

Artificial Intelligence in Health Professions Education

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Artificial intelligence (AI) has emerged as a powerful tool, leveraging computers and machines to [apparently] mimic the problem-solving and decision-making capabilities of the human mind. It can exhibit various levels of autonomy (perform tasks without constant guidance) and adaptivity (improve by learning from experience) depending on its design, capabilities, and the context in which it operates. For a long time, Hollywood has been grappling with how AI could harm or destroy the human race. A common thread in famous movies like Terminator, Matrix, or Mission Impossible is that AI has a mind of its own that threatens all of humanity and the fate of the human race is at stake. We have yet to reach this kind of self-aware AI and systems that have a sense of self only exist in stories. Current models only have a one-way relationship and bow to every human command. One of the most significant recent developments in AI is the advent of ChatGPT, a language model developed by OpenAI. It has a remarkable ability to process human language (text or speech) to understand its full meaning (intent and sentiment), setting a record for the fastest-growing user base in history by reaching one million users within five days.¹ This rapid adoption of ChatGPT underscores the transformative potential of various AI applications in all fields of life, including Health Professions Education (HPE).

Strengths

One of the greatest strengths of Artificial Intelligence (AI) is its ability to process and analyze large amounts of data quickly and accurately to reach a solution or make predictions. This ability of AI can be used for

the personalizing learning, automating administrative tasks, enhancing PowerPoint presentations, generating authentic clinical cases, preparing assessments, providing instant feedback, and conducting basic literature searches. AI can help in developing adaptive learning environments for students, where educational content is tailored to the learning needs and style of each student. This adaptive learning approach can help students master complex topics more efficiently, ensuring a deeper understanding of the material.² Thus, ensuring that each student is adequately challenged and supported in their learning journey. AI applications can also provide real-time analysis of students' performance, helping educators to identify areas for improvement and immediate support. Integrating AI-based Natural Language Processing technologies in simulation-based education may help the students refine their clinical skills in a risk-free environment, enhancing their clinical reasoning abilities to reach a differential diagnosis and develop patient management plans effectively. Clinicians can also harness AI to explore history, cross-check diagnoses, prescribe medicines, and confirm exact dosages based on individual genetic profiles.³ This is particularly helpful for oncologists and pediatricians, where the treatment efficacy may significantly vary among patients.⁴ For radiologists, AI algorithms can analyze radiographs, CT, and MRI scans to enhance the accuracy of diagnosis and prognoses.⁵ All these and other applications of AI can serve as a powerful tool for teaching healthcare students, managing patients, and improving patient outcomes.

Limitations

Despite the benefits, there are several limitations and challenges related to the use of AI in academia and healthcare. AI systems are complex and often operate as a 'black box'. This lack of transparency makes it difficult to trust or be held accountable for its conclusions. This lack of transparency can be problematic for educators and clinicians, who are keen on evaluating the process as well as the product.⁶ Biased outputs resulting from the quality of training data and flawed algorithms during the development process are also critical concerns. If the training data is biased, the AI will likely produce systematically unfair outputs and result in selection bias. These issues could lead to a particular group being unfairly treated or disadvantaged. Ensuring that AI systems are trained on diverse and representative datasets is essential to mitigate these biases.⁷ Moreover, AI has been reported to generate make-up information that is not based on actual data, often referred to as AI Hallucinations. Legal and ethical concerns such as data security, privacy, confidentiality, autonomy, informed consent, and the accountability of potential treatment based on AI-related information also need careful consideration, especially due to increasing cyber-security threats and attacks happening every day. With the evolving AI landscape, it is essential to establish robust regulations for the legal and ethical use of AI in academia and healthcare.⁸ These regulations should include guidelines on data security, patient confidentiality, and the appropriate use of AI by students, educators, and clinicians. There is also a need to develop stakeholders' consensus on academic and clinical tasks to be delegated to AI.

Way Forward

Current educators and clinicians having 20-40 years of practice ahead of them can no longer afford to ignore AI or take a stance of watchful waiting. Instead, they must take an activist approach toward integrating the various

applications of AI into their professional activities. The students and patients are already using it. AI queries by students and patients will inevitably lead to an evolution of their relationship with the educators and clinicians respectively. Currently, AI has a minimal presence in health professions education curricula and is primarily found as non-mandatory electives, workshops, and certificate courses. We must rethink and redesign the curricula to integrate AI and fully harness the potential of AI. This involves shifting from a traditional biomedical model to a 'biotechnomedical' model that integrates AI technologies for educating health professionals. Introduce health professionals and students to the key components of AI. The AI curriculum for health professionals may include an introduction to the basics of AI, its relevance in healthcare, hands-on experience with medical chatbots, algorithms behind X-ray, CT and MRI scan, case studies on AI's diagnostic accuracy, machine learning for personalized medicine, ethical implications and biases in medical AI. By fostering a deep understanding of AI and its capabilities, students can learn to use these technologies effectively and responsibly.⁹

To conclude, future health professionals need to understand how AI works to use it effectively in practice. A proactive approach will ensure that AI is used to enhance, rather than replace, the essential human elements of healthcare.³ As AI has the potential to automate many administrative tasks, it may allow educators and clinicians time to perform higher-order thinking or new AI-augmented tasks. Moreover, health professionals should enhance their critical thinking skills to evaluate and interpret AI-generated data accurately. By taking an activist approach to integrating AI into HPE, we can ensure that these technologies are used ethically and effectively to benefit both educators and learners.

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