



LETTER to EDITOR

Development of nursing education in line with technological developments in health care

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Dear Editor,

Today, one of the major challenges of nursing education and practice is the demand for technological developments in health care (1). Undoubtedly, management of technology in the health system requires training proficient human resources with knowledge and skills in the field of technology. Due to developments in new technologies and the application of such technologies in the field of health care, especially in nursing care, it is necessary to prepare nurses to effectively use these tools to improve health. Therefore, nursing education organizations should adopt strategies to respond technological needs of advanced nursing care.

Moving towards new approaches to higher education and the COVID-19 pandemic required many universities around the world to use virtual education technology (2). Given the increasing need for electronic learning, it is necessary to develop electronic learning systems with appropriate technology (3). Some new technologies include virtual reality stimulation (VR), augmented reality (AR), Metaverse, blockchain technology, the internet of things (IoT), and artificial intelligence, which are used to provide opportunities to transfer information, improve learning, and reduce learning problems. Augmented reality of virtual reality is a comprehensive technology that integrates virtual and real-world elements. The technologies of virtual reality and augmented reality are opportunities to change nursing training and promote student-centered learning. Nursing professors must accept VR and AR in education as valuable methods. To accept these new technologies, professors need training, preparation, and extensive knowledge of technologies of virtual reality and augmented reality, as well as organizational support to implement them in the curriculum (4). Therefore, it is suggested that the heads of medical sciences universities and nursing faculties not only invest in equipping classrooms but also help faculty members to interact more with knowledge-based companies active in augmented reality software, using these technologies. The use of VR and AR in nursing education can provide interactive learning and more realistic experiences, allowing nursing students to practice their clinical skills in simulated environments. This leads to a reduction in clinical errors and an increase in patient safety. By offering complex clinical scenarios, these technologies help in the development of nurses' decision-making skills (5). The term "Metaverse" plays an important role in modern life. The world created in virtual reality will certainly have considerable effects on the nature of education, teaching methods, and learning. Metaverse technology will provide important services to classrooms and education because it does not have the limitations of the real world, and everything imaginable in mind can be implemented in this world (6). The Metaverse allows

nursing students to indirectly experience high-risk environments in 3D, practice, and interact in virtual group settings, which helps improve collaboration and coordination within care teams. It also provides an environment where nursing students can engage in interactive learning without spatial and temporal limitations (7). This technology can facilitate international collaboration and enable students to participate in global classes. Block Chain technology provides the possibility of secure data storage, communication, and exchange. In addition to applications in storing and sharing academic documents and records, students' tuition fees, and observing educational justice in comprehensive and nationwide exams, the technology can change the management of the curriculum (8). Nurses can make a significant difference in the quality of patient care by leveraging the power of blockchain technology. This technology can be used to enhance the security and efficiency of clinical and administrative processes (9). The internet of things is the relation of various physical and virtual things based on information and communication technology to provide advanced services, through which all universities, professors, and students around the world can communicate and share their information about a certain topic. Thus, students and professors can have access to a large amount of information. This education method not only improves students' scientific level but also promotes professors' as well (10). IoT devices can continuously monitor patients' conditions and provide necessary information to nurses. This technology can help prevent clinical issues and improve disease management (11). Artificial intelligence (AI) refers to stimulating human intelligence in machines to think and act like humans. Artificial intelligence, with slow but continuous development, has found its place in academic centers, and has numerous capacities in personalized learning, following up the progress of learners and providing solutions to improve and correct the educational process, as well as producing virtual education courses and increasing access to educational resources (12). The use of AI technology can assist nurses in making better clinical decisions by providing the necessary information quickly and accurately, thereby improving the quality of healthcare (13).

Using virtual reality and augmented reality methods, which are necessary for all departments that use stimulation-based education in all authentic medical sciences centers in the world, not only save financial resources but also provides opportunities to improve critical thinking, decision-making, clinical judgments, and problem-solving ability. Inclusiveness, lack of time and place limitations flexibility of learning planning and scheduling, the possibility of repetition and feedback, the

possibility of re-reading the materials, the use of various educational media and audiovisual media, and effective assignment, and usefulness for different learning styles of learners can be mentioned as some advantages that can be considered in educational courses of modern methods (14). Technology-based care can play a key role in developing remote nursing services. Since studies have indicated that there will be an increased shortage of nurses in the coming years (15), designing and implementing educational plans for nurses has been considered an effective and useful approach in this regard, which can improve nursing consequences in dealing with technological developments,

and improve working interactions between health and treatment personnel, and increase the quality of care if effectively planned.

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