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Technology and Nursing Education

Teknoloji ve Hemşirelik Eğitimi

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ÖZET

Teknolojideki yenilik ve gelişmeler hayatın her aşamasını etkilediği gibi hemşirelik eğitimini de etkilemiştir. Teknolojideki gelişmeler son yıllarda hemşirelik eğitiminde teknoloji kullanımında belirgin bir artışa neden olmuştur. Yaşamımıza giren akıllı telefonlar, internet, taşınabilir dijital asistan cihazların kullanımının artması, teknoloji destekli öğrenmeyi ve hatta öğrenme-öğretme ortamının değişimini zorunlu kılmıştır. Özellikle geleneksel eğitim yöntemlerinden interaktif eğitim yöntemlerine geçişle birlikte hemşirelik eğitiminde teknoloji giderek daha yaygın hale gelmekte ve teknolojinin kullanımı daha güvenli, eğlenceli ve heyecan verici bir öğrenme ortamı yaratabilmektedir. Hemşirelik eğitiminde öğrenme hedefleri bilişsel, duyuşsal ve psikomotor alanda gerçekleşmekte olup öğrenme hedefine uygun olarak öğretim yöntemi ve bilgisayar, internet, akıllı telefon, tablet, giyilebilir teknoloji, arttırılmış gerçeklik uygulamaları, maketler, tıbbi cihazlar (tansiyon aleti, ateş ölçer, steteskop vb.), akıllı tahta, yapay zeka gibi birçok teknolojik alet eğitim materyali olarak kullanılmaktadır. Bu derleme, günümüz teknolojisindeki gelişmelerin hemşirelik eğitimine nasıl yansıdığını, eğitime nasıl yön verdiğini açıklamak amacıyla hazırlanmıştır.
Anahtar Kelimeler: Hemşirelik eğitimi, teknoloji, eğitim teknolojisi

ABSTRACT

Innovations and developments in technology have affected nursing education as well as every stage of life. Developments in technology have led to a significant increase in the use of technology in nursing education in recent years. The increase in the use of smartphones, internet, portable digital assistant devices in our lives has necessitated technology-supported learning and even the change of the learning-teaching environment. Especially with the transition from traditional teaching methods to interactive teaching methods, technology has become more and more prevalent in nursing education, and the use of technology can create a safer, fun and exciting learning environment. In nursing education, learning objectives are realised in cognitive, affective and psychomotor areas and many technological tools such as teaching method and computer, internet, smartphone, tablet, wearable technology, augmented reality applications, models, medical devices (sphygmomanometer, thermometer, stethoscope, etc.), smart board, artificial intelligence are used as educational materials in accordance with the learning objective. This review was prepared to explain how technological developments are reflected in nursing education and how they shape education.
Keywords: Nursing education, technology, educational technology

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INTRODUCTION

Innovations and developments in technology have affected every stage of life, as well as nursing education. The increasing use of smartphones, the internet, and portable digital assistant devices that have entered our lives has made technology-supported learning and even the change of the learning-teaching environment necessary.[1] Especially with the transition from traditional education methods to interactive education methods, technology has begun to be used more in nursing education. With the use of technology, a safer, higher-quality, fun and exciting learning environment can be provided.[2, 3]

Research has shown that technology plays a crucial role in nursing education, not only in knowledge transfer but also in cognitive, affective and psychomotor learning domains.[4] In this context, educational materials have also diversified, and many technological devices such as computers, internet, smartphones, tablets, wearable technology, augmented reality applications, models, medical devices (sphygmomanometer, thermometer, stethoscope, etc.), smart boards, artificial intelligence are used as educational materials in accordance with the learning goal. In addition, simulation applications are used in teaching clinical skills. This allows students to experience situations they have not encountered before in a safe environment using tools such as low and high-technology simulators, interactive patient simulators, video, digital story, cinematic technology, virtual reality, and haptic simulation software.[5, 6] Simulation tools range from low-fidelity models to advanced high-fidelity simulators, allowing students to engage in lifelike clinical scenarios.[7] These opportunities offered by technology in nursing education not only improve the learning processes of students but also increase safety in education and prevent negative clinical experiences.[8, 9] This transformation allows nursing students to be trained as more competent professionals who can use technology effectively. As a result, technology-supported learning improves the quality of nursing education and contributes to more effective and efficient delivery of health services.[3, 5, 6]

Reflections of Virtual Reality on Nursing Education

Virtual reality (VR) is a technology that creates a three-dimensional, computer-generated environment where users can interact with digital elements in a seemingly real-world setting through specific hardware and soft ware.[10, 11] There are electronic systems in which the interventions made in the psychomotor skill training of nursing students are detected by the sensors in the simulation system, and the mechanical effects and physiological reactions that occur in response to touch (haptic) are simulated.[5] VR can be realized in three ways: unattended, semi-participated and fully attended. Non-immersive VR, the user remains aware of their physical surroundings while interacting with a computer-generated environment through external devices such as a keyboard and mouse. Video games are a common example of this type of VR. Semi-immersive VR enhances the user's perception of being in an alternate reality while still maintaining awareness of their physical surroundings. Virtual tours exemplify this category of VR. Fully-immersive VR offers the most realistic and interactive experience, allowing users to engage deeply within a 3D computer-generated environment through headsets and haptic sensors. The integration of VR technology into nursing education allows students to practice patient care in a risk-free, controlled virtual environment, reducing potential safety hazards such as infections or medical errors. Through realistic simulations, students can enhance their clinical decision-making skills before encountering real patients.[12, 13]

Mobile games, which have started to take part in nursing education in recent years, support nursing students in active learning, solving clinical problems and gaining experience in a risk-free environment.[14, 15] Engaging with educational mobile games allows students to enhance their critical thinking, clinical decision-making, multitasking abilities, self-efficacy, and psychomotor skills in an interactive and immersive way. In the literature, there are mobile games developed for use in nursing education. Tan et al.[16] designed and implemented a serious game aimed at improving nursing students' knowledge and confidence in blood transfusion procedures. This game covers the pre-transfusion, intra-transfusion, and post-transfusion stages. In all three stages, students had the opportunity to monitor patients and experience the blood transfusion procedure. Bayram and Çalışkan[17] also used a mobile game for tracheostomy care in their studies. The game consists of stages that simulate a nurse performing tracheostomy care on a patient, and students are expected to complete all these stages in sequence. Suh et al.[15] developed a mobile game to evaluate the learning success and experiences of nursing students. They allowed students to use this mobile game for a week and then assessed them a week later. As a result of the evaluation, it was determined that the mobile game in nursing education increased the clinical knowledge of nursing students.

The Power of Social Media and Reflections on Nursing Education

Given that nursing students extensively use social media for accessing information, social interactions, and academic activities, integrating computer-assisted and e-learning programs into nursing education has become increasingly prevalent.[18] Videos and images related to course content are shared via social media, and students are encouraged to comment on these posts and answer questions asked on social media. Thus, it has been observed that the use of social media in nursing education improves communication, collaboration, information sharing, and students' critical thinking and clinical decision-making skills.[19] Digital storytelling, which involves creating short first-person video narratives by integrating recorded audio, images, music, and other multimedia elements, has been increasingly utilized in nursing education to enhance student engagement and comprehension.[20] Nursing students can capture events and objects with their smartphones and instantly share them on social media. It is used in combination with digital storytelling teaching methods through social media. For instance, in a case discussion on anaphylaxis, educators can employ digital storytelling via social media to present images and multimedia content illustrating its causes, clinical manifestations, and treatment strategies, thereby fostering interactive learning.[21, 22] With cinematic technology, many films can be used as an engaging teaching strategy to develop nursing students' critical thinking skills and apply the technique of in-class discussion.[3] Eweida et al.[23] used a cinematic simulation technique to increase nursing students' psychiatric clinical experience. In this study, nursing students were shown standardized instructional videos about people with mental health problems. It was determined that the empathy levels of nursing students increased with this application. Park and Cho[24] also showed six films determined by the researchers to first and second-year nursing students and then a discussion was held. After this application, it was determined that the inclusion of films in nursing education was effective in increasing nursing students' perceptions of nursing, nursing values, and satisfaction.

Distance Education and Reflections on Nursing Education

Both educational strategies and the use of technological tools in nursing education are constantly evolving to adapt to changing needs and advances. One of these is the distance education method. Distance education, which started to be used in nursing education, has become more widespread in recent years, especially after disasters such as the COVID-19 pandemic and earthquakes.[1, 4, 25] Distance education is an education system in which the educator and the student are in different places and use video, audio, computer, and multimedia technology tools. It is used in courses with intense theoretical content in nursing education.[4, 26] There are many applications such as Edmodo, Edpuzzle, Kahoot, MOOC, Zoom, Google Classroom, Microsoft Teams, Skype, Padlet that are used in the distance or face-to-face education process. These applications provide various interactive features such as word clouds, concept mappings, educational videos, and gamification, all of which enhance student engagement and promote active learning in nursing education. In addition, these applications can be used both in the application and measurement and evaluation phases of the nursing education process. These applications, developed in line with technological developments, enable educators to manage courses successfully, develop nursing students' critical thinking skills and increase their willingness to learn.[3]

Artificial Intelligence and Reflections on Nursing Education

Artificial intelligence, one of the most important technologies of today, aims to mimic cognitive functions through computers and to give computers the ability to learn cognitive functions such as judgment and decision-making. In artificial intelligence studies in the field of education, it can be seen that data and logic-based artificial intelligence and artificial intelligence applications are used in many fields as well as knowledge-based approach. Individualized education or dialogue education applications, exploratory education, data mining in education, article analysis of students, intelligent agents, chatbots, artificial intelligence-based evaluated systems, and automatic test creation systems can be examples of these applications. All of these applications support learning.[27, 28]

Nursing is a dynamic field that must constantly renew itself in line with new technologies and the demands of society.[27] For this reason, nursing educators should follow current developments in order to provide quality care and include the necessary innovations in the nursing education programme for these developments. In order to make effective applications for the integration of artificial intelligence applications into nursing education, nurse educators need to know the potential usage areas, challenges, ethical considerations, and limitations of artificial intelligence. The correct inclusion of artificial intelligence in the nursing education

program by educators will contribute to providing nursing students with an individual learning experience and identifying areas of difficulty.[29]

The impact of technology on nursing education includes both advantages and challenges. Below is a summary of its positive and negative aspects.[2, 30, 31]

- Making it easier to become a lifelong, self-directed learner,
- Increasing the independence of nursing students in learning,
- Providing flexibility in time and place,
- Providing innovative learning and teaching strategies,
- Enhancement of students' critical thinking, creative thinking, problem solving skills,
- Increase in interest and motivation in learning,
- Virtual reality and virtual patient applications enhance students' self-confidence, particularly during skill training. They also reduce application-related stress and minimize patient safety risks, such as procedural errors.

The negative aspects of using technology in nursing education: [2, 31]

- High implementation and maintenance costs,
- Educators' inability to adapt to rapidly developing technology,
- Insufficiency of educator-student and student-student interaction, especially in distance education systems,
- Lack of infrastructure,
- Threats from malware attacks.

CONCLUSION

In the 21st century, it is inevitable to use technology in transferring knowledge to our students who have strong ties with technology. It is crucial to plan the education programme by considering the positive and negative aspects in reflecting the developing technology to nursing education. It has been observed that with the use of current technological tools and methods in nursing education, there is an increase in the cognitive, affective and psychomotor learning of nursing students, and they are more interested and willing to learn. For this reason, it is important for the success of education that nurse educators continuously follow technological developments and incorporate technology into nursing education. In this way, nursing education will contribute to the training of professionals who can provide better quality and safer services in health care. By enhancing individual learning experiences, the integration of technology in nursing education has the potential to improve overall healthcare efficiency and patient outcomes.

Conflict of Interest and Financial Support Statement

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Authors' Contribution Statement

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REFERENCES

1. Ulupınar F, Toygar ŞA. Hemşirelik eğitiminde teknoloji kullanımı ve örnek uygulamalar. Fiscaoeconomia 2020; 4(2): 524-537. DOI: 10.25295/fsecon.2020.02.013.

2. Gause G, Mokgaola IO, Rakhudu MA. Technology usage for teaching and learning in nursing education: An integrative review. Curationis 2022; 45(1): a2261. https://doi.org/10.4102/curationis.v45i1.2261.
3. Güngör DC, Özkütük N, Orgun F. Hemşirelik eğitimine değişen ve gelişen teknolojilerin yansımaları. Sağlık Akademisyenleri Dergisi 2023; 10(1): 155-161. https://doi.org/10.52880/sagakaderg.1120307
4. Şenyuva E. Teknolojik gelişmelerin hemşirelik eğitimine yansımaları. Florence Nightingale Hemşirelik Dergisi 2019; 27(1): 79-90. DOI: 10.26650/FNJN322556
5. Gündoğdu H, Dikmen Y. Hemşirelik eğitiminde simülasyon: sanal gerçeklik ve haptik sistemler. Journal of Human Rhythm 2017; 3(4): 173-176.
6. Aygin D, Çelik Yılmaz A. Hemşirelik eğitiminde teknolojinin etkisi ve teknoloji tabanlı öğrenme yöntemlerinin kullanımı. Izmir Democracy University Health Sciences Journal 2022; 5(1): 32-46. Doi: 10.52538/iduhes.1012220.
7. Koukourikos K, Tsaloglidou A, Kourkouta L, Papathanasiou IV, Iliadis C, Fratzana A, Panagiotou A. Simulation in clinical nursing education. Acta Informatica Medica 2021; 29(1): 15-20. doi: 10.5455/aim.2021.29.15-20
8. Plotzky C, Lindwedel U, Sorber M, Loessl B, König P, Kunze C, Kugler C, Meng M. Virtual reality simulations in nurse education: A systematic mapping review. Nurse Education Today 2021; 101: 104868. https://doi.org/10.1016/j.nedt.2021.104868
9. García-Pazo P, Pol-Castañeda S, Moreno-Mulet C, Pomar-Forteza A, Carrero-Planells A. Virtual reality and critical care education in nursing: A cross-sectional study. Nurse Education Today 2023; 131: 105971. https://doi.org/10.1016/j.nedt.2023.105971
10. Abbas JR, O'Connor A, Ganapathy E, Isba R, Payton A, McGrath B, Tolley N, Bruce IA. What is virtual reality? A healthcare-focused systematic review of definitions. Health Policy and Technology 2023; 12(2): 100741. https://doi.org/10.1016/j.hlpt.2023.100741
11. Hite R. Virtual reality: Flight of fancy or feasible? Ways to use virtual reality technologies to enhance students' science learning. The American Biology Teacher 2022; 84(2): 106-108. https://doi.org/10.1525/abt.2022.84.2.106
12. Choi J, Thompson CE. Faculty driven virtual reality (VR) scenarios and students perception of immersive VR in nursing education: A pilot study. AMIA Annu Symp Proc 2023; 377-384.
13. Higazy OA, Ali AA, Hakami EA, Taha AAE, Egaili KA, Fadlalmola HA. Exploring transformative role of virtual reality technology in nursing education and patient care: A narrative review. Rawal Medical Journal 2023; 48(4): 1065-1069. doi: 10.5455/rmj.20230828092451
14. Min A, Min H, Kim S. Effectiveness of serious games in nurse education: A systematic review. Nurse Education Today 2022; 108: 105178. DOI: 10.1016/j.nedt.2021.105178
15. Suh D, Kim H, Suh EE, Kim H. The effect of game-based clinical nursing skills mobile application on nursing students. CIN: Computers, Informatics, Nursing 2022; 40(11): 769-778.
DOI: 10.1097/CIN.0000000000000865
16. Tan AJQ, Lee CCS, Lin PY, Cooper S, Lau LST, Chua WL, Liaw SY. Designing and evaluating the effectiveness of a serious game for safe administration of blood transfusion: A randomized controlled trial. Nurse Education Today 2017; 55: 38-44. https://doi.org/10.1016/j.nedt.2017.04.027.
17. Bayram SB, Caliskan N. Effect of a game-based virtual reality phone application on tracheostomy care education for nursing students: A randomized controlled trial. Nurse Education Today 2019; 79: 25-31. https://doi.org/10.1016/j.nedt.2019.05.010.
18. Alshammari A, Alanazi MF. Use of technology in enhancing learning among nurses in Saudi Arabia; A systematic review. Journal of Multidisciplinary Healthcare 2023; 16: 1587-1599. https://doi.org/10.2147/JMDH.S413281
19. Lopez V, Cleary M. Using social media in nursing education: An emerging teaching tool. Issues In Mental Health Nursing 2018; 39(7): 616-619. https://doi.org/10.1080/01612840.2018.1494990
20. Ginting D, Woods RM, Barella Y, Limanta LS, Madkur A, How HE. The effects of digital storytelling on the retention and transferability of student knowledge. SAGE Open 2024; 14(3): 1-17. https://doi.org/10.1177/21582440241271267

21. Erdoğan B, Altay N. The use of digital storytelling as a therapeutic communication method in pediatric nursing: Literature review. Necmettin Erbakan University Faculty of Health Sciences Journal 2022; 5(1): 1-9.
22. Shellenbarger T, Robb M. Technology-based strategies for promoting clinical reasoning skills in nursing education. Nurse Educator 2015; 40(2): 79-82. DOI: 10.1097/NNE.0000000000000111.
23. Eweida RS, Ghallab E, Ibrahim N, Khedr MA, Ali EA. Acceptability and effectiveness of cinematic simulation on leveraging nursing students' mental mastery in the psychiatric clinical experience: A randomized controlled trial. Teaching and Learning in Nursing 2024; 19(3): e531-e539. https://doi.org/10.1016/j.teln.2024.03.008
24. Park H, Cho H. Effects of nursing education using films on perception of nursing, satisfaction with major, and professional nursing values. The Journal of Nursing Research 2021; 29(3): 1-10. DOI: 10.1097/JNR.0000000000000433
25. Pregowska A, Masztalerz K, Garlińska M, Osial M. A worldwide journey through distance education-from the post office to virtual, augmented and mixed realities, and education during the COVID-19 pandemic. Education Sciences 2021; 11(3): 118. https://doi.org/10.3390/educsci11030118
26. Boz-Yüksekdağ B. Hemşirelik eğitiminde bilgisayar teknolojisinin kullanımı. Açıköğretim Uygulamaları ve Araştırma Dergisi 2015; 1(1): 103-118.
27. Gunawan J. Exploring the future of nursing: Insights from the ChatGPT model. Belitung Nursing Journal 2023; 9(1): 1-5. DOI: 10.33546/bnj.2551
28. Holmes W, Bialik M, Fadel C. Artificial intelligence in education: Promises and implications for teaching and learning. Boston, MA: Center for Curriculum Redesign; 2019.
29. O'Connor S. Open artificial intelligence platforms in nursing education: Tools for academic progress or abuse? Nurse Educ Pract 2023; 66:103537. DOI: 10.1016/j.nepr.2022.103537
30. Singh F, Masango T. Information technology in nursing education: Perspectives of student nurses. The Open Nursing Journal 2020; 14: 18-28. DOI: 10.2174/1874434602014010018.
31. Şenyuva E, Çalışkan F. Nursing students' views on the roles of lecturers in distance education during the COVID-19 pandemic in Turkey: A qualitative study. Celal Bayar Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi 2023; 10(4). https://doi.org/10.34087/cbusbed.1297737.