

EDITORIAL

Harnessing Generative Ai in Medical and Health Sciences Academia: Strategic Opportunities and Ethical Dilemmas for Malaysia

Manraj Singh Cheema

Department of Biomedical Science, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400, Serdang, Selangor Darul Ehsan, Malaysia

Correspondence: Manraj Singh Cheema, manraj@upm.edu.my, +603-97692660

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INTRODUCTION

Artificial intelligence (AI) is rapidly transforming education and research across the medical and health sciences academia sectors. In Malaysia, universities are increasingly leveraging AI to enhance teaching, improve research productivity, and foster student engagement. From simulating patient scenarios to automating systematic reviews, AI's potential is vast. Yet, this digital transformation is unfolding within a critical policy vacuum, particularly in the context of health education, raising urgent ethical, pedagogical, and discipline-specific concerns. While AI comprises various technologies, this editorial focuses specifically on generative AI (GenAI) tools that can produce human-like text, images, or analyses. As with any disruptive technology, GenAI represents a double-edged sword: its benefits are substantial, but so are the associated risks. This editorial explores these dualities within Malaysia's healthcare academic landscape and proposes a path forward rooted in ethical integration and professional accountability.

OPPORTUNITIES IN TEACHING AND LEARNING

Generative AI has unlocked new possibilities in healthcare education. Tools such as ChatGPT and Med-PaLM can generate differential diagnoses, explain physiological mechanisms, and simulate clinical decision-making processes. These technologies support personalized learning, flipped classroom strategies, and case-based assessments. Educators benefit from AI in designing OSCE practice stations, simulating patient histories, and generating formative assessments. This not only saves time but also allows greater focus on student mentorship and instructional quality. The adaptability of AI-driven content delivery is especially valuable in anatomy, pathology, and public health, where spatial and scenario-based understanding is essential.

ETHICAL AND PEDAGOGICAL RISKS

While generative AI presents clear educational benefits, it also brings ethical and pedagogical risks. Students may misuse AI to generate case-based answers, lab reports, or reflective portfolios, compromising academic integrity and undermining the cultivation of clinical reasoning. In disciplines where professional judgment and ethical conduct are critical, over-reliance on AI could diminish essential critical thinking skills. Furthermore, generative AI tools can produce inaccurate or biased information, which is especially dangerous in clinical contexts. The absence of discipline-specific AI guidelines leaves educators and students uncertain about acceptable practices, increasing risks of academic misconduct, patient simulation errors, and depersonalized learning environments.(1,2).

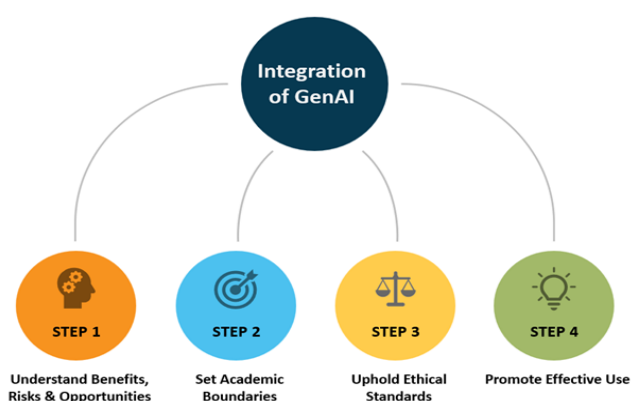


Figure 1: A Pedagogical Model for Generative AI in Medical and Health Sciences Education.

This visual framework outlines a four-step process for ethical and pedagogically sound integration of generative AI. It highlights the importance of balancing innovation with academic boundaries, ethical standards, and critical evaluation.

THE MALAYSIAN CONTEXT

Although Malaysia’s medical and health sciences faculties are progressing toward digitalization, institutional policies governing AI use remain inconsistent. Institutions such as UPM, UTM and UMPSA have issued generative AI guidelines, but few address the specific nuances of health education (3,4,5). At the national level, MOSTI’s AI Governance and Ethics Guidelines promote seven principles: fairness, reliability and safety, inclusiveness, privacy and security, transparency, accountability, and the promotion of human benefit (6). Similarly, the Malaysian Medical Council’s 2025 guideline on AI in medical practice highlights ethical compliance, clinical oversight, and patient safety, aligning with WHO recommendations (7, 8). These developments support the Pelan Strategik Pengajian Tinggi Negara (PSPTN) which emphasizes the integration of emerging technologies to future-proof higher education and the Dasar AI Negara. (National Artificial Intelligence Roadmap) envisions AI as a catalyst for economic and societal advancement, highlighting the need for sectoral governance and workforce preparedness (9,10).

However, a clear policy vacuum persists in AI integration specific to medical and health sciences education. Regulatory bodies like MQA, MOH, and the Malaysian Allied Health Professions Council must collaboratively set expectations for AI literacy and ethical use across healthcare professions. National conversations must include voices from students, clinical supervisors, university administrators, health regulators, and education technology developers to ensure AI governance is informed, inclusive, and grounded in real-world learning contexts.

GENERATIVE AI AND RESEARCH INTEGRITY

In research, generative AI tools enhance literature synthesis, electronic health record (EHR) analysis, medical image labelling, and clinical trial protocol drafting. While these tools boost efficiency, they challenge traditional concepts of authorship, originality, and accountability. AI-generated abstracts may contain hallucinated or inaccurate data, raising concerns about reliability. The Malaysian Code of Responsible Conduct in Research (MCRCR) promotes transparency and accountability (11) but lacks AI-specific guidance. Globally, frameworks like WHO’s AI Ethics Guidance, ITU-WHO Focus Group on AI for Health and the FUTURE-AI advocate that AI tools in healthcare must complement, not replace, human judgment and highlight the importance of fairness, traceability, and explainability in AI applications for healthcare (8, 12, 13). Malaysia must incorporate these principles into local research integrity frameworks to ensure responsible AI adoption.

A NATIONAL ROADMAP FORWARD

To harness generative AI responsibly in Malaysia’s health sciences academia, a cohesive national strategy should:

- I. Develop discipline-specific AI guidelines aligned with MQA standards and RCR principles.
- II. Promote AI literacy among educators and students, emphasizing ethical use, validation, and critical interpretation.
- III. Embed AI ethics and digital professionalism into undergraduate, housemanship, and CPD curricula across all healthcare professions.
- IV. Engage professional regulatory bodies such as the Malaysian Nursing Board, Pharmacy Board Malaysia, and Allied Health Professions Council to standardize AI training.
- V. Foster collaboration between educators, technologists, ethicists, students, and policymakers to ensure inclusive, context-sensitive governance.
- VI. Mandate transparency in academic and research outputs, including AI use disclosures.
- VII. Track AI’s impact on education through evidence-based metrics of engagement, performance, and integrity.

These measures should be operationalized through a joint task force between MOHE and MOSTI to establish a cross-disciplinary integration roadmap (Figure 2). Malaysia can also lead regional efforts to create ASEAN-wide standards for AI use in healthcare education.

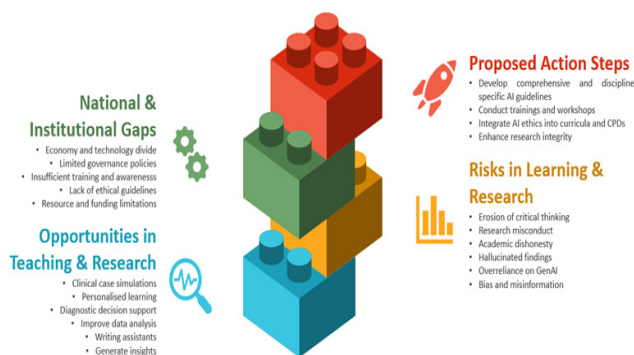


Figure 2: Generative AI in Medicine and Health Sciences Academia – Opportunities, Risks, and a Roadmap Forward.

This conceptual infographic illustrates the dual impact of generative AI on medical and health sciences education and research in Malaysia. It categorizes benefits, emerging risks, systemic challenges, and actionable steps to ensure responsible integration.

CONCLUSION

Generative AI offers transformative potential for medical and health sciences education and research in Malaysia. When used ethically and strategically, it enhances

learning, empowers educators, and streamlines scientific inquiry. However, without robust policy, ethical grounding, and critical oversight, it threatens the core principles of integrity, accuracy, and human empathy that underpin healthcare professions. This double-edged innovation must be approached with deliberate care and strategic foresight. It is not merely a technological advancement—it is a national imperative.

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