ORIGINAL RESEARCH

A93

EVALUATING AI-GENERATED CASE-BASED LEARNING AS A SCALABLE SOLUTION FOR SUSTAINABLE MEDICAL EDUCATION

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Introduction: Case-based learning (CBL) is a widely used teaching method, promoting clinical reasoning and application of knowledge through structured scenarios (1). Developing high quality CBL materials requires significant expertise and resources. Recent advances in Artificial Intelligence (AI) offer the potential to streamline this process, yet its effectiveness in producing high quality educational material is uncertain. This study aimed to evaluate whether CBL scenarios produced by AI are comparable in quality to those written by experienced educators, based on expert review across key educational domains.

Methods: Five CBL scenarios were generated using ChatGPT, guided by a prompt based on learning objectives from an established series of educator-written CBLs. For each topic, an AI-generated case and a corresponding educator-written case aligned to the same objectives were evaluated. Four experienced medical educators independently assessed each case using a five-point Likert scale across key domains: clinical accuracy, alignment with learning objectives, structure, educational value, and usability for teaching. Evaluators were blinded to the source of each case. The AI prompt was iteratively refined prior to final case creation to ensure structural comparability between AI-generated and educator-written CBLs.

Results: AI-generated CBL scenarios were comparable in quality to educator-written cases across all evaluated domains, with no statistically significant differences observed. Educator-written cases scored slightly higher in clinical accuracy (mean 4.45 vs 4.30, p=0.12) and educational value (mean 4.45 vs 4.00, p=0.09), while AI-generated cases

scored marginally higher for alignment with learning objectives (mean 4.45 vs 4.30, p=0.68). Overall, AI-generated cases demonstrated a similar standard of clinical accuracy, educational value, alignment with learning objectives, structure, and usability.

Discussion: AI-generated educational materials do not depend on access to conventional teaching resources, which require significant expertise and time to produce. Our findings suggest that AI can generate CBL scenarios of comparable quality to those written by medical educators, promoting global access to medical education, particularly in regions with limited infrastructure. The ability to rapidly generate structured CBLs with minimal input highlights the potential for scalable implementation in diverse educational settings.

Ethics Statement: As the submitting author, I can confirm that all relevant ethical standards of research and dissemination have been met. Additionally, I can confirm that the necessary ethical approval has been obtained, where applicable.

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