi: https://doi.org/10.1590/1518-8345.3655.3329

18. Caetano GM, Daniel ACQG, Costa BCP, Veiga EV. Elaboration and validation of an educational video on blood pressure measurement in screening programs. Texto contexto-enferm. 2021;30:e20200237. Doi: https://doi.org/10.1590/1980-265X-TCE-2020-0237

19. Carneiro LA, Rodrigues W, França G, Prata DN. Uso de tecnologias no ensino superior público brasileiro em tempos de pandemia COVID-19. Research, Society and Development. 2020;9(8):e267985485. Doi: https://doi.org/10.33448/rsd-v9i8.5485

20. Maciel MAC, Andreto LM, Ferreira TCM, Mongiovi VG, Figueira MCS, Silva SL, et al. The challenges of using active methodologies in remote teaching during the covid-19 pandemic in a higher nursing course: an experience report. BJDV. 2020;6(12):98489-504. Doi: https://doi.org/10.34117/bjdv6n12-367

21. Zayapragassarazan Z. COVID-19: Strategies for Engaging Remote Learners in Medical Education. Online Submission [Internet]. 2020[cited 2022 Set 05];9(273):1-18. Disponível em: https://eric.ed.gov/?id=ED604479

22. Khatib AS, Chizzotti A. Aulas por videoconferência: uma solução para o

distanciamento social provocado pela Covid-19 ou um grande problema? Rev EDaPECI [Internet]. 2020[cited 2022 Set 05];20(3):26-45. Disponível em: https://dialnet.unirioja.es/servlet/articulo?codigo=7675809

23. Silva CM, Toriyama ATM, Claro HG, Borghi CA, Castro TR, Salvador PICA. COVID-19 pandemic, emergency remote teaching and Nursing Now: challenges for nursing education. Rev Gaúcha Enferm. 2021;42:e20200248. Doi: https://doi.org/10.1590/1983-1447.2021.20200248

24. Ries EF, Rocha VMP, Silva CGL. Evaluation of remote teaching of Epidemiology at a public university in Southern Brazil during the COVID-19 pandemic. 2020. Preprint [cited 2022 set 05]. Doi: https://doi.org/10.1590/SciELOPreprints.1152

25. Chiavone FBT, Paiva RM, Moreno IM, Pérez PE, Feijão AR, Santos VEP. Technologies used to support the nursing process: scoping review. Acta Paul Enferm. 2021;34:eAPE01132. Doi: https://doi.org/10.37689/acta-ape/2021AR01132

26. Machado RC. Níveis de evidência para a prática clínica. REV. SOBECC. 2015; 20(3): 127. Doi: https://doi.org/10.5327/Z1414-4425201500030001

27. Fogg N, Wilson C, Trinka M, Campbell R, Thomson A, Merritt L, Tietze M, Prior M. Transitioning from direct care to virtual clinical experiences during the COVID-19 pandemic. Journal of Professional Nursing. 2020;36(6):685-91. Doi: https://dx.doi.org/10.1016/j.profnurs.2020.09.012

28. Gadelha MMT, Carmo AP, Andrade ME, Silva JMA, Bezerra ICB, Fernandes MC. The utilization of educational technologies: huge gap between the real and the ideal training processes in nursing education. R Pesq Cuid Fundam Online [Internet]. 2020[cited 2022 Set 05];12:909-14. Disponível em: http://seer.unirio.br/index.php/cuidadofundamental/article/view/7950/pdf

29. Castro TC, Gonçalves LS. The use of gamification to teach in the nursing field. Rev Bras Enferm. 2018;71(3):1038-45. Doi: https://dx.doi.org/10.1590/0034-7167-2017-0023

30. Almeida SDCDD, Medeiros FD, Mattar J. Educação e Tecnologias: refletindo e transformando o cotidiano. São Paulo: Artesanato Educacional; 2017.

31. Castro MJ, López M, Cao MJ, Fernández-Castro M, García S, Frutos M, Jiménez JM. Impact of educational games on academic outcomes of students in the Degree in Nursing. PLoS One. 2019;14(7):e0220388. Doi: https://dx.doi.org/10.1371/journal.pone.0220388

32. Alves LAS, Martins ADCS, Moura AA. Desafios e aprendizados com o ensino remoto por professores da educação básica. Rev Iberoamer Educ [Internet]. 2021[cited 2022 Set 05];86(1):61-78. Disponível em: https://rieoei.org/RIE/article/view/4373/4180

33. Bezerra IMP. State of the art of nursing education and the challenges to use remote technologies in the time of corona virus pandemic. J Hum Growth Dev. 2020;30(1):141-47. Doi: https://dx.doi.org/10.7322/jhgd.v30.10087

34. Son HK. Effects of S-PBL in maternity nursing clinical practicum on learning attitude, metacognition, and critical thinking in nursing students: a quasi-experimental design. Int J Environ Re Public Health. 2020;17:7866. Doi: https://dx.doi.org/10.3390/ijerph17217866

35. Martini JG, Massaroli A, Lazzari DD, Luz JH. Curriculum for undergraduate courses in nursing: integrative review of literature. R Pesq Cuid Fundam Online [Internet]. 2017[cited 2022 Set 05];9(1):265-72. Disponível em: http://seer.unirio.br/cuidadofundamental/article/view/4044/pdf_1

36. Nora FS, Grobocopatel D. Métodos de aferição da pressão arterial média. Braz Jour Anesthesiology [Internet]. 2020[cited 2022 Set 05];46(4):295-301. Disponível em: https://www.bjan-

sba.org/article/5e498bed0aec5119028b4879/pdf/rba-46-4-295.pdf

37. Costa RRO, Medeiros SM, Vitor AF, Lira ALBC, Martins JCA, Araújo MS. Tipos e finalidades da simulação no ensino de graduação em enfermagem: revisão integrativa da literatura. Rev Baiana Enferm. 2016;30(3):1-11. Doi: https://dx.doi.org/10.18471/rbe.v30i3.16589

38. Riegel F, Martini JG, Bresolin P, Mohallem AGC, Nes AAG. Developing critical thinking in the teaching of Nursing: a challenge in times of Covid-19 pandemic. Esc Anna Nery. 2021;25:1-5. Doi: http://dx.doi.org/10.1590/2177-9465-ean-2020-0476

39. Almeida ML, Canasto AVS, Pereira YG, Souza VRN, Santos RSS. Conhecimento e utilização da região ventroglútea pelos profissionais de saúde para a administração de medicamentos: uma revisão de literatura. Enc Ext Doc Inic Cien [Internet]. 2021[cited 2022 Set 05];8. Disponível em: http://reservas.fcrs.edu.br/index.php/eedic/article/view/4731

40. Lima SFB, Silva JD, Pereira JDS, Almeida CA, Marques SMO, Fernandes PKRS. A importância da disciplina de semiologia e semiotécnica para a prática assistencial. Arte e conhecimento: conexão FAMETRO [Internet]. 2017[cited 2022 Set 05]. Disponível em: https://doity.com.br/media/doity/submissoes/artigo55f2b1d44bd0b6631e771286a7a31dfe6760e912-arquivo.pdf