Canadian Medical Education Journal
Revue canadienne de l'éducation médicale

Harnessing Artificial Intelligence's potential in undergraduate medical education: An analysis of application and implication

Exploiter le potentiel de l'Intelligence Artificielle dans l'enseignement médical de premier cycle : une analyse de l'application et de l'implication

Candelaria Aristizabal Londono, Chun Huang et Garson Chan

Volume 15, numéro 3, 2024

URI : https://id.erudit.org/iderudit/1112784ar
DOI : https://doi.org/10.36834/cmej.78483

Aller au sommaire du numéro

Éditeur(s)

Canadian Medical Education Journal

ISSN

1923-1202 (numérique)

Découvrir la revue

Citer ce document

Aristizabal Londono, C., Huang, C. & Chan, G. (2024). Harnessing Artificial Intelligence's potential in undergraduate medical education: An analysis of application and implication. *Canadian Medical Education Journal / Revue canadienne de l'éducation médicale*, *15*(3), 119–120. https://doi.org/10.36834/cmej.78483

Canadian Medical Education Journal

Commentary and Opinions

Harnessing Artificial Intelligence's potential in undergraduate medical education: an analysis of application and implication

Exploiter le potentiel de l'Intelligence Artificielle dans l'enseignement médical de premier cycle : une analyse de l'application et de l'implication

Candelaria Aristizabal Londono,[1] Chun Huang,[2] Garson Chan[2,3]

[1]College of Medicine, University of Saskatchewan, Saskatchewan, Canada; [2]Department of Surgery, Division of Urology, College of Medicine, University of Saskatchewan, Saskatchewan, Canada; [3]Department of Obstetrics and Gynecology, College of Medicine, University of Saskatchewan, Saskatchewan, Canada

Correspondence to: Candelaria Aristizabal Londono; email: ury430@usask.ca

Published ahead of issue: Dec 19, 2023; published: Jul 12, 2024. CMEJ 2024, 15(3). Available at https://doi.org/10.36834/cmej.78483

Medical education should evolve to reflect societies' needs and their corresponding patterns of practice. The 21st century has seen an influx of changes to undergraduate medical education as the system transforms in order to ensure that learners become competent practitioners. Artificial intelligence (AI) is expected to profoundly influence not only the content of medical education curricula but also its delivery. Given the potential for AI to decrease medical education costs, and augment student learning, there is value in further exploring its role as an academic tool.[1] Our analysis outlines the current strategies used by undergraduate medical education programs for the implementation of AI as an adjuvant learning tool as well as the potential challenges that may follow.

There is limited research on the effectiveness of AI as an adjuvant learning and assessment tool in undergraduate medical education. One study conducted by Hamdy et al. examined the validity of AI-based virtual patients in assessing non-psychomotor competencies among medical students.[2] They found that virtual clinical encounters using high-fidelity AI-based patients were comparable to direct observation clinical assessments when identifying clinical incompetence among students.[2] Maicher and colleagues were also successful in developing an AI-based virtual standardized patient that could fulfill a similar role.[3] Their system was comparable to human examiners in its ability to assess students' medical history taking skills.[3] Additionally, the AI-based virtual standardized patients offered students the opportunity to practice their skills and receive immediate feedback, which has been shown to have positive effects on learner outcomes and accelerates learners' mastery of the skills when compared to delayed feedback.[3-5] The individualized feedback provided contributed to learners' knowledge acquisition and skill development.[6] The ability to provide immediate feedback strongly supports the incorporation of AI as an adjuvant learning tool in undergraduate medical education. Given the potential of AI to augment students' learning, undergraduate medical trainees are thought to be an optimal target population.[6] AI technology has the potential to support learners in skill mastery, improve learning outcomes by providing practice opportunities, and create immersive learning experiences with the use of limited resources. It would be disadvantageous to ignore its potential use in undergraduate medical education and when responsibly integrated, AI can enhance student learning and optimize the educational process.

The release of ChatGPT 3.0 drastically changed the landscape of AI, raising a new array of concerns regarding the safety and security of AI chat technology. One major concern is that the use of AI as a medical tool may lead to biased diagnoses and dangerous recommendations that could put patients at greater risk.[7] The use of AI technology in undergraduate medical education could also expose students to biases and errors in thinking, which, without adequate guidance, could negatively impact students' skill

development and clinical reasoning abilities. Additionally, some AI algorithms have been shown to be discriminatory against certain racial groups, minority groups, women, cultures, and ideologies.[8] This occurs because AI algorithms are trained on data sets, and the selective curation of the training library introduces biases when improperly controlled.[8] In the spring of 2023, The Washington Post published an article questioning the safety of AI programs like ChatGPT after it invented a sexual harassment scandal and named a law professor as the accused.[9] This event highlighted one of the pitfalls of chatbots and, consequently, AI technology. The ability to misrepresent key facts and fabricate sources is dangerous and raises questions about its role as a tool in more sensitive settings such as medicine. When using these programs, we must understand that current AI is a language model and not a knowledge database. Large language models can be incorrect and lack the ability to weigh the importance of all available information. Although it has the potential to reduce clinical errors due to cognitive biases, a sufficiently large and responsibly developed database is needed for it to be an effective academic tool. Other worries about the use of AI have been raised in the context of academia. Scholars are concerned about the use of ChatGPT to dishonestly complete assignments and assessments. Additionally, concerns have been raised about its proliferative effects on scientific writing. Concerns also exist about students' over-reliance on chatbots and AI as the use of these programs may diminish their ability to identify, appraise, and synthesize their own information when in practice. To ensure that the benefits of AI outweigh its risks, these concerns must be recognized and appropriately addressed.

AI is evolving at an exponential rate. Given its potential impact on medicine and medical education, there is a need for our systems to adapt to maximize the benefits for all parties involved and minimize many of its potential dangers. Undergraduate medical education trainees, in particular, could significantly benefit from AI technology. They would not only benefit from developing a greater understanding of the technology and its applications in medicine but also from its use as an adjuvant educational tool. As a result, there is a need to incorporate education on AI into the medical education curriculum and to develop techniques for its use as an educational tool. Future research should focus on identifying effective strategies to educate trainees on the topic and support their learning. Furthermore, research should aim to identify the most effective way to execute its inclusion. Lastly, institutions should direct their efforts to the development of a regulatory framework. This would not only help guide the development of curriculum content, but it would also work to ensure that the contributions of AI as an adjuvant educational tool are beneficial.

Conflicts of Interest: There is no conflict of interest or funding provided for this research.
Edited by: Marcel D'Eon (editor-in-chief)

References

1. Rowson M, Smith A, Hughes R, et al. The evolution of global health teaching in undergraduate medical curricula. *Global health*. 2012;8(1):35-. https://doi.org/10.1186/1744-8603-8-35
2. Hamdy H, Sreedharan J, Rotgans JI, et al. Virtual Clinical Encounter Examination (VICEE): a novel approach for assessing medical students' non-psychomotor clinical competency. *Med Teach*. 2021;43(10):1203-9. https://doi.org/10.1080/0142159X.2021.1935828
3. Maicher KR, Zimmerman L, Wilcox B, et al. Using virtual standardized patients to accurately assess information gathering skills in medical students. *Med Teach.* 2019;41(9):1053-9. https://doi.org/10.1080/0142159X.2019.1616683
4. Papa FJ, Aldrich D, Schumacker RE. The effects of immediate online feedback upon diagnostic performance. *Acad Med.* 1999;74(10):S16-S8. https://doi.org/10.1097/00001888-199910000-00027
5. Garner MSMPH, Gusberg RJMD, Kim AWMD. The positive effect of immediate feedback on medical student education during the surgical clerkship. *J Surg Ed* 2014;71(3):391-7. https://doi.org/10.1016/j.jsurg.2013.10.009
6. Chan KS, Zary N. Applications and challenges of implementing artificial intelligence in medical education: Integrative review. *JMIR med educ.* 2019;21(6):e13930-e. https://doi.org/10.2196/13930
7. Richie CS. Environmentally sustainable development and use of artificial intelligence in health care. *Bioethics.* 2022;36(5):547-55. https://doi.org/10.1111/bioe.13018
8. Mesko B, Gorog M. A short guide for medical professionals in the era of artificial intelligence. *NPJ dig med.* 2020;3(1):126-. https://doi.org/10.1038/s41746-020-00333-z
9. Verma P, Oremus W. *ChatGPT invented a sexual harassment scandal and named a real law prof as the accused*. The Washington Post. 2023.