TPM Vol. 32, No. S3, 2025
ISSN: 1972-6325
https://www.tpmap.org/

Open Access

LEVERAGING CHATGPT TO FOSTER CRITICAL THINKING IN MEDICAL EDUCATION WHILE AVOIDING AI OVER-RELIANCE

SULTHAN AL RASHID[1], MADHUSUDHAN B[1], SYED ILYAS SHEHNAZ[1], DR. ARUNMOZHI KANNAN [2]

[1]DEPARTMENT OF PHARMACOLOGY, SAVEETHA MEDICAL COLLEGE AND HOSPITAL, SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES (SIMATS), CHENNAI, TAMIL NADU, INDIA.
[2]PROFESSOR , DEPARTMENT OF PROSTHODONTICS AND CROWN & BRIDGE, SREE BALAJI DENTAL COLLEGE & HOSPITAL, CHENNAI, INDIA

I. INTRODUCTION

The teaching of critical thinking has always been a vital priority in medical education, as treating physicians must be able to pass through complex clinical situations. Critical thinking enables students to question information, evaluate evidence and pass appropriate judgments (Kaur & Mahajan, 2023). Nonetheless, the application of AI (e.g., ChatGPT) for medical education may bring opportunities and challenges. Whilst the use of AI can significantly informs learning, by providing a way to give rise of patterns, ideas and to enable new perspectives the over favouring of these tools risks undermining the very skills that educators are concerned about (Knopp et al., 2023) In this article, we discuss the potential for using ChatGPT to encourage critical thinking in medical students and highlight the centrality of preserving independence of thought. [Figure 1].

II. AI AS A CATALYST FOR CRITICAL THINKING

AI-powered resources like ChatGPT could be learning guides instead of knowledge repositories. For other learning domains, such as medicine, where problem solving occupies a central role these tools offer unique possibilities to investigate clinical cases, relate basic science to clinical science, and to construct explanatory scenarios that extend students' knowledge. But AI can only promote critical examination if educators deploy it with purpose.

For instance, ChatGPT can help in formulating integrated clinical questions (Indran et al., 2024). Imagine having that patient to teach students how to diagnose and treat a patient for chest pain. Instead of feeding you answers with a spoon, ChatGPT can cook up some probing questions:

- What are your differential diagnoses for this presentation?
- How would you prioritize investigations?
- What would be the implications if the patient had a prior history of diabetes or hypertension?

Through engaging students with questions like these, ChatGPT teaches them to address problems methodically and reason coherently. These thoughtful questions serve as catalysts for further thought and not shortcuts to answers. By not providing the answer directly, AI promotes inquiry and critical thinking skills in students.

III. ENHANCING CASE-BASED DISCUSSIONS

CBDs frequently serve as a means of teaching problem solving in medical education. ChatGPT may be used as a support tool to augment these sessions. For example, teachers can employ ChatGPT to generate variants of the clinical case. To enhance students' flexibility of thinking, the case analysis can be used with alterations to its base (e.g., to the patient's age, comorbidities, or social background), and students can be tasked with re-analyzing the case given new constraints, thereby reinforcing adaptative reasoning habits.

Example:

1. **Original Case:** A 60 year-old male with sudden chest pain that shoots into his left arm.

2. **Variation:** A 35-year-old woman with a first-degree relative with ischemic heart disease complaining of the same symptoms

3. **Critical Discussion:** How might gender and age shape your diagnostic considerations?

Exercises of this type lead to more critical thought and stimulate students' ways of thinking, from learning-by-rote to the more fr situational approach. These variances also mimic the realities of human anatomy where there is no medical "standard" seen in special dissections or when donating a body to science.

Moreover, teachers could utlize AI to predict how the students may respond and prepare for counter-arguements or alternative explanations. This approach keeps the conversation fluid and forces students to defend their thinking and to reconsider assumptions. In a way, ChatGPT can be considered a scaffold, and it supports students as a teacher to the next level.

IV. FACILITATING INTEGRATION OF BASIC AND CLINICAL SCIENCES

The linkage between basic sciences and clinical practice is a cornerstone of medical education. Frequently, students fail in being able to apply physiology, pharmacology, or biochemistry to actual instances. These prompts could be bridged by a model like ChatGPT that generates prompts that transcend disciplines.
For instance:

- How does the alteration of glucose metabolism contribute to CAD?
- Describe the pharmacology of drugs involved in MI.

Concepts such as these force students to recall experience or recall data, whether from their own experiences or from other experiences, synthesize it and apply it in a clinical frame, which is part of critical thinking. This multidisciplinary approach provides students with a broader, more integrated view of medicine as science vs. individual areas. But if the prompts generated by AI are aligned with learning objectives, it can make for a meaningful engagement.

V. ENCOURAGING HIGHER-ORDER THINKING WITH AI

For students, learning experiences need to be structured to follow Bloom's Taxonomy (Adams, 2015) in order to enhance critical thinking skills. Additionality, ChatGPT can be used at all levels of the taxonomy to promote higher order thinking skills:

1. **Remembering**: Create lists of symptoms or diagnostic criteria to recall basic concepts.
2. **Understanding**: Students should be able to describe disease Knowledge: Seek clarification from the students as to why they believe that viruses should be inactivated.
3. **Applying**: Create patient vignettes that require students to use what they have learned to solve clinical problems.
4. **Analyzing**: Pose questions that students can compare, contrast, and draw patterns between.
5. **Evaluating**: Tell students to critique treatment options or assess the reliability of diagnoses generated by AI.
6. **Creating**: Students are asked to formulate their own clinical scenarios or questions to test peers with.

For example, ChatGPT can generate conflicting treatment approaches to a case and ask students to justify their choice based on evidence-based medicine. Such exercises require students to evaluate information critically, consider multiple perspectives, and articulate their reasoning.

VI. AVOIDING OVER-RELIANCE ON AI

Although there is a great potential in using ChatGPT, we have a concern that students could be too reliant on AI and reduce their cognitive load. Over dependence can mean that we provide AI-generated answers without thinking them through. Teachers should be proactive in preventing this and use methods that encourage critical evaluation and self-motivated learning.

1. Encouraging Critical Evaluation of AI Responses

We need to train our students to question how accurate, relevant, and reliable AI outputs are. For instance, an educator may show an AI- produced response to a clinical question and instruct learners to:

- Identify potential inaccuracies or biases.
- Cross-reference data with references using with conventional medicine.
- Critique the reasoning provided.

This endeavor not only reiterates the significance of verification but it also teaches skepticism, an essential part of the critical mindset. Students can be taught to analye AI-generated outputs prompting practice of "thinking before agreeing," an important skill in the field of medicine.

2. Shifting AI from Answer-Provider to Thought-Partner

Educators can conceptualize ChatGPT as a 'thought-partner', as opposed to an infallible source of knowledge. Rather than consulting A.I. for the answers — which it often won't provide — the program allows students to query it for off-the-wall, uninhibited brainstorms and outside-the-box perspectives they may not have otherwise considered and then refine their reasoning.

For example, if a student were working through a neurological case, they could choose to use ChatGPT to:

- Formulate a differential diagnosis.
- Investigate the pathophysiology associated with each diagnosis.
- Compare and contrast management approaches.

But in the end, it's the student's responsibility to analyze and make a decision. This is an attitude that emphasises AI's responsibility to provoke thought, not take over human thinking.

3. Promoting Human-AI Collaboration

The way to use ChatGPT effectively is for human-AI collaboration, where AI supplements, not replaces, human cognition. Educators can create assignments that specifically integrate AI and independent effort. For example:

- Students use ChatGPT for Brainstorming diagnosis ideas.
- They subsequently manually investigate and fine-tune the ideas through reading textbooks, papers, or expert consultations.

By engaging students in both AI and human-led exploration, we're teaching them to recognize the fallibility of AI and the needed skill of independent thought

4. Assessing Student Reasoning Beyond AI-Generated Outputs

In order to prevent over-dependence, assessments should target students' reasoning instead of their final responses. Educators can:

- Have students share their thinking process, step-by-step.
- Mandate rationales when making decision based on AI recommendations.

For instance:

- If ChatGPT offers a diagnosis, students need to state why it is consistent (or inconsistent) with the clinical scenario.

The focus on thinking over result, also permits fostering of critical thinking.

VII. TRAINING EDUCATORS TO USE AI EFFECTIVELY

To utilize ChatGPT and realize its full potential, but to avoid over-reliance, medical educators will need to have tools—and ideally a certain level of training—themselves. Programs of faculty development can Focus on:

- Knowing what AI tools can and cannot do.
- Creating AI-focussed learning tasks that foster critical and creative thinking.
- Monitoring and intervening students' overreliance on AI.

This type of training is essential to engage in when training educators so that they can lead by example and show them how to thoughtfully and critically engage with AI

VIII. **MAINTAINING ETHICAL USE OF AI**

Ethical considerations The introduction of AI in medical education should be ethical. Too much dependence on AI sparks concerns about academic integrity and fairness. Institutions have to provide clear standards for AI use so it supplements learning rather than degrading honesty and accountability. The limitation of AI should also be made transparent, so that students do not see the AI output as infallible (Masters, 2023).

IX. **CONCLUSION**

AI ChatGPT-like tools present unique opportunities to promote critical thinking in medical education. Through fostering curiosity, promoting the convergence of information and problem solving strategies, and helping individuals develop flexible thinking, AI can promote critical thinking skills among students. Beneficiaries of such advances assisted by educators are conditioned to think independently and rely less. Yet the moral of the story here is: ChatGPT must be framed as a tool to enhance, not replace, human reasoning.

To strike this balance, educators need to educate students to evaluate critically AI-generated responses, blend AI and classical instruction, and put reasoning before outputs. By leveraging AI with deliberate human reasoning, medical education can prepare future physicians who are not only comfortable with technology but also thoughtful, well-prepared practitioners of humanistic avenues of high-quality patient care. In this way

Funding:

The authors did not receive any financial support for this study.

Declaration of Interest:

The authors declare that they have no conflicts of interest.

REFERENCES:

Adams N. E. (2015). Bloom's taxonomy of cognitive learning objectives. *Journal of the Medical Library Association : JMLA*, *103*(3), 152–153. https://doi.org/10.3163/1536-5050.103.3.010

Indran, I. R., Paranthaman, P., Gupta, N., & Mustafa, N. (2024). Twelve tips to leverage AI for efficient and effective medical question generation: A guide for educators using Chat GPT. *Medical teacher*, *46*(8), 1021–1026. https://doi.org/10.1080/0142159X.2023.2294703

Kaur, M., & Mahajan, R. (2023). Inculcating Critical Thinking Skills in Medical Students: Ways and Means. *International journal of applied & basic medical research*, *13*(2), 57–58. https://doi.org/10.4103/ijabmr.ijabmr_214_23

Knopp, M. I., Warm, E. J., Weber, D., Kelleher, M., Kinnear, B., Schumacher, D. J., Santen, S. A., Mendonça, E., & Turner, L. (2023). AI-Enabled Medical Education: Threads of Change, Promising Futures, and Risky Realities Across Four Potential Future Worlds. *JMIR medical education*, *9*, e50373. https://doi.org/10.2196/50373

Masters K. (2023). Ethical use of Artificial Intelligence in Health Professions Education: AMEE Guide No. 158. *Medical teacher*, *45*(6), 574–584. https://doi.org/10.1080/0142159X.2023.2186203

Figure 1: Leveraging ChatGPT to Foster Critical Thinking in Medical Education While Avoiding AI Over-Reliance