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Editorial

Framing AI Prompting through Bloom's Taxonomy: Implications for Medical Education in LMICs

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The public release of advanced generative AI tools in late 2022 marked a turning point in the accessibility of artificial intelligence. AI had been evolving for decades; however, these tools brought powerful natural language capabilities into everyday use, allowing users to generate explanations, images, and even academic content with unprecedented ease. Within months, academic communities across disciplines began using these systems for teaching, assessment design, and research. Universities, professional bodies, and journals needed to develop and adapt their policies and practice taking into consideration ethical use, educational value, and implications for academic integrity, in a context of widespread adoption.

The rapid integration of artificial intelligence (AI) into medical and health professions education presents opportunities and challenges, particularly in low- and middle-income countries (LMICs) in the South East Asian Region. While AI tools offer unprecedented access to information and learning support, their educational value depends largely on how they are used. Large language models (LLMs) in particular have generated acceptable results in medical contexts; however inherent biases and inconsistencies have required additional validation. This is largely due to the predictive nature of the LLM model where responses are not founded on a database of facts, but generated by predicting the most likely pattern of words based on a database of text (Lucas *et al.,* 2024).

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Although LLMs perform well at recall level, complex clinical reasoning, multi-step calculations or statistical analysis (Tran *et al.,* 2025; Van Veen 2024).

In this context, Bloom's taxonomy offers a valuable framework for guiding AI prompt construction towards meaningful learning. First published in 1956 and revised in 2001, the taxonomy consists of six hierarchical levels of cognitive processes ranging from basic recall to higher-order evaluation (Anderson & Krathwohl). Its relevance to medical education is well established, serving as a framework across curriculum design to outcome development to assessment alignment.

LLMs have shown inherent capabilities of aligning with Bloom's taxonomy when appropriately guided. For example, AI-generated learning objectives frequently employ Bloom-aligned verbs such as "describe," and "interpret," indicating an implicit alignment with pedagogical frameworks. However, evidence also shows that AI performance is strongest at lower cognitive levels and declines when tasks require higher-order reasoning such as analysis and evaluation. This limitation is particularly relevant in medical education, where clinical reasoning and decision-making are essential competencies (Gordan *et al.,* 2024).

Prompt design therefore becomes an essential pedagogical tool, and Bloom-informed prompt targeting higher cognitive levels can push AI systems toward complex outputs beyond a factual summary. Studies in AI-assisted assessment demonstrate that detailed prompts are necessary to achieve alignment with intended cognitive levels, while simpler prompts often fail to reach the desired depth of thinking. In effect, Bloom's taxonomy can act as a scaffold not only for student learning, but

also to guide interaction between learners, teachers and AI. This is of particular significance for the South East Asian Region, where resource constraints often lead to limited staff, large classrooms and assessment burdens. Training of students and staff to strategically use prompts aligned with Bloom's taxonomy may potentially bridge these gaps, and ensure that AI supports the development of higher order thinking. This should be tempered with knowledge that AI may supply "confidently incorrect" responses, and Bloom's guided prompting should be accompanied by critical appraisal and academic oversight.

Ultimately, the integration of AI into medical education can be viewed as both a technological and pedagogical shift. Bloom's taxonomy offers a familiar and adaptable framework to guide this transition.

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