# Educational Technologies in the Promotion of Sexual and Reproductive Health Used by Nursing Teachers

## Tecnologias Educacionais na Promoção da Saúde Sexual e Reprodutiva Utilizadas por Enfermeiro(a)s Docentes

## Tecnologías Educativas en la Promoción de la Salud Sexual y Reproductiva Utilizadas por Enfermeros Docentes

**RESUMO**

**Objetivo:** Analisar as tecnologias educacionais utilizadas por enfermeiros docentes universitários na promoção da saúde sexual e reprodutiva, bem como suas potencialidades, limites e desafios. **Método:** Estudo descritivo, exploratório, qualitativo, realizado em ambiente virtual com enfermeiros docentes, por meio de questionário online semiestruturado. **Resultados:** Predominaram docentes entre 41 e 60 anos, com doutorado ou pós-doutorado e tempo de atuação entre 6 e 15 anos ou superior a 11 anos. As tecnologias mais utilizadas foram folders (91,7%), vídeos educativos e cartilhas (83,3%), websites (58,3%) e aplicativos (50%), enquanto inteligência artificial, realidade virtual e serious games tiveram menor uso. Todos os participantes consideram as tecnologias educacionais importantes e 91,7% as utilizam na prática docente. **Discussão:** As tecnologias favorecem a diversificação do aprendizado, aproximação da prática clínica, a motivação discente e inovação no ensino. **Conclusão:** Evidencia-se a relevância das tecnologias educacionais no ensino-aprendizagem da saúde sexual e reprodutiva.

**DESCRITORES:** Tecnologia educacional; Saúde Sexual e Reprodutiva; Promoção da Saúde.

**ABSTRACT**

**Objective:** To analyze the educational technologies used by university nursing faculty in promoting sexual and reproductive health, as well as their potentialities, limitations, and challenges. **Method:** A descriptive, exploratory, qualitative study conducted in a virtual environment with nursing faculty, using a semi-structured online questionnaire. **Results:** Most participants were between 41 and 60 years old, held a PhD or postdoctoral degree, and had between 6 and 15 years or more than 11 years of professional experience. The most commonly used technologies were folders (91.7%), educational videos and booklets (83.3%), websites (58.3%), and applications (50%), while artificial intelligence, virtual reality, and serious games were less frequently used. All participants considered educational technologies important, and 91.7% reported using them in their teaching practice. **Discussion:** Technologies promote diversified learning, closer integration with clinical practice, student motivation, and innovation in teaching. **Conclusion:** The relevance of educational technologies in the teaching-learning process of sexual and reproductive health is evident.

**DESCRIPTORS:** Educational Technology; Sexual and Reproductive Health; Health Promotion.

**RESUMEN**

**Objetivo:** Analizar las tecnologías educativas utilizadas por docentes de enfermería universitarios en la promoción de la salud sexual y reproductiva, así como sus potencialidades, limitaciones y desafíos. **Método:** Estudio descriptivo, exploratorio, cualitativo, realizado en un entorno virtual con docentes de enfermería, mediante un cuestionario en línea semiestructurado. **Resultados:** Predominaron docentes entre 41 y 60 años, con doctorado o posdoctorado y con entre 6 y 15 años o más de 11 años de experiencia profesional. Las tecnologías más utilizadas fueron folletos (91,7%), videos educativos y cartillas (83,3%), sitios web (58,3%) y aplicaciones (50%), mientras que la inteligencia artificial, la realidad virtual y los serious games tuvieron menor uso. Todos los participantes consideran importantes las tecnologías educativas y el 91,7% las utilizan en su práctica docente. **Discusión:** Las tecnologías favorecen la diversificación del aprendizaje, la aproximación a la práctica clínica, la motivación estudiantil y la innovación en la enseñanza. **Conclusión:** Se evidencia la relevancia de las tecnologías educativas en el proceso de enseñanza-aprendizaje de la salud sexual y reproductiva.

**DESCRIPTORES:** Tecnología Educativa; Salud Sexual y Reproductiva; Promoción de la Salud.


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## INTRODUCTION

New health technologies are being developed worldwide at all times and are constantly evolving. Institutions around the world aim to implement health technologies responsibly, creating high-quality, equitable, and accessible forms of health promotion. Research shows that health technologies have the capacity to improve patient outcomes, healthcare processes, and safety[1].

Health technology plays a crucial role in safety and health systems, which can be defined as progress in science, information technology, and the culture of care. It is designed to generate new knowledge as a continuous and natural byproduct of the care experience and to provide best practices for health and healthcare. It employs modern, evidence-based, and high-quality mechanisms to create secure digital care systems[2].

This research is justified by the fact that health technologies are considered essential to a future-oriented, efficient, effective, high-quality, and safe learning healthcare system. Thus, healthcare professionals need to understand that digital health transformations are an integral part of the new healthcare and educational system. Nurses play a key role in communities by promoting health and preventing sexual and reproductive health issues. Universal access to sexual and reproductive health is an inalienable human right and is consistent with the fulfillment of the 2030 Agenda, as emphasized in the Sustainable Development Goals (SDGs) related to good health, well-being, and gender equality [3].

This research began during an international academic mobility period, in the 8th semester of the Bachelor of Nursing program at the Federal University Fluminense in Rio das Ostras. The exchange took place at the Higher School of Nursing in Coimbra, Portugal, through the Erasmus+ Program (*European Region Action Scheme for the Mobility of University Students)* and the Association of Portuguese-Speaking Universities (AULP)

Program of the Federal University of Fluminense/RJ.

During the mobility period, an Integrative Literature Review was conducted using the PICO mnemonic: Population, Intervention, Comparison (not applicable), and Outcomes.

The inclusion criteria for Population were: studies that included nursing participants or were conducted within the nursing field; Intervention: studies addressing health promotion in the context of sexual and reproductive health; and Outcomes: articles addressing the use of educational technologies by nurses in the field of sexual and reproductive health.

Studies were excluded if the full text was not available free of charge or if they were published outside the 5-year timeframe. The guiding question for the search was: What educational technologies do nurses use to promote sexual and reproductive health?

Regarding the search strategy and identification of articles, the search engines PubMed and EBSCOhost, as well as the MEDLINE and CINAHL Complete databases, were used, respectively. In addition to these, the Portuguese Open Access Scientific Repositories (RCAAP) were used. To conduct this review, primary and secondary articles were selected, in Portuguese or English, covering the time frame from 2018 to 2022.

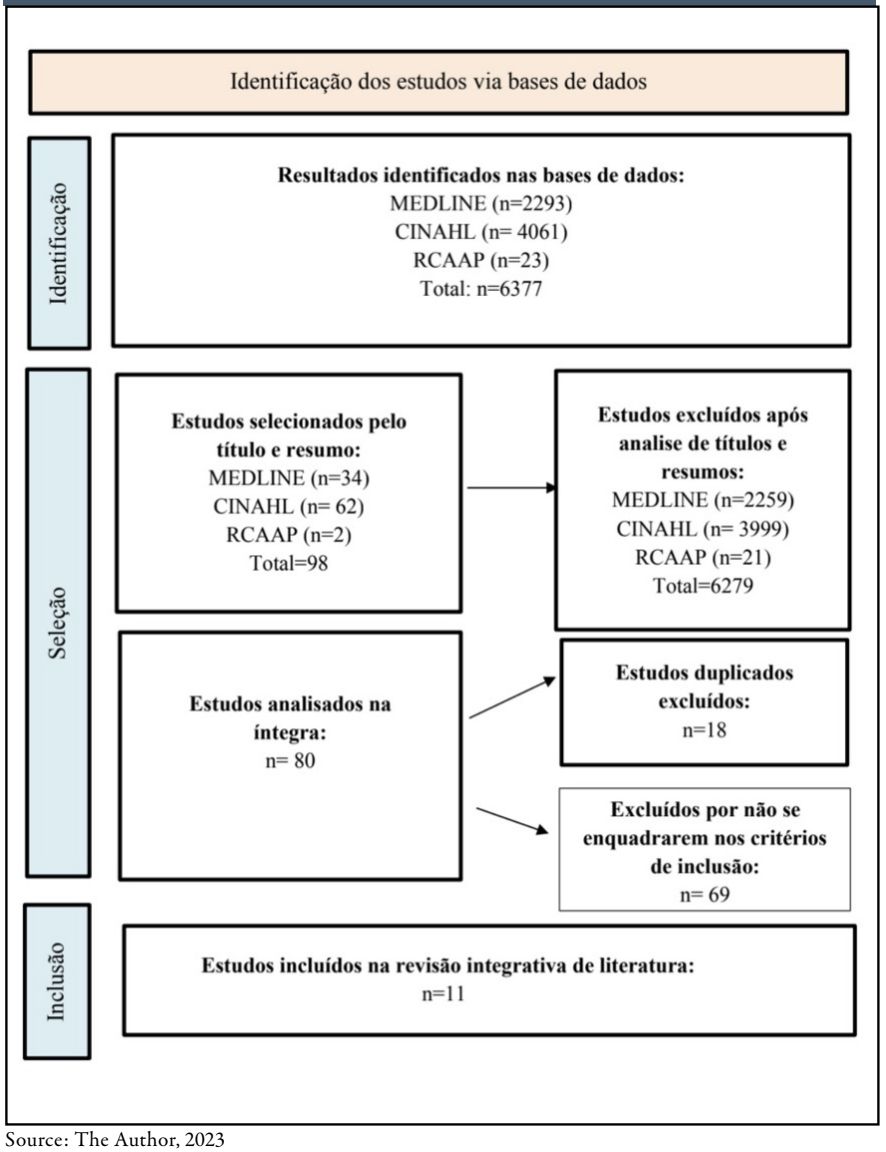
The search terms used were based on the Descriptors in Health Sciences (DeCS) and *Medical Subject Headings* (MeSH): *Health Promotion*; *Reproductive Health*; *Educational Technology*; *Nurses*; and *Nursing*.

Access to the databases was provided via a *Virtual Private Network* made available by the Coimbra School of Nursing (Portugal) during the academic exchange. Subsequently, search terms were formulated using the Boolean operators AND and OR.

Searches were conducted using search terms in English and Portuguese, either in pairs or using three or four combinations. In MEDLINE/PubMed, the "terms" field was used; in CINAHL Complete, the "abstract" *field*; and in RCAAP, the "subject" field.

Subsequently, the titles and abstracts were reviewed, applying the selection criteria as shown in the flowchart below:

**Figure 1: PRISMA Flowchart (Adapted) of the study selection process**




Source: The Author, 2023

Overall, the studies analyzed educational technologies used by nurses in the field of sexual and reproductive health with a focus on health promotion. The studies selected for the review included: two (2) educational videos, one (1) *serious game*, one (1) booklet, one (1) *brochure*, three (3) mobile apps, one (1) *podcast,* one (1) *online* platform *(website)*, and one (1) virtual reality application. Figure 2 presents a schematic summary of the results found in the 11 selected articles:


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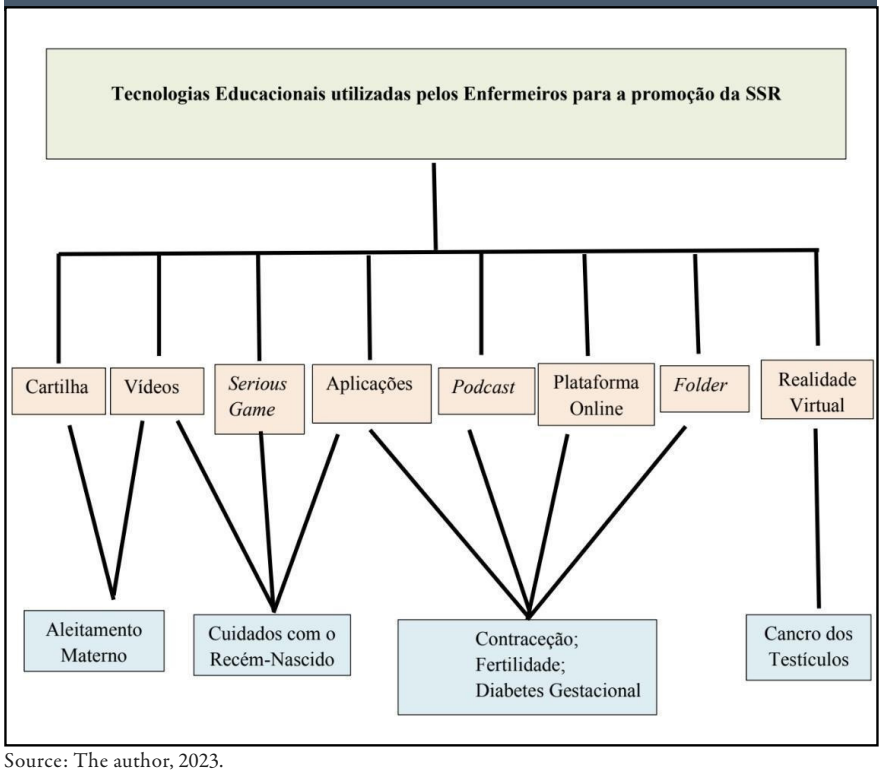
**Figure 2 - Summary of educational technologies found in the Integrative Literature Review**




Source: The author, 2023.

It was found that, given the range of factors that can influence the population's adoption of health-promoting or risk-taking behaviors, nurses should take these factors into account when using technologies to promote health. The results of the integrative review deepened understanding of the topic, as they confirmed the fundamental role of nurses in acquiring knowledge and applying innovative educational technology strategies to promote sexual and reproductive health.

Therefore, the focus of this study is the use of educational technologies by nursing faculty in undergraduate nursing programs within the context of sexual and reproductive health promotion. The following guiding questions were formulated for the study: What educational technologies do faculty members use to promote sexual and reproductive health? What are the potentials, limitations, and challenges involved? The objective of the study is to analyze the educational technologies used by nursing faculty members to promote sexual and reproductive health, as well as to discuss their potential, limitations, and challenges.

## METHOD

This was a descriptive and exploratory study using a qualitative approach. The study was guided by the COREQ (*Consolidated Criteria for Reporting Qualitative Research)* guidelines and conducted online. The data collection form was made available on a digital platform. The inclusion criteria were: Nursing faculty members who had been teaching in undergraduate nursing programs in the areas of Women's Health, Child Health, Adolescent Health, or Public Health for more than one year. The exclusion criteria included faculty members who were on leave at the time of data collection.

Invitations to participate in the study were sent via email and the researchers' social media accounts, such as Facebook, Instagram, WhatsApp, and Gmail. The link provided access to the data collection instrument and the Informed Consent Form (ICF). Data collection was conducted using a semi-structured online form containing open-ended and closed-ended questions about educational technologies and their use in teaching. Twelve nursing faculty members working at universities participated in the study.

The study was approved by the Research Ethics Committee (CEP) of the Federal University of Fluminense, under Opinion No. 6,606,287 (CAAE: 74898323.9.0000.8160), on January 4, 2024. The data were tabulated and analyzed using Bardin's Content Analysis methodology[5] .

## RESULTS

### Characterization of Participants

There was a predominance of faculty members aged 41 to 60: 8 (66.6%); married: 7

(58.3%); white: 6 (50%); heterosexual: 11 (91.7%); cisgender: 11 (91.7%); natives of the State of Rio de Janeiro: 7 (58.3%); time in higher education of 21 years or more: 7 (58.3%); time working at the university between 6 and 15 years: 8 (66.6%); time working as a faculty member for 11 or more years: 8 (66.6%); highest degree: Doctorate and Postdoctorate: 9 (75%).

The results revealed that 11 (91.7%) used educational technologies and technological innovations in their teaching practice; and 12 (100%) considered educational technologies and technological innovations relevant to the teaching-learning process.

Regarding educational and health

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technologies, 12 (100%) were familiar with educational videos; 12 (100%) with *brochures*; 12 (100%) with booklets; 10 (83.3%) with

teleconsultation; 10 (83.3%) about electronic medical records; 10 (83.3%) about websites; 8 (66.7)

on *podcasts;* 8 (66.7%) on apps; 6 (50%) on realistic 3D simulations; 5 (41.7%) have knowledge of artificial intelligence; 3 (25%) on virtual reality; 1 (8.3%) on *serious games*; 0 (0%) on nanotechnology.

In addition, 11 participants (91.7%) use *brochures*; 10 (83.3%) use educational videos; 10 (83.3%) use booklets; 7 (58.3%) use *websites*; 6 (50.7%) use apps; 6 (50%) use electronic medical records; 5 (41.7%) *podcasts;* 3 (25%) on teleconsultation; 3 (25%) realistic 3D simulations; 2 (16.7%) use artificial intelligence; 1 (8.3%) virtual reality; 1 (8.3%) *serious game;* 0 (0%) nanotechnology.

In the field of sexual and reproductive health, the most prevalent technologies were related to the following topics: Family Planning and Sexually Transmitted Infections (16.6% each, respectively); and Gynecological Consultation; Sexual Violence; Gender Identity; Contraceptive Methods; Breastfeeding; Newborn Care; Breast Cancer; Cervical Cancer; Adolescent Health; Public Health; Child Health; Genetics; Telemedicine; and Sexual and Reproductive Health (8.3%) each, respectively.

## DISCUSSION

The data were organized into three thematic categories based on Bardin's Content Analysis[4],
and brought to the final discussion in light of the theoretical frameworks of Integrative Literature Review and other works aligned with the study's theme: **Favorable attributes of educational technologies and their interface with health**

The study highlighted the benefits and potential of educational technologies in teaching for the teaching-learning process, which include: diversifying learning and making it more efficient and productive; facilitating students' understanding; bridging the gap to clinical practice; increasing the efficiency of the teaching-learning process; fostering dialogue, motivation, and creativity; enhancing teaching; greater diversity of approaches and innovation; and promoting sexual and reproductive health, among others. Educational technologies can be defined as a systematic set of knowledge that enables the planning, execution, control, and monitoring of the educational process through the use, development, application, and management of technological processes and resources, with the aim of supporting and facilitating learning[6] :

*- Educational technologies are fundamental processes for facilitating learning, increasing student motivation to participate and learn about the lesson topic.* (Interviewee B)

*- It facilitates students' understanding, brings students closer to the daily reality of clinical practice, and stimulates creativity.* (Interviewee J)

*- In addition to expanding didactic, pedagogical, and communicational possibilities, they allow for other aesthetic and social dimensions of how we relate to knowledge.* (Interviewee E)

Advances in educational technologies have positively transformed health education, providing new opportunities for health education and training. The use of educational technologies in conjunction with the theoretical and scientific knowledge that professionals already possess has proven to be an effective strategy for training and, consequently, for improving the quality of care provided. Educational technologies have the potential to be used as strategies that bring learners closer to the subject matter and encourage active participation, thereby enabling the actual assimilation of knowledge and facilitating the production and dissemination of knowledge[5] :

*- Educational technologies are important for the teaching-learning process because they facilitate the organization of ideas, can increase student participation and creativity, and make the process more efficient and productive.* (Interviewee C)

*- Educational technologies facilitate the teaching-learning process by expanding opportunities for knowledge assimilation, offering practicality and dynamism that move away from traditional pedagogical approaches.* (Interviewee F)

Educational technologies play an indispensable role in the health education process, benefiting its development, providing evidence-based information, and promoting health for users of health services, enhancing nursing care practices, improving services and care, and making the process less monotonous and more stimulating[6] .

Educational technologies are health promotion strategies that advance science, information technology, and a culture of care, all of which align to generate new knowledge and providing best practices and healthcare, employing modern, evidence-based, and high-quality mechanisms to create safe systems for care, knowledge production, and teaching and learning with dynamism and evolution[1] :

*- The use of educational technologies is important because they are part of today's workplace reality, so they need to be included in training.* (Interviewee A)

*- It makes classes more dynamic.* (Interviewee H)

- Productivity; communication; social recognition of nursing students; creativity. (Interviewee I)

*- Greater diversity of approaches and innovation.* (Interviewee J)


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*- Easy access, student interest, lower cost*. (Interviewee K)

*- Diversifying the ways of delivering healthcare education by expanding access to knowledge for different people.* (Interviewee L)

There is no question that technology benefits clinical practice and teaching and learning, as it enables a harmonious integration between scientific advancement and humanization. It is of utmost importance that professionals seek constant updates due to the numerous changes and advancements in the technological context as a way to enable the use of the most appropriate technology in their clinical practices[6] :

*- It diversifies teaching and learning strategies; helps students stay focused on the subject; improves dialogue with students.* (Interviewee L)

*- Enhances teaching; facilitates the development of skills and the acquisition of knowledge based on scientific evidence; makes the learning environment more interactive.* (Interviewee C)

## Educational technologies and knowledge production in the field of sexual and reproductive health

Activities such as creating *e-books, podcasts*, using virtual reality and artificial intelligence, producing educational videos, manuals, *m-health* apps, *brochures*, and video games have yielded satisfactory results and advances in health promotion and education[7], a fact reported by the participants:

*- They offer diverse and comprehensive access to accurate and reliable information, in addition to combating fake news. They promote playfulness, interactivity, mobility, accessibility, integration, and the expansion of knowledge, contributing to healthy sexual practices and awareness of sexual and reproductive rights. (*Interviewee F)

New technologies aimed at improving women's health have advanced in recent years, including artificial intelligence (AI) approaches for cancer diagnosis, machine learning to predict pregnancy complications, the development of educational materials and apps to promote sexual and reproductive health, as well as educational technologies for health promotion[7] :

*- Bringing theory and practice together, realistic simulations, and broader outreach.* (Interviewee A)

Online platforms and mobile apps make information on sexual and reproductive health accessible to people anywhere in the world, including in remote areas where educational and health resources are limited. These technologies can be adapted to meet the needs of different groups, including young people, adults, LGBTQIA+ individuals, and people with disabilities, ensuring that everyone has access to relevant and appropriate information. Simulations, quizzes, and interactive videos help make learning about sexual and reproductive health more engaging and relevant, encouraging users to actively participate in their own educational process. Online tools and apps offer a range of information that allows users to learn at their own pace and according to their needs and interests[7] :

*- It facilitates the teaching-learning process and increases student motivation for participation and learning.* (Interviewee B)

*- They facilitate dialogue on topics that are taboo, carry a lot of stigma and moral judgment, and are therefore difficult to address.* (Interviewee E)

In the study, the main educational technologies used by the interviewed nursing instructors were: 91.7% *brochures*; 83.3% educational videos; 83.3% workbooks; 58.3% *websites;* 50.7% apps; 50% electronic medical records; 41.7% *podcasts*; 25% teleconsultation; 25% realistic 3D simulation; 16.7% artificial intelligence; 8.3% virtual reality; 8.3% *serious games.*

*Podcasts* are a popular medium for disseminating scientific health content, contributing to the democratization and spread of evidence-based information and health promotion. They offer several advantages, such as not requiring visual attention; listeners can multitask—performing household chores, commuting on public transportation, or engaging in physical activity—while listening to *podcasts*. Studies from around the world demonstrate that *podcasts* in health education as highly valuable for students, educators, institutions, and society in general, as they offer an easy and engaging form of learning[8] .

Studies conducted in the U.S. and Australia indicate that VR will allow nurses to experientially understand what patients go through, thereby transforming them into more empathetic providers. VR has many benefits to offer nursing, both in the educational setting and in clinical practice[9] .

In women's health, technologies such as VR that immerse participants in three-dimensional (3D) theoretical worlds offer the opportunity for simulation and interaction in any circumstance. Virtual reality constitutes a 3D interface that places a subject in active interaction with a world recreated by computer programs[9] .

Digital booklets and brochures are educational tools designed to facilitate access to information for people from different sociocultural backgrounds and educational levels. They have the ability to bridge the gap between scientific facts and the lay public through various strategies, so that even readers with limited education or reading difficulties can understand the material's content[10] .

Educational videos are important tools that contribute to health promotion. Their easy accessibility and availability on digital platforms help reach the target audience regardless of geographic location or time, having positive effects on the care pro-

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vided[11] .

A mobile app is a software application designed to perform various functions, and its use for therapeutic, preventive, diagnostic, and educational purposes in the healthcare field is innovative and highly valuable, given that the majority of the population owns a mobile device. Research indicates that mobile devices equipped with these apps are used by healthcare professionals at a rate of 45% to 85%, and are consulted more frequently than books and magazines[12] .

The study in question found that, in the field of sexual and reproductive health, educational technologies are most commonly used in the following areas or topics: Family Planning and Sexually Transmitted Infections (16.6% each, respectively); and Gynecological Consultations, Sexual Violence, Gender Identity, Contraceptive Methods, Breastfeeding, Newborn Care, Breast Cancer, Cervical Cancer, Adolescent Health, Public Health, Child Health, Genetics, Teleconsultation, and Sexual and Reproductive Health (8.3% each, respectively).

### Limitations, setbacks, and challenges of the educational technologies used by university nursing faculty

Among the limitations and challenges of educational technologies identified by the participants are adapting to new technologies; the rigid time constraints and course loads; outdated curricula; limited internet access and poor-quality internet connections; issues related to security and confidentiality; the high cost of acquiring certain technologies; inequality in access to technologies; lack of teacher training; lack of support for technology use; professionals' lack of interest in staying current; lack of support for teachers and universities; inadequate infrastructure; and lack of equipment and expertise.

It is of the utmost importance that institutions open themselves up to the world and bring the world into their midst, and technology facilitates this process. This begins with maintaining the current curriculum—with its diverse subjects—and employing active teaching methods to prioritize student engagement, making students the protagonists of the learning process and enabling the implementation of innovative models[13] :

*- Challenges include the lack of interest among some teachers and researchers in developing and applying these technologies, high costs without available funding, restricted access for the digitally illiterate and people with disabilities, and the reliance on internet access to use certain technologies.* (Interviewee E)

*- Adapting to new technologies.* (Interviewee F)

*- Time, rigid course loads, outdated curricula.* (Interviewee G).

Teachers face challenges when it comes to using technology, and in this regard, it is important for them to stay up to date. As learning environments, educational institutions should prepare students for real-life situations. More than just mastering content and techniques, students must be able to apply what they have learned to solve real-world problems. Research highlights seven aspects from the teacher's perspective that deserve attention, namely: a shift in the teacher's approach, the integration of technology into the curriculum, the time required to adapt the process so that students become active participants and active methodologies can be used in the classroom, lack of training regarding the integration of active technologies into the classroom learning process, the shift away from a lecture-based culture, and the transition from a content-focused process to a student-centered process learning[13] :

*- Access to good internet, lack of knowledge about technologies.* (Interviewee H)

*- Teacher training, acceptance of innovations, and some financial support as well.* (Interviewee I)

*- Access to high-speed internet, high cost of acquiring high-fidelity manikins, funding for research.* (Interviewee J)

*- Teachers' lack of technological proficiency and lack of equipment in educational institutions.* (Interviewee K)

*- Security and confidentiality; need for adequate training; difficulty in using the technology.* (Interviewee B)

*- Cost; training professionals to use the technology.* (Interviewee C)

*- Lack of institutional support for technology use; I usually need to rely on students' cell phones, internet, etc. Access to the internet is already a challenge at the university. (*Interviewee D)

## CONCLUSION

The study made it possible to identify the main educational technologies used by nursing faculty members at institutions of higher education, the benefits and potential of these technologies, and their intersection with health, particularly in the context of sexual and reproductive health. Furthermore, it revealed limitations and challenges for the implementation of educational technologies in health-related teaching at universities.Among the potential benefits of educational technologies for nursing education, the following stand out: diversification of approaches and innovation; ease of content comprehension for students; alignment with clinical practice; increased efficiency and effectiveness of the teaching-learning process; opportunities for dialogue, motivation, and creativity; enhancement of teaching; and promotion of sexual and reproductive health, among others.

The educational technologies most frequently cited by study participants


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were *brochures,* educational videos, booklets, *websites*, apps, and electronic medical records; while the least used included teleconsultation, realistic simulation, artificial intelligence, virtual reality, and *serious games.*

Educational technologies contribute to and enhance the promotion of sexual and reproductive health education by enabling access to curriculum content, inclusion, personalization, interactivity, and secure, accurate, and confidential information, as well as support for informed decision-making. Regarding the limitations and challenges of using educational technologies, we can cite inequalities in access, dependence on adequate infrastructure, resistance to change among faculty, and concerns regarding privacy and pedagogical effectiveness.

In this context, to optimize the opportunities and potential offered by educational technologies, higher education institutions must proactively address these limitations and challenges, ensuring that their adoption is inclusive, effective, and centered on students' pedagogical needs.

It is necessary to broaden the discussion of educational technologies within the academic community, training teachers and technical staff to implement and utilize them in various areas of nursing. Building a balanced and sustainable educational future will depend on the ability to address the challenges and setbacks of educational technologies through a strategic and holistic approach.

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