TRANSFORMING NURSING EDUCATION: THE IMPACT OF AI ON TRAINING THE NEXT GENERATION OF NURSES

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AI is poised to play a huge role in training future nurses, offering tools that enhance both learning and patient care. The impact of AI on training future nurses is significant, offering both challenges and opportunities. AI can help nurses by improving education, streamlining clinical practice, and enhancing decision-making skills.

The goals of the article are to study the efficiency of AI for training future nurses and to share our practical experience on the successful integration of AI educational content.

AI blends technology with real-world application in a way that can make a huge difference in nursing education. AI-powered simulations can create realistic, diverse scenarios that challenge students in ways traditional training can't always do – without any risk to actual patients. AI can also help track long-term outcomes by analyzing a student's performance and predicting their future success. This can give instructors valuable insights into where students may need additional support, enabling more proactive and personalized interventions.

We suggest that one of the best ways to train nursing students is through AI-driven simulations that reflect real clinical situations. These can range from basic skills (e.g., administering medications) to complex cases (e.g., managing patients with multi-organ failure). AI should provide real-time feedback on the student's decisions, technique, and reasoning, helping them refine their skills in a controlled, low-risk environment.

By preparing nursing educators to effectively integrate AI, focusing on human-centered care, and encouraging ongoing education, we can create a new generation of nurses who are tech-savvy, compassionate, and capable of using both technology and empathy to provide the best possible patient care. The key is to view AI as an augmentation of nursing education rather than a replacement for human interaction or the critical aspects of nursing practice.

Keywords: nursing education; AI educational content; nursing students; human-centered care; nursing practice.
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ТРАНСФОРМАЦІЯ МЕДИЧНОЇ ОСВІТИ: ВПЛИВ ШІ НА ПІДГОТОВКУ НОВОГО ПОКОЛІННЯ МЕДИЧНИХ СЕСТЕР

Штучний інтелект (ШІ) відіграє значну роль у підготовці майбутніх медсестер, надаючи інструменти, які значно поліпшують як навчання, так і догляд за пацієнтами. Вплив ШІ на підготовку медичних сестер є величезним, відкриваючи і нові можливості, і виклики. Завдяки ШІ, медсестри можуть вдосконалити свою освіту, оптимізувати клінічну практику та поліпшити навички прийняття рішень.

TRANSFORMING NURSING EDUCATION: THE IMPACT OF AI ON TRAINING THE NEXT GENERATION OF NURSES

ШІ поєднує сучасні технології з реальними практичними застосуваннями, що може радикально змінити підхід до освіти медсестер. Зокрема, симуляції на основі ШІ дають змогу створювати реалістичні та різноманітні сценарії, які змушують студентів долати труднощі, коли традиційні методи навчання не завжди можуть цього досягти – і все це без жодного ризику для реальних пацієнтів. Крім того, ШІ може здійснювати довгостроковий моніторинг успішності студентів, аналізуючи їхні результати та прогнозуючи майбутні досягнення. Це дає викладачам важливу інформацію, яка допомагає ідентифікувати області, де студент може відчувати потребу у додатковій підтримці, що забезпечує проактивний та персоналізований підхід до навчання.

Одним із найефективніших методів навчання студентів є використання симуляцій на основі ШІ, які відображають реальні клінічні ситуації. Вони можуть варіюватися від базових навичок, таких як введення ліків, до складних випадків, наприклад, ведення пацієнтів із поліорганною недостатністю. ШІ також може надавати зворотний зв'язок у реальному часі щодо рішень, технік та міркувань студентів, допомагаючи їм удосконалювати свої навички в контрольованому середовищі з низьким рівнем ризику.

Ключовим аспектом для успішної інтеграції ШІ в навчання є підготовка медсестер-педагогів, з акцентом на догляд, орієнтований на пацієнта, і заохочення постійного навчання. Такий підхід уможливить сформувати нове покоління медсестер, які володіють як технічними навичками, так і співчуттям, здатних поєднувати технології та людяність для надання найкращого догляду за пацієнтами.

Головним є те, щоб розглядати штучний інтелект не як заміну людської взаємодії, а як важливе доповнення до медсестринської освіти, що дозволяє зберегти критичні аспекти медсестринської практики, такі як емпатія, критичне мислення та прямий догляд за пацієнтами.

Ключові слова: медсестринська освіта; зміст навчання ШІ; студенти медсестри; пацієнтоорієнтована допомога; медсестринська практика.

Introduction. AI-driven technologies have ushered in a new era of personalized learning, enabling nurses to acquire essential skills and competences. The impact of AI on training future nurses is transformative, enhancing education and improving patient care. AI can greatly lessen administrative tasks, improve clinical decision-making, and support remote patient monitoring, etc. The opportunities of applying artificial intelligence in nursing education include improving learning outcomes and emotional regulation of nurses during their work. The impact of AI on training future nurses is significant, offering both challenges and opportunities. AI can help nurses by improving education, streamlining clinical practice, and enhancing decision-making skills. AI is poised to play a huge role in training future nurses, offering tools that enhance both learning and patient care.

Therefore, AI in education is particularly fascinating. It blends technology with real-world application in a way that can make a huge difference in nursing education. Nurses often face high-stakes decisions with patients who may have complex, unpredictable conditions. AI-powered simulations can create realistic, diverse scenarios that challenge students in ways traditional training can't always do – without any risk to actual patients. Thus, the ability to offer instant feedback during these simulations means that students can quickly adjust their approach, learn from mistakes, and improve in real-time, much like in sports or music training. That type of active learning is powerful for retention and confidence-building requiring nurses to continuously acquire new knowledge and skills R. Fritz & G. Dermody [5]

AI is revolutionizing nursing education by offering personalized, efficient, and accessible training methods that equip future nurses with the skills needed to provide exceptional patient care. Through advanced simulations, predictive analytics, and real-time support, AI is not only enhancing the learning experience but also contributing to improved healthcare outcomes. However, nurses must develop a deep understanding of AI tools to ensure they can integrate them effectively into patient care. There's also a concern about technology replacing human touch or reducing critical thinking skills if not integrated thoughtfully. It is noteworthy that balancing AI and human-centered care is crucial.

The **goals** of the article are to study the efficiency of AI for training future nurses and to share our practical experience on successful integration of AI educational content.

Literature review. Gary Glauberman, Avree Ito-Fujita, Shayna Katz, James Callahan investigate AI in Nursing Education: Opportunities and Challenges; Igal Lifshits, Dennis Rosenberg study Artificial intelligence in nursing education; Bohn, Anselmann discuss Artificial intelligence in nursing practice – A Delphi study with ChatGPT; Abdulqadir J. Nashwan, Ahmad A. Abujaber illustrate Embracing artificial intelligence in nursing education: preparing future nurses for a technologically advanced healthcare landscape; Ferhat Onur Agaoglu, Murat Baş, Sinan Tarsuslu, Lokman Onur Ekinci define Serial mediating role of transformational leadership and perception of artificial intelligence use in the effect of employee happiness on innovative work behaviour in nurses; Wesam Taher Almagharbeh, Hazem Abdul Kareem Alfanash, Khaldoon Aied Alnawafleh, Amal Ali Alasmari, Faris Abdelkarim Alsaraireh, Mutaz M. Dreidi & Abdulqadir J. Nashwan introduce Application of artificial intelligence in nursing practice: a qualitative study of Jordanian nurses' perspectives, etc.

Methods. A comprehensive systematic review of the literature was performed using targeted keywords to gather up-to-date evidence on the integration of artificial intelligence (AI) in both nursing education and

practice. A thematic analysis was employed to identify key recurring themes, providing valuable insights into the prospective influence of AI on the evolution of nursing education and practice.

Discussion. As one can consider that AI in "nursing practice will advance in the modern healthcare landscape" C. Ronquillo [6] and can assess the strengths and weaknesses of nursing students, tailoring educational content and simulations to suit their individual learning needs. This can ensure that each student progresses at their own pace and receives targeted support.

Thus, AI in education is occurring on a global scale with a principal objective to prepare students for the future workforce JC. De Gagne [3] Machine learning algorithms can analyze students' movements or decision-making processes to determine whether they are following best practices ensuring that AI can give realistic, practical advice and feedback to nursing students during training. AI can also help track long-term outcomes by analyzing a student's performance and predicting their future success. This can give instructors valuable insights into where students may need additional support, enabling more proactive and personalized interventions.

Nevertheless, AI may "transform the role of nurses" T. Clancy [2] and help track long-term outcomes by analyzing a student's performance and predicting their future success. AI can help future nurses sharpen their decision-making abilities by providing them with real-time data during their training. For instance, AI can offer suggestions based on patient data, helping nursing students learn how to quickly analyze information and make informed choices, thus preparing them for high-pressure environments. This can give teachers valuable insights into where students may need additional support, enabling more proactive and personalized interventions. It highlights as C. Ronquillo, et.al. [6] stated that "nurses' understanding of the relationship between the data they generate and the AI technologies they use".

AI can also create realistic hospital environments for students to practise navigating clinical workflows, like managing patient records, working with multidisciplinary teams, and making care decisions under pressure. These systems helps students understand the nuances of real-world healthcare environments without overwhelming them. Virtual patient simulations powered by AI allow students to practise diagnosing and treating various conditions in a risk-free environment. These simulations can mimic a range of patient responses, offering real-world scenarios that are difficult to replicate in traditional classrooms, providing instant feedback during training, whether in simulations or clinical practice. This could be anything from assessing a nurse's technique to providing suggestions on improving decision-making processes, helping students learn from their mistakes in real time. AI-powered tools can also help nursing students learn how to make more

informed decisions. By providing evidence-based guidelines and facilitating evidence based decision making G. Rubeis [7], predictive analytics, and real-time patient data, AI can help students understand how to assess complex clinical situations.

We suppose that the combination of these tools can prepare nurses not just for technical tasks, but also for critical thinking, decision-making, and emotional intelligence needed in today's fast-paced healthcare settings. Training AI and ensuring professional competence for future nurse students go hand-in-hand, especially as AI becomes an integral part of healthcare system. For AI to effectively support nursing education, both the technology and the students need to be carefully prepared. AI needs access to high-quality, diverse data to reflect the full spectrum of nursing scenarios including data on various patient populations, medical conditions, treatments, and outcomes. AI system should be trained to recognize subtle signs in patient symptoms considering different cultural factors and adjusting its recommendations based on individual needs.

We suggest that one of the best ways to train nursing students is through AI-driven simulations that reflect real clinical situations. These can range from basic skills (e.g., administering medications) to complex cases (e.g., managing patients with multi-organ failure). AI should provide real-time feedback on the student's decisions, technique, and reasoning, helping them refine their skills in a controlled, low-risk environment. As healthcare practices evolve, AI systems should be able to update their knowledge bases and algorithms, ensuring that nursing students are learning using the most current, evidence-based practices enabling student nurses to adeptly use AI in practice A. Abujaber [1]. But we should not forget that nurses need to be trained to use AI tools effectively rather than rely on them entirely. AI should serve as a support system to enhance their decision-making, but nurses should still develop critical thinking, emotional intelligence, and the ability to engage in hands-on care. Training should include a balance between AI-driven knowledge and traditional clinical skills.

Thus, integrating soft skills into training is very significant as AI can assess clinical competence, but soft skills like communication, empathy, and teamwork require a human touch. By combining AI's analytical power with human insight, future nurse students will be equipped with both the technical skills and the compassionate, critical-thinking abilities needed for excellent patient care. While AI can simulate patient interactions to some degree, students still need real-world experience working with patients, families, and healthcare teams. Incorporating training on emotional intelligence, cultural competence, and collaborative care into curricula will be vital.

AI systems need to be programmed to adhere to ethical guidelines, and care must be taken to ensure

they are free from biases related to race, gender, socio-economic status, or other factors. This makes AI more equitable in its recommendations and training as future nurses need to understand the ethical considerations surrounding the use of AI in healthcare. They should be trained on how to balance the convenience and efficiency of AI with the ethical responsibility to provide personalized, compassionate care. This includes knowing when to trust AI recommendations and when to override them based on clinical judgment.

Future nurses should be trained to work alongside AI and other healthcare professionals. AI teachers could walk students through a simulated patient interviews or provide instantaneous feedback on assignments such as drafting succinct clinical documentation or calculating medication dosages G. Sun [8]. This means understanding the strengths and limitations of AI, how to communicate effectively with AI-powered tools, and how to use these tools as part of a multidisciplinary healthcare team. Interdisciplinary collaboration will become a critical skill, and nursing students should learn how AI can support – but not replace – the human aspects of care.

Conclusions. Incorporating AI into nursing education offers a powerful opportunity to equip students with the knowledge and skills necessary to thrive in an increasingly technology-driven healthcare landscape. This integration allows future nurses to understand AI's transformative role in healthcare, enhancing clinical decision-making, optimizing healthcare delivery, and ultimately improving patient outcomes. However, the key lies in viewing AI as a tool that augments, rather than replaces, the critical human elements of nursing practice.

By preparing nursing educators to seamlessly integrate AI into the curriculum, the focus should remain on human-centered care. AI can provide immense support in areas such as patient monitoring, predictive analytics, and decision-making, but it is essential that students are trained to balance these technological advancements with the compassion, empathy, and ethical considerations that define nursing practice. Ongoing education will also be crucial to ensure that nurses continue to adapt to evolving technologies while maintaining their commitment to holistic patient care.

The primary challenge for educators during this transition will likely be striking the right balance bet ween technology and human-centered care. It's not enough to simply incorporate AI tools into the curriculum; it's vital to ensure that nursing students retain a strong foundation in the core values of the profession – empathy, critical thinking, and direct patient interaction – while learning to leverage technology effectively. By fostering this balance, we can cultivate a new generation of nurses who are not only tech-savvy but also deeply compassionate and equipped to provide the highest quality care through both technology and human connection.

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"Машина, здається, віддаляє нас від природи. І саме вона з особливою суворістю підкоряє нас вічним законам природи".

*Антуан де Сент-Екзюпері
французький письменник*

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