Training and Research | Role of Artificial Intelligence and the WFME Standards

AMCOA 2024 - Regulation in the Era of Artificial Intelligence

Zambia, Africa

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President

Introduction

The World Federation for Medical Education aims to enhance the quality of medical education and to promote the highest standards.

It is a partnership organisation of the world's six regional associations for medical education, also working with its two founding members WHO and WMA, and four executive members, JDN, IFMSA, AMEE and INTEALTH.

It was founded in 1972.

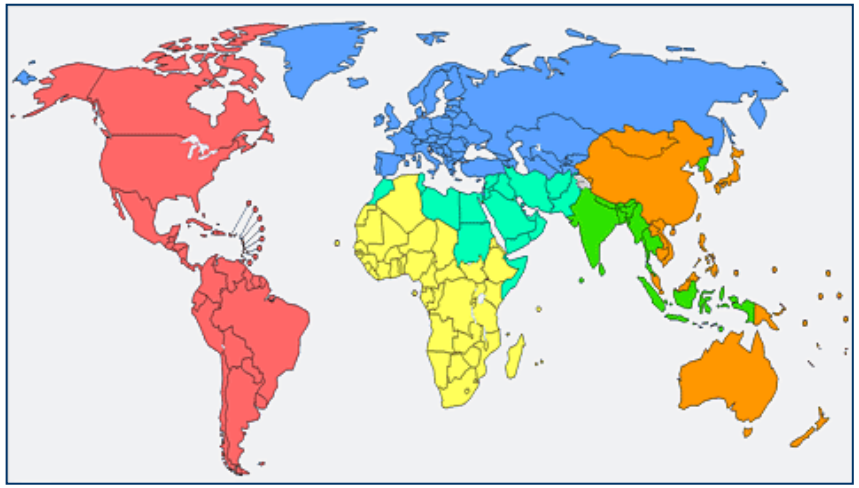
Three main priorities among many others:

- promotion of accreditation through the WFME Recognition Programme
- raising the standards for BME, PGME and CPD
- maintaining the *World Directory of Medical Schools*

Regional members of WFME

FEPAFEM PAFAMS

AMSE THE ASSOCIATION OF MEDICAL SCHOOLS IN EUROPE



ASSOCIATION FOR MEDICAL EDUCATION IN THE EASTERN MEDITERRANEAN REGION
AMEEMR

AMSA AFRICAN MEDICAL SCHOOLS ASSOCIATION

Western Pacific Association for Medical Education

World Health Organization

WMA

IFMSA International Federation of Medical Students' Associations

Executive members of WFME

JUNIOR DOCTORS NETWORK

WMA

Intealth™ Advancing the Global Health Workforce

ECFMG™ A Division of Intealth

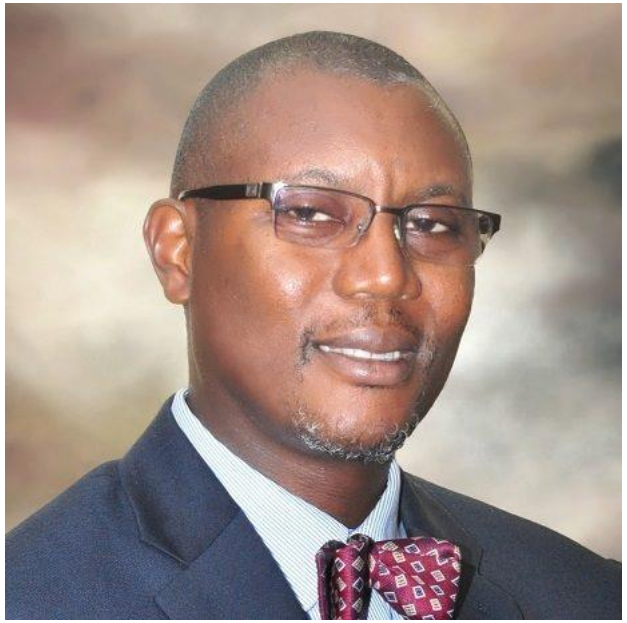
FAIMER™ A Division of Intealth

amee An International Association for Health Professions Education

WFME Executive Council

Professor Emiola Oluwabunmi Olapade-Olaopa

President of the Association of Medical Schools of Africa (AMSA)



VISION

To improve health for all through quality medical education

MISSION

To enhance the quality of medical education through global leadership in promotion of standards, recognition of accreditation and engaged collaborations to support the continuum of medical education worldwide.

PRIORITIES

- Standards (BME, PGME, CPD, Distance Learning, Masters)
- Recognition Programme (BME, PGME, CPD)
- World Directory of Medical Schools

VALUES

- Collaboration
- Integrity
- Respect

Purely voluntary. If used, can be modified to suit local context

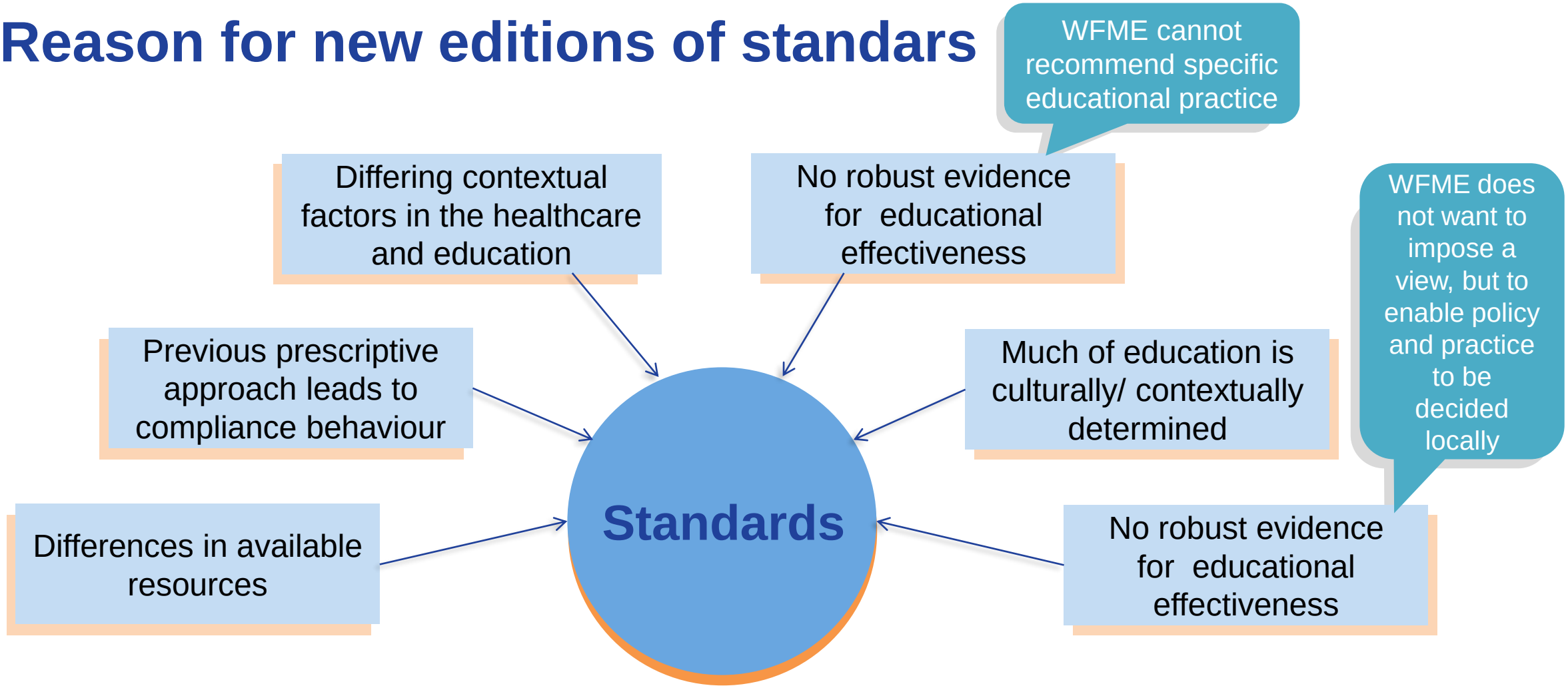
WFME standards
are available for:

- Distributed and distance learning
- Basic medical education
- Postgraduate medical education
- Continuing professional development

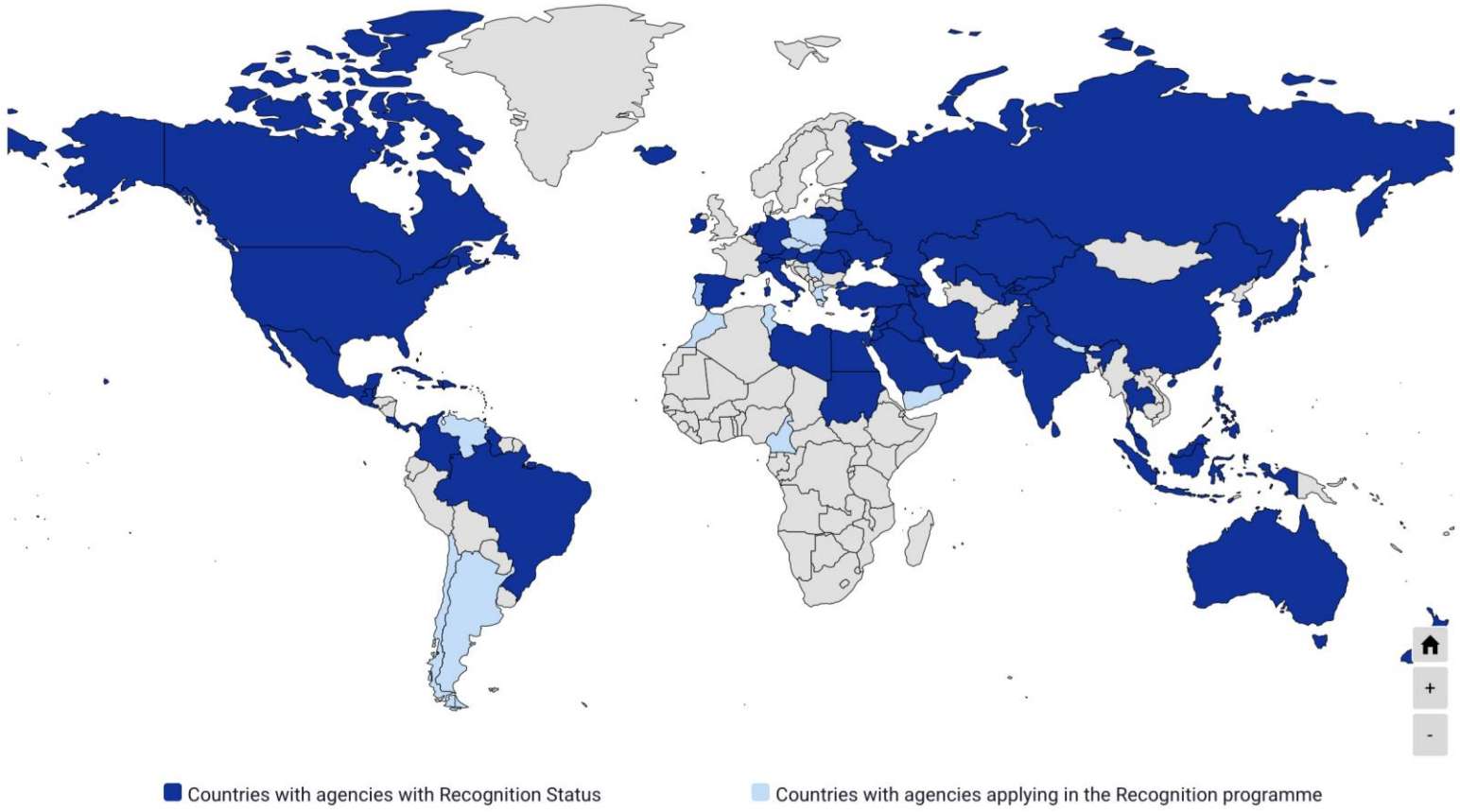
Revision of medical education standards

Basic Medical Education	Published in 2020
Post Graduated Medical Education	Published in 2023
Continue Professional Development	Being revised for 2024 publication
Distributed and Distance Learning	Published in 2021

Reason for new editions of standars



Recognized Countries 45 in progress 12 May 2024



Role of Artificial Intelligence and the WFME Standards

Introduction to AI in Medical and Health Education

- In the rapidly evolving landscape of education, Artificial Intelligence (AI) stands out as a transformative force, reshaping traditional learning into dynamic and interactive experiences.
- The integration of AI within education, especially in medical and health disciplines, marks a shift towards more personalized and adaptive learning environments (1, 2). AI's role extends from streamlining administrative tasks to offering bespoke learning journeys, highlighting its potential to revolutionize education by making it more attuned to individual needs and the demands of modern healthcare practices (3, 4).
- AI's impact on medical education is particularly significant, with its applications ranging from virtual patient simulations to adaptive learning algorithms(5).

Yoshinari,G H, & Magalhães, L **Ethical challenges in the use of artificial intelligence (AI) in medicine: human and non-human caring**
1. Masters K. Artificial intelligence in medical education. Med Teach. 2019;41(9):976-80.
2. Vitorino LM, Yoshinari Júnior GH. Artificial intelligence as an ally in Brazilian nursing: challenges, opportunities and professional responsibility. Rev Bras Enferm. 2023;76(3):e760301.
3. Parycek P, Schmid V, Novak A-S. Artificial Intelligence (AI) and Automation in Administrative Procedures: Potentials, Limitations, and Framework Conditions. Journal of the Knowledge Economy. 2023:1-26.
4. Vitorino LM, Júnior GHY. ChatGPT and the teaching of contemporary nursing: And now professor? J Clin Nurs. 2023;32(21-22):7921-2.
5. Yoshinari Júnior GH, Vitorino LM. How may ChatGPT impact medical teaching? Rev Assoc Med Bras (1992). 2023;69(4):e20230282.

Introduction to AI in Medical and Health Education

- Such innovations enhance the educational experience, preparing students for the complex realities of healthcare. Virtual simulations allow for the practice of diagnostic and decision-making skills within a safe, controlled environment, enhancing the comprehension of medical principles and patient care (6).
- This not only improves educational outcomes but also bridges the gap between theoretical knowledge and practical application.
- Furthermore, AI supports educators by automating routine tasks, such as grading and attendance tracking, thereby enabling a focus on personalized interaction and teaching. Advanced analytics powered by AI assist in identifying students needing extra support, facilitating timely intervention and customization of help.
- AI's capability to keep educational content current, by integrating the latest medical research into learning materials, ensures that students are learning from the most recent and relevant information.

6. Zhang W, Cai M, Lee HJ, Evans R, Zhu C, Ming C. AI in Medical Education: Global situation, effects and challenges. Education and Information Technologies. 2023:1-23.

Introduction to AI in Medical and Health Education

- For students, AI provides a learning experience tailored to their individual pace and style, through intelligent tutoring systems that offer personalized feedback and guidance.
- Virtual simulations present opportunities for hands-on practice without the risks associated with real-life patient care. AI also fosters a collaborative learning environment by recommending study groups or partners, enhancing the sense of community within the educational setting (7).
- The success of AI in education is contingent on the availability of rich medical datasets, which fuel the realism of simulations and the effectiveness of personalized learning paths.
- This reliance on data highlights critical ethical considerations, including privacy, consent, and data security, setting a foundation for a deeper exploration of the ethical dimensions of AI in medical education (8).

7. Seo K, Tang J, Roll I, Fels S, Yoon D. The impact of artificial intelligence on learner– instructor interaction in online learning. International Journal of Educational Technology in Higher Education. 2021;18(1):54.
8. Nguyen A, Ngo HN, Hong Y, Dang B, Nguyen B-PT. Ethical principles for artificial intelligence in education. Education and Information Technologies. 2023;28(4):4221-41.

Introduction to AI in Medical and Health Education

- As we navigate these considerations, the importance of ethical data use becomes a central theme, leading to a broader discussion on ensuring AI's responsible and beneficial integration into medical and health education.
- To address these issues, there's a critical need for integrating discussions on data ethics, privacy, and fairness into the medical curriculum, preparing students to confront and navigate these ethical complexities in their future practice.
- Such opacity underscores the urgent need for improved transparency and interpretability within AI technologies, especially in educational settings where the stakes for accuracy and fairness are notably high.
- In medical and health education, the ethical landscape surrounding the use of Large Language Models (LLMs) and other AI technologies is particularly fraught with challenges around data privacy, confidentiality, and algorithmic bias(1, 6).

1. Masters K. Artificial intelligence in medical education. Med Teach. 2019;41(9):976-80.
6. Zhang W, Cai M, Lee HJ, Evans R, Zhu C, Ming C. AI in Medical Education: Global situation, effects and challenges. Education and Information Technologies. 2023:1-23.

Data Ethics, Bias, and Transparency in Medical AI Education

- The necessity for comprehensive medical datasets to fuel AI-driven educational tools underscores significant ethical dilemmas, especially regarding the potential misuse of sensitive information. Moreover, biases in AI algorithms can exacerbate societal and healthcare inequities, impacting educational content and students' clinical judgment (10, 11).

10. Chen RJ, Lu MY, Chen TY, Williamson DFK, Mahmood F. Synthetic data in machine learning for medicine and healthcare. Nature Biomedical Engineering. 2021;5(6):493-7.
11. Rampton V, Mittelman M, Goldhahn J. Implications of artificial intelligence for medical education. The Lancet Digital Health. 2020;2(3):e111-e2.

Data Ethics, Bias, and Transparency in Medical AI Education

- Large Language Models (LLMs) like ChatGPT epitomize the advancements in AI, offering capabilities to parse and analyze extensive datasets to mimic human language richness. This process, reliant on vast amounts of diverse text data, is designed to capture the complexity of human communication across various contexts, enabling LLMs to produce responses that closely resemble human discourse.
- However, this dependency on large datasets introduces significant ethical considerations, particularly the potential for inherent biases. These biases may stem from unrepresentative training data, distorting AI outputs and reflecting existing disparities within the model's decision-making processes.
- The phenomenon of "hallucinations," where LLMs generate information not directly derived from their training data, illustrates another layer of complexity, leading to potential inaccuracies. This, combined with the models' "black box" nature—characterized by their intricate and opaque processing—poses challenges in diagnosing and correcting biases or inaccuracies(9).

Data Ethics, Bias, and Transparency in Medical AI Education

- Achieving transparency and explainability in AI within medical education is paramount, ensuring systems are not only accurate but also understandable to users. The challenge lies in the inherent complexity of AI systems, particularly those based on deep learning, which complicates efforts to make AI's decision-making processes transparent and interpretable.
- Addressing these challenges requires a concerted effort from all stakeholders involved in AI's educational integration, advocating for the development of AI systems that are both powerful and accountable(11).
- By prioritizing transparency and ethical considerations, such as data ethics and bias mitigation, we can ensure that AI technologies are effectively and responsibly harnessed to enrich medical education, ultimately leading to a healthcare workforce that is both technologically proficient and ethically informed.

11. Rampton V, Mittelman M, Goldhahn J. Implications of artificial intelligence for medical education. The Lancet Digital Health. 2020;2(3):e111-e2.

Impact on the Educator and Learner Relationship

- The advent of AI in medical and health education heralds a transformative shift in the dynamics between educators and learners, reshaping the traditional roles and interactions that have long characterized the educational landscape(11).
- AI's capability to personalize learning, automate administrative tasks, and provide instant feedback has the potential to greatly enhance the efficiency and effectiveness of education. However, this technological intervention also raises profound questions about the future role of human educators and the nature of the student-teacher relationship.
- As AI tools become more integrated into educational settings, there is a growing potential for these technologies to supplement, and in some cases, substitute for human instruction, prompting a reevaluation of what it means to teach and learn in the digital age (10, 12).

10. Chen RJ, Lu MY, Chen TY, Williamson DFK, Mahmood F. Synthetic data in machine learning for medicine and healthcare. Nature Biomedical Engineering. 2021;5(6):493-7.
11. Rampton V, Mittelman M, Goldhahn J. Implications of artificial intelligence for medical education. The Lancet Digital Health. 2020;2(3):e111-e2.
12. Lakhani HV, Pillai SS, Zehra M, Sharma I, Sodhi K. Systematic Review of Clinical Insights into Novel Coronavirus (CoVID-19) Pandemic: Persisting Challenges in U.S. Rural Population. Int J Environ Res Public Health. 2020;17(12).

Impact on the Educator and Learner Relationship

- The potential for AI to supplement human instruction offers exciting possibilities for enhancing educational quality and accessibility.
- AI-driven platforms can provide personalized learning experiences, adapt to individual student needs, and offer insights into student progress that can inform teaching strategies. This level of customization and support can free educators from routine tasks, allowing them to focus more on the complex aspects of teaching that require empathy, moral judgment, and critical thinking—qualities that AI cannot replicate (13).
- However, the prospect of AI substituting human educators in certain contexts raises ethical concerns regarding the depersonalization of education, the loss of direct human mentorship, and the potential erosion of ethical standards that human educators uphold.

13. Arora A, Alderman JE, Palmer J, Ganapathi S, Laws E, McCradden MD, et al. The value of standards for health datasets in artificial intelligence-based applications. Nature Medicine. 2023;29(11):2929-38.

Impact on the Educator and Learner Relationship

- The implications of these changes for educational quality and ethical standards are profound. While AI can enhance the learning experience by providing data-driven insights and freeing educators to engage in more meaningful interactions with students, the essence of education—particularly in fields as intrinsically human as medicine and health—lies in the relationship between educator and learner.
- This relationship is built on trust, empathy, and a deep understanding of ethical principles, aspects that AI cannot fully replicate. Therefore, as we navigate the integration of AI into educational contexts, it is crucial to maintain a balance that leverages the strengths of AI to enhance education while preserving the irreplaceable value of human interaction and ethical guidance in the learning process.

AI Accountability and Regulation in Education

- The advent of AI in education has ushered in a transformative era, marked by innovations that promise to redefine teaching and learning paradigms. However, this digital renaissance is accompanied by a complex web of ethical, legal, and regulatory challenges that necessitate a nuanced understanding of the evolving legislative landscape, particularly within the European Union (EU)(14).
- The EU's pioneering legislative framework, the AI Act, emerges as a cornerstone in the global discourse on AI governance, setting a precedent for a risk-based regulatory approach. This landmark Act categorizes AI systems according to the risk they pose to society, ranging from high-risk applications, which are subject to strict compliance requirements, to low or minimal risk applications, where regulatory obligations are significantly lighter(15).

14. MADIEGA TA. EU guidelines on ethics in artificial intelligence: Context and implementation. 2019.
15. Thelisson E, Verma H. Conformity assessment under the EU AI act general approach. AI and Ethics. 2024.

AI Accountability and Regulation in Education

- *High-Risk Applications in Education*
  - Within the educational sphere, AI systems classified as high-risk under the AI Act are subject to rigorous scrutiny. These systems, which might include AI-driven examination tools or personalized learning platforms, are pivotal in shaping educational outcomes and thus bear a substantial impact on students' futures. The Act mandates these high-risk applications to adhere to strict compliance measures, including transparency, data governance, and accuracy standards, to ensure their ethical deployment and operational integrity.
  - The obligation for high-risk AI systems to undergo thorough assessment processes before deployment underscores the EU's commitment to safeguarding educational equity and upholding students' rights. It reflects a conscientious effort to balance innovation with accountability, ensuring that AI applications in education enhance rather than undermine the learning experience(15).

15. Thelisson E, Verma H. Conformity assessment under the EU AI act general approach. AI and Ethics. 2024

AI Accountability and Regulation in Education

- *Low or Minimal Risk: A Space for Innovation*
  - In contrast, AI applications deemed to pose low or minimal risk are afforded a degree of regulatory latitude under the AI Act. This categorization encompasses a broad spectrum of educational tools and platforms that, while transformative, are considered less likely to have a significant adverse impact on students or the educational process.
  - The Act's nuanced approach in this regard encourages innovation and experimentation within the educational technology sector, fostering an environment where AI can be leveraged to enhance learning outcomes without the burden of onerous regulation(15).

15. Thelisson E, Verma H. Conformity assessment under the EU AI act general approach. AI and Ethics. 2024

AI Accountability and Regulation in Education

- *Unacceptable Risk:*
  - *The Red Lines* at the opposite end of the spectrum, the AI Act identifies certain uses of AI that are considered to pose an unacceptable risk and are, therefore, prohibited. In the context of education, this could relate to AI systems that manipulate student behaviors or exploit vulnerabilities, representing a clear violation of ethical principles and students' rights. By delineating these red lines, the AI Act ensures that the integration of AI into education respects the foundational values of trust, dignity, and respect for individual autonomy(15).

15. Thelisson E, Verma H. Conformity assessment under the EU AI act general approach. AI and Ethics. 2024

Ethical Frameworks for AI in Education

- As AI becomes increasingly embedded in medical and health education, it presents a dual-edged sword—offering remarkable tools for enhancing learning and decision-making while raising significant ethical dilemmas. The deployment of AI in educational settings necessitates a conscientious approach, underpinned by ethical frameworks that ensure technologies are used to benefit students ethically and equitably.
- At the heart of these considerations are the principles of autonomy, justice, beneficence, and non-maleficence, each playing a crucial role in guiding the responsible integration of AI into educational practices(16, 17).
- The principle of autonomy emphasizes the necessity of empowering users—both students and educators—by ensuring they have the knowledge and freedom to engage with AI technologies on their terms. This entails transparent information about how AI systems make decisions, the data they use, and the potential biases they may introduce.

16. Hagendorff T. The Ethics of AI Ethics: An Evaluation of Guidelines. Minds and Machines. 2020;30(1):99-120.
17. Varkey B. Principles of Clinical Ethics and Their Application to Practice. Med Princ Pract. 2021;30(1):17-28.

Ethical Frameworks for AI in Education

- Such transparency is crucial for maintaining trust and agency in educational environments, where the goal is to enhance, not undermine, the learning experience. Justice, in this context, extends beyond mere access to AI tools; it encompasses the fair distribution of their benefits and the mitigation of risks across diverse student populations. Ensuring that AI-driven educational tools do not widen the gap but rather foster inclusivity and equality is paramount(16, 17).
- Beneficence and non-maleficence serve as the ethical pillars that demand AI applications in education not only do good but also avoid harm. Beneficence calls for the development and application of AI that genuinely enhances educational outcomes, providing students with engaging, effective, and personalized learning experiences. Conversely, non-maleficence requires vigilance against the potential negative impacts of AI, such as reinforcing biases, compromising privacy, or diminishing the human interaction that is critical to the educational experience.

16. Hagendorff T. The Ethics of AI Ethics: An Evaluation of Guidelines. Minds and Machines. 2020;30(1):99-120.
17. Varkey B. Principles of Clinical Ethics and Their Application to Practice. Med Princ Pract. 2021;30(1):17-28.

Ethical Frameworks for AI in Education

- By adhering to these principles, stakeholders can navigate the complex ethical landscape of AI in education, ensuring that technological advancements serve to uplift and equalize, rather than to divide or diminish(16, 17).

16. Hagendorff T. The Ethics of AI Ethics: An Evaluation of Guidelines. Minds and Machines. 2020;30(1):99-120.
17. Varkey B. Principles of Clinical Ethics and Their Application to Practice. Med Princ Pract. 2021;30(1):17-28.

Future perspectives

- As we peer into the future of work in health professions, it becomes evident that AI education tools are not just supplementary technologies but fundamental elements reshaping the landscape of healthcare education and practice. The integration of AI into healthcare education heralds a transformative shift, where the skills and competencies required for future healthcare professionals will be markedly different from those of today.
- Embracing AI tools in education equips students with a sophisticated understanding of data analysis, machine learning, and digital ethics, preparing them for a healthcare environment where AI assists in diagnostics, treatment planning, and patient care. This preparation not only enhances their clinical skills but also cultivates a mindset that is critical, adaptive, and ethically attuned to the nuances of technology-driven healthcare.
- However, this evolution is not without its ethical challenges.

Future perspectives

- The increasing reliance on AI in healthcare education necessitates a careful balance between leveraging technology for educational advancement and preserving the humanistic values central to healthcare. The potential for AI to inadvertently perpetuate biases, infringe on privacy, or devalue the importance of empathy and interpersonal skills in healthcare underscores the need for ethical vigilance.
- Educators, developers, and policymakers must collaborate to ensure that AI tools are designed and used in ways that uphold ethical standards and foster an environment where technology enhances, rather than detracts from, the human aspects of healthcare.
- Looking ahead, the convergence of AI and healthcare education presents both profound opportunities and complex ethical dilemmas. As we navigate this evolving landscape, it is crucial to remain committed to principles of equity, transparency, and accountability.

Future perspectives

- Ensuring that AI technologies are accessible to all students, transparent in their operations and decision-making processes, and accountable for the outcomes they produce is essential. This commitment not only safeguards against ethical pitfalls but also ensures that AI serves as a catalyst for enriching medical and health education, ultimately leading to more competent, compassionate, and technologically proficient healthcare professionals.

Conclusion

- In light of these considerations, it seems clear that the integration of AI into medical and health education requires a forward-thinking approach that acknowledges the potential of technology while upholding the highest standards of ethical conduct. As we embark on this new era, it seems that the recommendations for educators, developers, policymakers and researchers are focused on fostering an educational ecosystem where AI is used responsibly.
- This would require rigorous ethical oversight, ongoing professional development for educators in the ethical use of AI, and the development of curricula that balance technological proficiency with the enduring values of care and compassion. By embracing these challenges and opportunities, we can aspire to ensure that the future of healthcare is not only technologically advanced but also ethically grounded and human-centric.
- WFME is exploring the possibility of developing new standards for AI education and updating the criteria of the Recognition Program for Basic Medical Education.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