THE ROLE OF HIGH-FIDELITY CLINICAL SIMULATION IN HEALTH EDUCATION

O PAPEL DA SIMULAÇÃO CLÍNICA DE ALTA FIDELIDADE NA EDUCAÇÃO EM SAÚDE

EL PAPEL DE LA SIMULACIÓN CLÍNICA DE ALTA FIDELIDAD EN LA EDUCACIÓN EN SALUD

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Norberto Maciel Ribeiro[1], Gregório Magno de Vasconcelos de Freitas[2], Liliana Maria Gonçalves Rodrigues de Góis[3]

ABSTRACT

Health education is one of the most compelling challenges for the current 21st-century generation, enriched by digital means and highly technological. Educating for health proves to be a complex process that requires pedagogical strategies that promote the construction of new knowledge. Understanding the complex phenomenon involving health education and the environments that construct new knowledge allows for an exhaustive reflection on the nature of educational processes and simultaneously constitutes an opportunity for knowledge construction mediated by specialists in active cooperation with the student. From this perspective, high-fidelity clinical simulation stands out as a pedagogical and metacognitive strategy for the development of new fundamental knowledge and skills. Thus, high-fidelity clinical simulation in health education exerts a pedagogical and innovative action by allowing the participation and cooperation of the educational community as a central figure in the entire educational process.

Keywords: Health Education. High-Fidelity Clinical Simulation. Innovation. Health.

RESUMO

A educação em saúde é um dos desafios mais relevantes para a geração atual do século XXI, enriquecida por meios digitais e altamente tecnológicos. Educar para a saúde revela-se um processo complexo que exige estratégias pedagógicas capazes de promover a construção de novos conhecimentos. Compreender o fenômeno complexo que envolve a educação em saúde e os ambientes de construção de novos saberes permite uma reflexão aprofundada sobre a natureza dos processos educativos e, simultaneamente, constitui uma oportunidade de construção do conhecimento mediada por especialistas em cooperação ativa com o estudante. Nessa perspectiva, a simulação clínica de alta fidelidade destaca-se

[1] Dr. in Education. University of Madeira, RISE Health. CIE-UMa. Portugal, Funchal.
E-mail: nmaciel@staff.uma.pt. Orcid: https://orcid.org/0009-0004-6120-2770
[2] Dr. in Education. University of Madeira. CIE-UMa. Portugal, Funchal.
E-mail: gregorio.freitas@staff.uma.pt. Orcid: http://orcid.org/0000-0003-3815-3398
[3] Dr. in Education. University of Madeira. CeiED-ULusófona / CIE-UMa e CEIS20-UC. Portugal, Funchal.
E-mail: lilianagr@staff.uma.pt Orcid: https://orcid.org/0000-0002-8388-3042

como uma estratégia pedagógica e metacognitiva para o desenvolvimento de novos conhecimentos e habilidades fundamentais. Assim, a simulação clínica de alta fidelidade na educação em saúde exerce uma ação pedagógica e inovadora ao permitir a participação e a cooperação da comunidade educacional como figura central em todo o processo educativo.

Palavras-chave: Educação em Saúde. Simulação Clínica de Alta Fidelidade. Inovação. Saúde.

RESUMEN

La educación en salud es uno de los desafíos más relevantes para la generación actual del siglo XXI, enriquecida por medios digitales y altamente tecnológicos. Educar para la salud se revela como un proceso complejo que exige estrategias pedagógicas capaces de promover la construcción de nuevos conocimientos. Comprender el complejo fenómeno que involucra la educación en salud y los entornos de construcción de nuevos saberes permite una reflexión exhaustiva sobre la naturaleza de los procesos educativos y, al mismo tiempo, constituye una oportunidad para la construcción del conocimiento mediada por especialistas en cooperación activa con el estudiante. Desde esta perspectiva, la simulación clínica de alta fidelidad se destaca como una estrategia pedagógica y metacognitiva para el desarrollo de nuevos conocimientos y habilidades fundamentales. Así, la simulación clínica de alta fidelidad en la educación en salud ejerce una acción pedagógica e innovadora al permitir la participación y cooperación de la comunidad educativa como figura central en todo el proceso educativo.

Palabras clave: Educación en Salud. Simulación Clínica de Alta Fidelidad. Innovación. Salud.

1 INTRODUCTION

Health education plays a fundamental role in society in addressing human needs. The vision of educating and promoting health seeks professionalism, critical thinking, creativity, reflection, and a holistic approach, capable of responding to the challenges of a more global, demanding, and infodemic-ridden community.

High-fidelity clinical simulation (HFCS) has proven to be a challenge for all participants, in the pursuit of constructive, interactive, and pedagogical synergies in the construction of new knowledge. Higher education, according to the legal framework, aims for high qualification and scientific production as pillars of knowledge construction, and institutions create conditions for educational, scientific, and technological dissemination (Law nº. 62/2007, 2007). Currently, the continuous transformation of the educational society and the need to provide adequate resources "makes the State the educator of the 'citizen' and the school its privileged instrument" (Formosinho & Machado, 2013, p. 28).

Currently, the transmissive culture of content and the current postmodernity of the 21st century in education still face challenges inherent to a culture that is expected to be critical, reflective, and convergent with the construction of current knowledge available to the community it serves. HFCS, as a pedagogical strategy, seeks, on the one hand, to connect learning experiences that guarantee the student develops competencies as a health educator and ensure this experience without exposing users (individual/family and community) to avoidable risks during the educational process; that is, to develop experiential learning that brings students and teachers closer to real-world practice contexts in a safe environment.

The mission of Higher Education aims at high-level qualification, production, dissemination of interdisciplinary knowledge, technological and scientific knowledge, capable of stimulating intellectual development in the lifelong learning of its students. In the University environment, for example, Nursing creates conditions for the dissemination of knowledge, teaching, learning, research and experimental development (Law Nº. 62/2007, 2007), and HFCS as a technological resource is valued by the educational community to develop cognitive and psychomotor skills, preparing its students for the processes of practice and education in health.

Health education is distinguished by its ability to train people to care for people with an emphasis on the construction process, allowing the creation of pedagogical practice conducive to the needs of the learners.

2 HIGH-FIDELITY SIMULATION IN HEALTH EDUCATION

High-fidelity clinical simulation (HFCS) has been progressively gaining significant ground within the educational community. Several studies document this growth and the impact that HFCS has on the teaching/learning process and the development of new knowledge for human care. One example is the integrative review developed by Oliveira et al. (2014), which included 54 articles and highlighted HFCS as an essential focus for the development of knowledge and technical and human skills.

The educational path in health is vast and complex, given the unique nature of everyone, increasingly requiring convergent responses that echo holistic practice, seeking to create a learning experience conducive to continuous improvement. Currently, SCAF laboratories create special conditions for meaningful learning (Martins, et al., 2012), and in this sense, students of the Nursing Degree Course at the University of Madeira (UMa), within the framework of the interinstitutional protocol between the University and the Clinical Simulation Center of the Autonomous Region of Madeira, can, during their educational activities, develop their simulated practices in a high-fidelity laboratory. This experience constitutes added value, as it provides students with a moment prior to their experience in a clinical context, safeguarding the comfort and safety of the individual, family, and community in real-world settings.

The HFCS (School-Based Learning and Assessment) aims primarily to promote the development of transversal skills in health and to evaluate student satisfaction with the training process. Satisfaction is a significant indicator, as it is associated with greater engagement and motivation for learning (Martins et al., 2014). In fact, an educational process strengthened by innovative pedagogical practice stimulates satisfaction (Fonseca, 2021) and promotes greater active involvement, using essential tools such as information and communication technologies (Jonassen, 2000). HFCS clearly promotes meaningful learning; however, some (residual) studies do not show these benefits when compared to other teaching-learning strategies (Batista et al., 2014). In health education, numerous pedagogical strategies emerge that aim to develop technical, relational, and human skills, stemming from the mission of excellence and continuous improvement of processes. It is essential to provide a space prior to practical experiences, and the HFCS environment is equipped to improve performance levels, increase the safety of educational processes, and promote the development of individual and collective skills, aiming to reduce the gap between evidence and practice.

2.1 A HEALTH EDUCATION EXPERIENCE WITH HIGH-FIDELITY SIMULATORS

The experience with the HFCS operated seeks to list the steps recommended for the development of clinical scenarios according to the International Nursing Association for Clinical Simulation and Learning committee in 8 essential phases (INACSL, 2016; Martins et al., 2014; Kaneko & Lopes, 2019):

Phase 1 - Meeting between the teacher and the professional simulation centre, with the objective of developing an HFCS plan.

Phase 2 – Selection of scenarios, with a high level of realism, complete, with increasing difficulty, suitable for the stage of academic development and the preparation of the room and specific simulators.

Phase 3 – Conducting a workshop lasting 6 hours of theoretical training, distributed in three thematic sessions lasting 120 minutes each: with a focus on “caring for a person with a stroke”, “caring for a person in the postoperative period after gastrectomy” and “caring for an adult with asthma”.

Phase 4 - Briefing with the mission of explaining the objectives and details of the simulation experience to be developed.

Phase 5 – Development of the simulated practice in a team of two members and under the supervision of a teacher/specialist with the mission of enhancing performance, teamwork, leadership, communication and decision-making in the clinical process.

Phase 6 - Debriefing, a moment of reflection after each scenario, lasting 30 minutes, allows the student to self-evaluate and reflect on possible improvement actions, namely: the overall assessment of the experience's performance, the balance regarding the interventions correctly developed and the key points relating to the simulated clinical experience.

Phase 7 - Evaluation of the educational experience, namely satisfaction with the simulated experience (practical dimension, realism dimension and cognitive dimension) and the debriefing (psychosocial value, value cognitive and affective value).

HFCS aims to enable learners to create their own objectives, empowering them for a practice that generates new opportunities and skills (Jonassen, 2000). Offering students/learners the autonomy to define their own learning objectives enhances the development of reflective, critical, and creative thinking and stimulates a personalized learning practice that generates new learning opportunities (Jonassen, 2000; Vygotsky, 1991).

HFCS establishes itself as a privileged space to explore learning processes in simulated scenarios, and with the use of robotics, under the guidance of a mediator, it enhances the growth of new knowledge in a continuous, more proactive, and mobilizing learning process.

The planning phase of HFCS, phases 1 and 2, is operationalized with a meeting between the team, the professor, and the experienced nurse practitioners in the Clinical Simulation Center and with high-fidelity simulators, assessing a plan suitable for the professional development of the students, creating conditions for the active participation of the professor/mediator in the planning process that promotes the development of cognitive abilities (Jonassen, 2000; Vygotsky, 1991).

The HFCS experience is intentional, organized, and structured, in which the educational institution managed the teaching-learning strategy (Fonseca, 2021). Although with a pre-determined curriculum, the phenomena under study were transformed into a scenario, integrated into real life, seeking to engage the student in action, namely in finding solutions to problems (Martins et al., 2014). At this stage of the process, they emphasize the student's involvement in planning the simulation, which requires greater commitment and adaptation of the scenarios to the needs (INACSL, 2016; Kaneko & Lopes, 2019), thus seeking to stimulate metacognition of practical experiences (competence within the scope of skills) and self-learning (Fonseca, 2021).

Conducting a workshop represents a moment of theoretical training on the scenarios that will be developed; that is, the professor/supervisor selects the specific themes targeted by a clinical simulation and creates the opportunity for students to review and critically analyse knowledge about the phenomenon being simulated. In addition to providing guidance on the simulated environment and available resources, we believe it is fundamental that students at this stage of the process express their expectations and experiences in practical contexts, in order to recreate cases based on these experiences, allowing for learning reflection during the experiences at HFCS (INACSL, 2016; Kaneko & Lopes, 2019).

In phase 4, students are informed about the objectives and the simulation experience to be developed. This phase dedicates significant time to presenting the scenario, known as the briefing, which allows for the description of all the stages the scenario will unfold, fostering an environment of trust and engagement in the simulation experience. Furthermore, it is crucial that the learning facilitator encourages student autonomy in defining objectives and designing the simulation (Fonseca, 2021), creating opportunities to define personal goals and anticipate possible outcomes, not only through reflective and critical thinking but also through creative thinking (Jonassen, 2000; Vygotsky, 1991), encouraging them to argue and express their ideas.

Students develop the simulation experience in teams (two students per team) under the guidance of the learning facilitator, in phase 5. The simulation scenario presented to the students, based on a clinical case in the scientific field, allows them to use the nursing process as a methodological tool, that is, assessment, diagnosis, intervention planning, intervention, evaluation of results, and record keeping. Prior experience and knowledge promote motivation, a proactive attitude, involvement, and satisfaction (Martins et al., 2012). In developing the scenario, the student is confronted with the need to solve problems, and the implementation of the process may stimulate their critical and creative spirit in the search for solutions, revealing knowledge that has not yet been validated or made conscious (Jonassen, 2000).

During the debriefing, phase 6, it emerges as a space for the student to analyse their performance, and for the supervising teacher to reformulate possible actions for improvement, that is, to evaluate the performance of the entire simulated practice. Effectively, it constitutes a criterion of good practices; however, it is fundamental to provide space for students to identify their main learnings, facilitating factors, difficulties, and strategies they used to overcome them, to share their thoughts, feelings, uncertainties, and limitations in their ability to act, and thus learn from the group's experiences (Bortolato-Major et al., 2019; Moliterno et al., 2024). In this way, the teacher would promote a harmonious, affective, and mutually trusting climate, facilitating reflective thinking and a relationship between emotion and reason inherent in human learning (Vygotsky, 1991).

Debriefing is considered a critical aspect of simulation in the educational process. It is a process by which the team can (re)examine whether clinical simulation promotes clinical reasoning and critical thinking (Coutinho et al., 2014, p.161).

While debriefing is a complex activity, it is fundamental for the construction of self-directed knowledge (Martins, 2014). Debriefing emerges as a space where the student exercises their critical capacity in conjunction with the learning facilitator and constitutes a moment of good practices in the educational process of simulation. However, we believe it constitutes a learning moment to create the opportunity for students to identify their main knowledge, facilitating factors of learning, difficulties and strategies they use, share their feelings, uncertainties and limitations in their ability to act, and thus learn from their experiences (Bortolato-Major et al., 2019; Moliterno et al., 2024). The debriefing space also provides interaction with the experiences lived by the participants in the simulation process, given that it allows the sharing of reflections and knowledge, fostering an important social behaviour of the learning experienced in the context (Correia, 2011).

The evaluation of teaching practice by students, staff, teacher, and nurses in practice represents a criterion of good practices in simulation (Kaneko & Lopes, 2019) and can demonstrate that the professor valued the opinion of students and partners with a focus on the continuous improvement of the teaching-learning process. Several authors refer to the importance of evaluating not only student satisfaction with the simulation and debriefing, but also the development of clinical skills, promoted through an objectively structured clinical examination (Batista et al., 2014; Kaneko & Lopes, 2019).

The learning resulting from simulation is useful not only for academic development, but above all for the acquisition of scientific, technical, and human skills for a health culture grounded in ethics, safety, and quality of care (Martins et al., 2012; Bortolato-Major et al., 2019).

Bringing HFCS (Clinical Simulation Environments as a Learning Environment) into the discussion, as a constructive learning environment for knowledge acquisition, constitutes an intentional objective. The perspective of a curriculum-as-life can find a space to promote meaningful learning capable of fostering the development of each student's abilities. As Sousa (2020) emphasizes, considering the postmodern era, a curriculum-as-life is also possible in HFCS learning environments, placing students at the center of the learning processes, with critical expression, as agents of social, political, environmental, and cultural change, that is, protagonists of revolution (Freire, 2013). The fact is that in clinical simulation environments, content is transferred from the teacher/specialist to the student and, from this perspective, the development of HFCS can also be understood as a "bank deposit," guided by a theme, in which students are committed to simulating it to achieve the proposed objectives (Freire, 2013).

The student thus plays a passive role in the learning process, conditioned by the "designer" of the simulation project, who aims to shape the student towards a specific outcome. In this sense, the learning experience is conditioned in the transition from strengthened and math-centered processes, that is, there are limitations in valuing the student, conditioning them to idealize and create their own learning project, that is, to develop their knowledge (Silva, 1999).

Knowledge is always knowledge; there is no clear separation between the act of knowing and what is known, that is, it is "intentional" and is always directed towards something (Freire, 2013). From Freire's perspective, it is the students' experience that becomes the primary source of the "significant themes" that will constitute the "programmatic content," and in this convergence, it makes perfect sense to integrate students in all phases of the HFCS process, fundamentally in the project phase, creating conditions for empowerment to develop naturally.

HFCS constitutes an action activity and, as a pedagogical strategy that generates meaningful learning (Bortolato-Major et al., 2019; Martins et al., 2012), promotes the activation of higher-level thinking processes (critical and creative) in students, especially during the debriefing phase.

In the HFCS learning environment, the development of a meaningful task is identified, based on a teaching-learning process that is triggered through intentional pedagogical intervention and from a real context, promoting student involvement. The teaching-learning strategy at HFCS can be understood as innovative, given that it provides a process of knowledge construction based on the student's own perceptions and conceptions of the world, aiming at the development of learning (Martins et al., 2012; Oliveira et al., 2014), that is, a socio-constructivist, creative learning context adapted to traditional models, promoting autonomy and student involvement as the central agent of the process, which fosters plural communication and the sharing of reflections.

Health education has developed over time, naturally evolving as a necessity of practice, absorbing knowledge from didactics, mathematics, and pedagogy. On the other hand, practical and simulated teaching in the school context is also an example of this evolution (Martins et al., 2012). The pedagogical experiences developed at HFCS constitute opportunities for students to respond to emerging needs in the art of providing good and quality care, stimulating growth at a personal, cultural, scientific, social, ethical, and reflective level, and empowering them for responsible and safe decision-making.

3 CONCLUSION

Health education has evolved significantly in recent years. On the one hand, the discipline has been supported by capable and more comprehensive theories to meet the needs of the community it serves; on the other hand, the emerging development of new, more effective pedagogical techniques that promote more meaningful learning has also evolved remarkably.

The HFCS, equipped with technology, creates a simulation environment like the real-world context of practice. Furthermore, the educational processes developed at HFCS during educational experiences have allowed for the construction of new knowledge and fostered the development of research, teaching/learning, and innovation, as well as the training of professional skills in a controlled, safe, and realistic environment. Several specialties can be explored in educational activities, namely the need for care for individuals experiencing health/illness processes in the respiratory, gastrointestinal, circulatory, integumentary, and neurological systems, as well as health/illness experiences in children. We also highlight the

experiences of simulated practices in family care and community processes, as well as the area of intra- and extra-hospital emergency/urgency care and the care of individuals in surgical and palliative care settings.

The integration of HFCS as a pedagogical strategy in training curricula at the health education level is evident, creating conditions for better learning, training, research, and improvement of professional skills in clinical practice.

The mission of health education is to develop pedagogical activities and enhance clinical training and professional skills development, contributing to continuous improvement and quality assurance. In this regard, the HFCS developed aligns with the integration of curricula in partnership with the training of professionals at the undergraduate and postgraduate levels, and in this context, educational partnerships aimed at developing meaningful learning are of great interest.

The physical spaces in the high-fidelity clinical simulation laboratory resemble the spaces of the real practice context (wards, consultation rooms, resuscitation rooms, minor surgery room, operating theatre, intensive care unit), including all the necessary equipment, hospital beds, technical assistance equipment, auxiliary diagnostic equipment and monitoring equipment.

The HFCS is considered a fundamental resource to enhance safe and risk-free practice, creating conditions to promote continuous improvement of technical and human skills in the construction of health processes, ensuring conscious and scientifically based decision-making, that is, it prepares students to solve complex problems in clinical decision-making.

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