



Research Article

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Teaching Nurses in The Digital Age: The Transformative Roles of Artificial Intelligence

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Abstract

Artificial intelligence (AI) is one of the most revolutionary technologies in healthcare and higher education and has transformed the way future healthcare professionals are prepared. AI has the potential to transform nursing education in ways that were previously unimaginable, such as enhancing teaching and learning, clinical reasoning, competency assessment, and personalised education via intelligent tutoring systems, adaptive learning platforms, virtual simulations, predictive analytics, and generative AI applications. The rapid digital revolution spurred by the COVID-19 epidemic has further underscored the necessity for nurse educators to infuse AI into curricula while ensuring that technological improvements complement rather than displace the humanistic values inherent to nursing practice. The tremendous promise of AI adoption, however, is accompanied by major worries about ethical governance, academic integrity, algorithmic prejudice, data privacy, faculty preparation, digital inequalities, and overreliance on automated decision-making. This critical study synthesises current information from contemporary literature to analyse the expanding role of artificial intelligence in nursing education. It critically assesses the revolutionary applications of AI in training nurses, addresses the pedagogical and ethical problems involved with the use of AI, and considers upcoming trends that are expected to influence the future of nursing education. The review believes that AI should be considered an educational partner that augments the skills of nurse educators, rather than substitutes for them. Successful deployment involves curriculum redesign, faculty development, institutional investment, solid governance structures, and evidence-based policies that encourage equitable and responsible use of AI. To prepare nurses for increasingly digital healthcare systems, we need to educate graduates who have not just excellent clinical competence but also digital literacy, ethical awareness, critical thinking and the ability to cooperate effectively with intelligent technologies.

Keywords: Artificial intelligence, nursing education, digital health, nurse educators, higher education, simulation, adaptive learning, generative AI.

Introduction

Healthcare is undergoing an extraordinary digital transformation enabled by breakthroughs in artificial intelligence (AI), machine learning, robotics, big data analytics and intelligent clinical decision-support systems. These technology advances are revolutionising the delivery of health care, health care research, health care management, and the education of health care professionals throughout the world. Nursing is an especially critical sector in the health professions, with nurses being the largest component of the global health workforce and central to patient care, health promotion, disease prevention and coordination of health services. Thus, there is a need for nursing education to swiftly adapt to equip graduates who can perform effectively within increasingly technology-enabled healthcare environments[1].

Artificial intelligence is a broad term that refers to the ability of computing systems to execute tasks that would normally require human intelligence. These include the ability to learn from experience, recognise patterns, understand natural language, solve complicated problems, make predictions and assist decision-making. Today's AI technologies include machine learning, deep learning, natural language processing, computer vision, predictive analytics, conversational bots, and generative AI systems that can create text, graphics, simulations and educational content. Unlike past educational systems that mainly enabled content distribution, AI provides intelligent engagement, personalisation, and constant adaptation to individual learners' needs[2].

The advent of AI brings a profound transformation in educational philosophy. The traditional teacher-centred approaches, which are based on the passive transmission of knowledge, are progressively giving way to learner-centred pedagogies, which put the emphasis on critical thinking, problem solving, collaboration, lifelong learning and competency-based education. AI technology behind these educational changes make personalised learning, instant feedback, adaptive assessment, and immersive simulations possible to enhance the quality of learning. In nursing education where theoretical knowledge needs to be combined with psychomotor abilities, clinical reasoning, communication and professional judgement, AI provides chances to bridge the gap between classroom learning and clinical practice[3]. The COVID-19 epidemic has sped up the digital transformation of educational institutions around the world. Lockdowns, restrictions on clinical placements and social distancing techniques pushed nursing schools to move to online learning, virtual simulations, telehealth education and digital assessment strategies within a very short time frame. AI-enabled educational tools emerged during this shift to assist remote teaching, automated student feedback, intelligent tutoring, and virtual clinical encounters. These developments emphasised the robustness of digital education and the need for future nurses to be prepared with abilities relevant to technology-enabled healthcare systems [4].

But we need to balance the excitement for AI with cautious contemplation. While AI has major educational benefits, there are issues about algorithmic bias, transparency, ethical accountability, privacy, academic integrity, faculty preparation, access to technology, and the possible reduction of the interpersonal aspects of nursing education. At the core nursing is based on compassion, empathy, therapeutic communication and ethical decision making – qualities which cannot be duplicated by sophisticated algorithms. Therefore, AI should not be seen as a replacement for educators, but rather as a complementing tool to enhance instruction while maintaining the humanistic basis of the profession[5]. Recent systematic evaluations suggest that the evidence for AI in nursing education is growing, however most of the research remains exploratory and is mostly from high-income nations. There is comparably little information on sustainable implementation, educational efficiency, cost-effectiveness and ethical governance in resource-constrained contexts, especially in low- and middle-income nations. Closing these knowledge gaps is critical to ensure that AI contributes substantially to egalitarian, evidence-based nursing education worldwide[6]. With this in mind, this review critically examines the transformative role of artificial intelligence in nursing education, reviews the existing evidence on its educational impact, discusses major challenges in implementation, and explores future directions that may influence nursing education in the digital age.

Artificial Intelligence and the Evolution of Nursing Education

The incorporation of AI into nursing education is part of a larger trend in healthcare education spurred by the quick pace of technology change and the increasing complexity of contemporary healthcare environments. Traditionally, nursing education depended mainly on face-to-face lectures, supervised clinical placements, laboratory demonstrations and an apprenticeship model in which students learned by observation and repeated practice. These approaches remain fundamental but are increasingly challenged by the growth in student numbers, the dearth of qualified clinical teachers, restricted clinical placements, concerns about patient safety and the rapid change in health care technologies. Many of these difficulties in education have been proposed to be addressed by AI by increasing the effectiveness of teaching, improving learning and enabling competency-based education[7].

Educational technology has evolved through a number of different periods. Early innovations were in computer-assisted training, multimedia presentations, and learning management systems that made access to educational content easier. Development thereafter brought e-learning platforms, virtual classrooms, mobile learning and high-fidelity simulation which allowed more flexibility and learner interaction. The contemporary time is characterised by intelligent educational systems that are able to analyse the conduct of learners, adjust the teaching tactics, forecast the educational results and provide personalised feedback according to the individual performance. This is a move away from technology as a passive information repository and towards it as an active educational partner[8].

Artificial intelligence has opened up new pedagogical avenues for nurse educators. Machine learning algorithms can study the students' learning patterns and pinpoint gaps in knowledge that require focused attention. Conversational AI systems rely on natural language processing to answer queries, generate explanations, summarise complicated scientific publications, and provide individualised academic support. With computer vision technology, psychomotor skills in simulation exercises can be assessed automatically. Predictive analytics can identify children at risk of academic failure, leading to early educational interventions. Together, these characteristics allow for educational experiences to be more personalised, efficient and sensitive to learners' developing needs[9].

One of the biggest advancements in recent years has been the introduction of generative artificial intelligence. Large language models can be leveraged to generate educational materials, write case studies, create clinical situations, develop formative evaluations, and facilitate academic writing. These technologies have revolutionised the development of educational resources, lowering faculty burden and improving the availability of customised learning content. However, generative AI also raises serious concerns about accuracy, inaccuracy, plagiarism, intellectual property, and the development of independent critical thinking skills in pupils. Nurse educators confront the combined challenge of successfully integrating these technologies while developing responsible and ethical use of AI[10].

AI has also largely redefined simulation-based teaching. Conventional simulation is not very flexible and use pre-set situations. However, AI-driven simulations can dynamically change patient responses based on students' clinical decisions, providing more authentic and individualised learning experiences. Intelligent virtual patients can simulate realistic physiological changes, emotional responses, and changing clinical situations that challenge students to employ clinical reasoning, communication, teamwork, and decision-making abilities in real time. These technologies improve experiential learning and reduce hazards to patient safety[11].

Most importantly, the incorporation of AI in nursing education is more than the enhancement of instructional efficiency. It indicates a significant change in the skills needed by modern nurses. There is an increasing need in contemporary healthcare for digitally literate workers who can interpret clinical information produced by AI, collaborate with intelligent technologies, critically appraise algorithmic recommendations, and ensure that technology serves patients in an ethical and equitable manner. Therefore, AI is no longer only an instructional tool; it is an integral part of the professional training of future nurses[12]. Hence, from an educational viewpoint, AI should not be seen as an end in itself, but rather as a catalyst to transform nursing education into a more flexible, learner-centred, evidence-informed, and technology-integrated discipline. Its long-term success will need not only on technology sophistication, but also on deliberate curriculum development, faculty competence, ethical governance, and continuing research evaluating educational effects across diverse[13].

Artificial Intelligence in Teaching Nurses: Transformative Roles

Artificial Intelligence (AI) is changing the nature of nursing education, moving away from a standardised, teacher-centered model toward a personalised, competency-based, and data-driven educational model. Traditional educational technology, on the other hand, has been largely a conduit for information delivery. AI is an active participant in knowledge acquisition, clinical reasoning, skill development, evaluation, and continued learner engagement. New evidence indicates that AI can enhance educational results, improve instructional efficiency, and better equip nursing graduates for increasingly digital healthcare settings. However, the pedagogical value of AI lies in its intentional integration into pedagogy rather than its sheer availability. Therefore, AI should be viewed as a disruptive educational collaborator that helps and strengthens the skills of nurse educators[14].

Personalised Learning and Adaptive Education

One of the key contributions of AI in nursing education is personalised learning environments. The traditional nursing education is standardised with a curriculum based on the assumption that students learn at the same pace and in similar ways of teaching. However, the educational background, learning preferences, cognitive capacities and clinical experiences of nursing students are different. AI-driven adaptive learning technologies cater to these variations by assessing student performance, pinpointing knowledge gaps, and altering instructional content to suit individual learning demands. Machine learning algorithms are constantly assessing the student's answers throughout quizzes, simulation exercises, and online activities to identify the areas that require further reinforcement. Students who grasp certain topics can proceed at a faster pace, and students who struggle with learning are given more instructional resources, customised feedback, and individual opportunity to practise. This adaptable strategy encourages self-directed learning, reduces cognitive overload, and increases knowledge retention[15].

Despite frequent reports of increased learner engagement and academic success using adaptive learning technology, research on long-term knowledge retention and clinical competence is mixed. Critics claim that dependence on algorithm-driven personalisation may mistakenly limit learners' exposure to unusual or challenging clinical circumstances which are necessary for the development of professional judgement. Thus, adaptive learning should supplement, not supplant, a comprehensive curriculum design that offers students a variety of clinical experiences[16].

Intelligent Tutoring Systems and Virtual Academic Assistant

Artificial intelligence has also changed the academic assistance landscape, with intelligent tutoring systems (ITS) providing personalised education outside of traditional classroom settings. In contrast to traditional online learning platforms that only provide instructional content, ITS interactively communicate with learners by assessing questions, detecting misconceptions, providing explanations and recommending further learning resources.

Conversational AI systems powered by natural language processing (NLP) may answer questions from students, elucidate

complex physiological mechanisms, explain disease processes, summarise scientific material, and reinforce pharmaceutical concepts in real time. These technologies provide instant feedback so students can learn at their own pace without having to wait for instructor availability. Intelligent tutoring technologies provide a promising option for extending academic support and sustaining educational quality in nursing programmes confronting increased student enrolment and teacher shortages[17].

Generative AI systems also assist students in clarifying concepts, preparing for exams, reflective writing, and synthesising evidence, further improving educational accessibility. But these technologies have substantial educational challenges. AI-generated responses may not always be accurate, current, or properly referenced, and learners may accept wrong information without critical review. Also, overreliance on AI-generated explanations may prevent independent thinking and problem-solving skills. Therefore, nurse educators need to reinforce the need for AI literacy by training students to critically appraise AI-generated material rather than take automated responses at face value[18].

AI-powered Clinical Simulation and Experiential Learning

Clinical education continues to be the cornerstone of nursing training, but rising student numbers, restricted clinical placements, patient safety concerns and workforce shortages have posed considerable problems for nursing schools across the globe. AI-enhanced simulation can bypass many of these constraints, offering immersive learning settings that closely duplicate complicated clinical situations without exposing patients to unnecessary risks.

The typical simulation scenario is frequently pre-scripted and offers little flexibility. In contrast, AI-powered simulation changes patient reactions on the go in response to students' clinical decisions, communication skills, drug delivery, and priorities for care. During the learning process, virtual patients may experience physiological decline, emotional reactions, reactions to treatment, or unforeseen consequences. Such realism allows students to combine academic knowledge with clinical reasoning, cooperation and decision making under realistic conditions [19].

Virtual reality (VR), augmented reality (AR), and mixed reality technologies facilitate experiential learning by providing students the opportunity to frequently practise techniques in secure situations. AI may assess students' technical performance, spot procedural flaws, measure response times, and suggest individualised recommendations for improvement. These qualities encourage intentional practice, build learners' confidence, and decrease anxiety prior to genuine patient contacts.

While there are benefits, the simulation cannot completely mirror the nuances of actual clinical environments, notably the interpersonal elements of caring for patients. The development of compassion, empathy, therapeutic communication, cultural sensitivity and ethical judgement happens predominantly through real human interactions. Therefore, AI-augmented simulation should be used to complement rather than replace direct clinical experience with patients[20].

Enhancing Clinical Reasoning and Decision-Making

Clinical reasoning is one of the most critical qualities expected of newly qualified nurses. In the practice of nursing, the nurse integrates the patient's history, physical evaluation, laboratory results, clinical guidelines, and contextual information to make safe and evidence-based judgements. AI has a great potential to support the development of these competencies in the education of nurses.

Decision-support systems offer students complicated clinical scenarios that require differential diagnosis, prioritisation of nursing interventions, drug management, and early detection of patient deterioration. AI algorithms can create dynamic clinical scenarios which evolve according to the choices of students, forcing them to repeatedly assess the status of patients and change care strategies. This interactive learning environment replicates the uncertainties of real clinical practice and encourages higher-order thinking rather than memorisation.

Predictive analytics offer even more depth to clinical teaching by showing how machine learning models detect patients at risk for sepsis, falls, pressure injuries, hospital readmission or clinical deterioration. This familiarity will equip future nurses to understand the clinical recommendations that are provided by AI, while being professionally responsible for end decisions.

But instructors must guard against automation bias, the temptation to embrace algorithmic recommendations without adequate critical review. More and more research is backing up the idea that AI should enhance clinical discretion, not replace it. Students must consequently learn not only how AI arrives at suggestions, but also why those recommendations may be inadequate, prejudiced, or clinically incorrect [21].

Changing Assessment and Competency Evaluation

Assessment is one of the most labour consuming aspects of nursing education. Artificial Intelligence allows new techniques for assessment of cognitive knowledge, psychomotor skills, communication skills and professional conduct using automated and continuous assessment systems.

AI-enabled assessment tools may examine students' examination responses, uncover reoccurring misconceptions, produce personalised feedback, and recommend focused remediation. Computer vision technology can objectively assess procedural abilities during simulation by evaluating hand location, sequence of activities, adherence to aseptic protocols, and time to completion of clinical operations. Automated analytics also enable instructors to track the progression of learners in a longitudinal manner instead of depending on high-stakes examinations[22].

AI is also an important enabler of competency-based education by putting the focus on demonstrable performance, not time spent in educational sessions. Continuous evaluation provides the early identification of pupils at risk of falling behind, allowing timely academic interventions before learning deficiencies become irreversible. However, the exclusive use of computerised assessment presents fundamental issues of fairness, validity and transparency. Professional traits such as empathy, ethical reasoning, cultural competency, leadership and interpersonal communication are challenging to assess with present AI systems. Thus, human educators are essential in evaluating these complicated aspects of professional nursing competency.

Curriculum Innovation and Generative Artificial Intelligence

The rise of generative AI is one of the most significant educational advances of the previous decade. Large language models can quickly produce lecture notes, clinical case scenarios, examination questions, simulation scripts, patient education materials and literature summaries. These capabilities greatly reduce faculty effort and increase curriculum flexibility. Nurse educators are also increasingly using generative AI to create realistic clinical situations that represent actual healthcare concerns, improving classroom discussions and simulation exercises. The use of AI in curriculum building also allows for quick upgrading of teaching material based on growing clinical guidelines and emerging scientific knowledge. Generative AI can be thought of as a personal tutor for the learner, able to clarify complex ideas, provide practice questions, summarise research articles, and facilitate evidence-based learning. These types of software enable active learning and improve access for students who need more academic support.

However, generative AI raises significant threats to academic integrity. Students might cheat using AI, to write essays, do assignments or prepare for exams without really comprehending. In addition, AI-generated content sometimes contains made-up references, incorrect clinical information or old suggestions. Rather than banning AI, nursing programmes should develop explicit institutional policies that promote the ethical use of AI, and re-design evaluations to emphasise critical thinking, reflective practice and authentic clinical application[13].

Supporting research and evidence based practice Evidence-based practice is the scientific foundation of modern nursing. Graduates are expected to be able to locate, critique, synthesise and apply research findings to clinical decision making. Artificial intelligence is more and more supporting these competencies, by assisting literature research, evidence synthesis, data analysis and scientific writing.

For example, nursing students can use AI-powered research tools to quickly find relevant papers, summarise systematic reviews, organise references, assess qualitative data, and interpret complex statistical outputs. The technologies cut down administrative loads, allowing students to concentrate more on critical assessment and interpretation of the facts. But AI-generated literature summaries do not replace for careful scientific examination. Students need further work on their research methodology, epidemiology, biostatistics and critical appraisal skills to be able to discern good quality evidence from inaccurate or deceptive AI output. AI should be treated as a research assistant and not as a scientific authority with independence[4].

Staff Development and Educational Leadership

Faculty expertise and institutional leadership are essential for successful integration of AI into nursing education. Many nurse educators were trained prior to the advent of modern AI technology and may be ill-prepared to apply intelligent educational systems into instruction. Thus, faculty development has become an essential prerequisite for successful AI application.

Professional development programs should go beyond technical training and encompass curriculum redesign, instructional innovation, ethical governance, AI literacy, data privacy, assessment redesign, and critical evaluation of AI-generated educational materials. Faculty also need opportunities to interact with experts in computer science, educational technology, health informatics, and ethics to enable responsible AI deployment.

AI is also changing the role of the teacher – crucially. Nurse educators are increasingly becoming facilitators of learning, mentors in critical thinking, ethical advisors, and designers of technology-enhanced educational experiences rather than being just information producers. This shift increases the continued necessity of human knowledge in digitally changed learning environments.

The potential of artificial intelligence for education is great, but present evidence does not support uncritical uptake. Many published research involve pilot projects, single institutions or limited sample sizes, restricting the ability to generalise.

Furthermore, educational outcomes are often more orientated towards learner pleasure and short-term information acquisition rather than long-term clinical competence, patient outcomes, or professional performance. There is also minimal research on AI implementation in low- and middle-income nations with varying digital infrastructure, faculty readiness, and financial resources compared with high-income settings.

Future study should go beyond the demonstration of technology feasibility and evaluate the educational effectiveness, cost-effectiveness, equality, ethical governance, and long-term effects on nursing practice. Ultimately, AI should be evaluated not on its technological advancements, but on its capacity to cultivate competent, compassionate, ethically grounded and digitally equipped nurses capable of delivering high quality patient-centred care in an increasingly complicated healthcare environment[22].

Ethical Considerations and Challenges

AI has enormous potential to revolutionise nursing education, but its widespread implementation is fraught with significant pedagogical, ethical, legal, and organisational issues. While AI offers the potential to improve efficiency, personalisation and accessibility, it also presents basic problems of educational quality, professional accountability, academic integrity, equity, and safeguarding the humanistic values that characterise nursing. So, successful AI integration demands rigorous governance, not naïve technological enthusiasm.

One of the biggest challenges is faculty preparedness.” Many nursing educators were prepared before the advent of AI-enabled educational tools and are not formally trained in digital pedagogy, prompt engineering, machine learning applications, learning analytics, and AI ethics. Faculty uncertainty can lead to uneven uptake, innovative resistance, or improper reliance on commercially accessible AI solutions without sufficient pedagogical scrutiny. The circumstance highlights the necessity for continuing faculty development courses that go beyond technological expertise to encompass instructional design, ethical use of AI, digital evaluation and curriculum redesign. Institutional leadership is also key in providing financial investment, technical support, and clear governance norms to enable sustained implementation. A second concern is intellectual honesty. Generative AI systems that can write essays, literature reviews, clinical reflections, treatment plans, and answer test questions have radically challenged standard assessment approaches. But these technologies can also help learning while at the same time enabling plagiarism, contract cheating, shallow learning and less development of independent critical thinking. Plagiarism detection software currently available cannot reliably discriminate between AI-generated and human-generated content, making traditional assessment increasingly unreliable. Instead of banning AI, nursing schools should re-design assessments to focus on authentic clinical reasoning, reflective practice, oral examinations, simulation-based assessment and problem-solving activities that require students to demonstrate true understanding and professional judgement.

Algorithmic prejudice is another important issue. AI systems learn from existing datasets that may have historical, demographic, socioeconomic, racial or gender biases. As a result, AI-based educational recommendations may unwittingly perpetuate inequalities, especially when training data sets are not adequately representative of minority groups or under-resourced healthcare settings. Nursing education is rooted in social justice and equitable healthcare, and needs to critically analyse AI algorithms to ensure that educational technologies foster inclusiveness, and do not perpetuate inequality. Nurse educators should thus foster students’ abilities to critically question algorithmic results, rather than uncritically adopting AI advice.

And data privacy and cybersecurity must be top of mind. AI-enabled educational platforms often capture large amounts of learner data such as academic performance, behavioural analytics, learning preferences, biometrics during simulation and interaction histories. Unauthorised access, cyber attacks or abuse of educational data could threaten confidentiality and damage institutional confidence. As a result, educational institutions need to adopt comprehensive cybersecurity infrastructure such as encryption, secure cloud storage, multi-factor authentication, restricted access, and compliance with national data protection laws. Training in safe data management and digital professionalism for academics and students is equally crucial.

There are also concerns that the rise in AI could lead to the dehumanisation of nursing education. Nursing is essentially relational, with emphasis on empathy, compassion, cultural sensitivity, therapeutic communication, ethical reasoning and patient advocacy. Competencies are learned through real encounters of persons and not by algorithmic teaching. An over-reliance on AI-assisted learning may inadvertently limit opportunities for experience learning, mentorship, reflective discussion and the development of emotional intelligence. Therefore, AI should be used to supplement, not replace, human teachers, and maintain the human connections that are integral to the professional character of nursing. The other concern is the digital gap that affects equitable implementation. Significant discrepancies remain in access to dependable internet connectivity, digital devices, simulation laboratories and technological infrastructure, especially in low- and middle-income nations. If AI ends up concentrated in resource-rich institutions, these inequities could exacerbate educational inequalities. Thus, sustainable AI deployment necessitates concurrent investments in digital infrastructure, inexpensive technology, faculty capacity-building, and institutional collaborations to ensure fair access to all educational contexts.

Finally, significant regulatory and legal questions are yet unresolved. The issues of intellectual property, copyright of AI-generated instructional content, accountability for AI-driven clinical decisions, transparency of algorithmic procedures, and certification criteria are still evolving. Nursing regulatory agencies, educational institutions, and professional organisations should work together to develop robust governance structures that support ethical, transparent, and accountable application of AI in nursing education. Collectively, these issues indicate that AI implementation is not solely a technological issue, but a complicated educational transition that demands multidisciplinary collaboration, ethical leadership, institutional preparation, and evidence-based policymaking.[23]

Future Directions and Research Priorities

We may expect to see more and more artificial intelligence infused into nursing education in the next ten years. Future advances will likely move from standalone educational applications to full digital learning ecosystems that integrate AI, virtual reality, augmented reality, robots, wearable technology, learning analytics, and immersive simulation. Such advances could change nursing education into a highly individualised, competency-based, and continually adaptive learning environment.

A priority that is emerging is the development of AI-enabled competency-based education, where intelligent algorithms continuously track the progress of the learners and offer individualised educational courses. Such approaches may supplant traditional time-based educational models with flexible competency achievement that more accurately reflects actual clinical performance rather than classroom attendance.

Another major direction is the expansion of AI-enhanced virtual patients and intelligent simulations. Advances in natural language processing and computer vision will enable virtual patients to demonstrate more realistic physiological responses, emotional expressions, ethnic diversity and complex clinical deterioration, thereby enhancing clinical reasoning and communication skills.

AI literacy should be a basic professional capability in future nursing programs. To be effective in increasingly digital healthcare systems, graduates will need a solid understanding of machine learning, algorithmic bias, health informatics, predictive analytics, digital ethics, cybersecurity and human-AI collaboration. Moving research priorities away from descriptive studies to a comprehensive study of the long-term educational impact of AI. There is a need for large multicentre randomised research to assess whether AI-enhanced education enhances clinical competence, patient safety, professional performance, workforce readiness and healthcare outcomes. Economic evaluations considering implementation costs and return on investment are equally significant especially in resource constrained environments.

There is a dearth of information from low- and middle-income nations, particularly in sub-Saharan Africa, where internet infrastructure, faculty capacity and healthcare goals are very different than those in high-income regions. Therefore, context-specific implementation research is needed to ensure that the adoption of AI contributes to global educational equity, rather than increasing existing inequities. Future research should also focus on the ethical governance of AI, including openness, explainability, justice, accountability and responsible innovation. The development of AI systems that are congruent with the values and obligations of the nursing profession will necessitate interdisciplinary collaboration among nurse educators, computer scientists, ethicists, educational psychologists, policymakers, and healthcare administrators[24].

Conclusion

Arguably, artificial intelligence is one of the most important breakthroughs in current nursing education. Its ability to personalise learning, boost clinical reasoning, improve simulation, automate assessment, support evidence-based practice, and increase access to educational resources has made AI a strong driver for educational revolution. AI is not just a technology, it is changing the paradigm of nursing education by facilitating learner-centred, competency-based, and data-informed teaching techniques.

However, AI should not be considered as a replacement for nurse educators or the humanistic foundations of nursing. Compassion, empathy, ethical reasoning, cultural competence, and therapeutic communication are distinctively human characteristics that cannot be mimicked by clever algorithms. And so, the educational value of AI is in its potential to augment, not replace, human expertise and professional judgement and mentorship. The future of nursing education will demand educators with pedagogical brilliance and digital competence, graduates who can critically cooperate with intelligent technology, and institutions dedicated to responsible innovation through evidence-based governance. Investments in faculty development, curriculum revision, digital infrastructure, ethical regulation, and implementation research will be critical to harnessing the promise of AI to bolster nursing education globally. The success of integrating artificial intelligence should ultimately be judged not by technological sophistication but by its ability to produce competent, compassionate, ethically rooted, and digitally ready nurses who can deliver safe, equitable, and patient-centered care within an increasingly smarter health care landscape.

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