Practical Uses of LLMs In Medical Education: Getting Started

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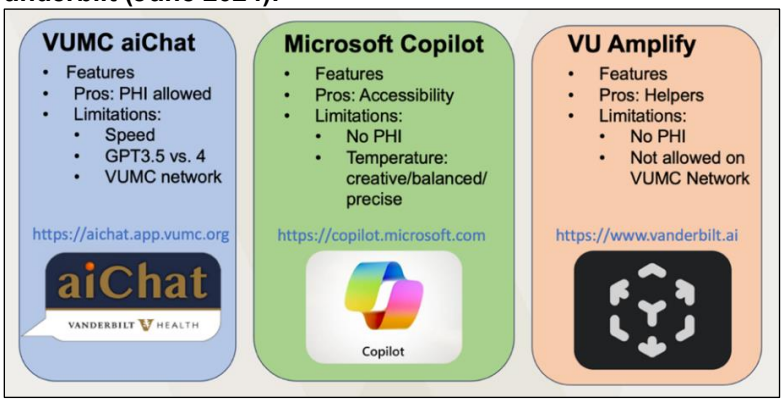
The rise of generative AI and emerging machine learning tools has far-reaching implications for teaching and learning in medicine. Patients and learners in medicine have increasingly adopted tools such as ChatGPT and other Large Language Models (LLMs) to answer their personal and clinical questions. Learners and patients deserve our informed guidance—on medical advances as well as the technological advance of AI as it relates to healthcare. To stay abreast of the AI revolution, medical educators must acquire literacy in the **components**, **fundamental principles**, **risks** (ethical[7] and patient safety), and **limitations** of LLMs.[2] This is intended as a quick guide to getting started with practical uses of LLMs in MedEd.

What is a Large Language Model (LLM)?	• A computational model that uses machine learning to process language to *mimic the way humans communicate* • Generative pretrained transformers (GPT) transform language input into tokens, utilize a self-attention mechanism (context), and stacking layers, then convert this generated data back into language output • Built upon probability: Math (not magic)
LLM-Enhanced Learning:	• Traditional Medical Education: **Cognitive Apprenticeship** • Modern MedEd Context with AI: **Creative Copilot**
Safe and Appropriate Use in MedEd:	• Three questions to ask before you start (UNESCO):[3] 1. Does it matter if the output is true? 2. Do you have expertise to verify that the output is accurate? 3. Are you able and willing to take full responsibility for missed inaccuracies? • Avoid using PHI or FERPA data, respect institutional policy[5] • Obtain learner consent—importance of keeping learners (humans) in the loop
Getting Started (VUMC):	• Many AI tools are available at VUMC. The best way to understand AI is to explore it and learn its strengths and weaknesses. Here are some example prompts you can try: "Explain congestive heart failure at an 8th-grade reading level." "Write 3 multiple-choice questions about lupus." "Summarize this document with a focus on practical applications."

Generative AI Options at Vanderbilt (June 2024):



Suggested Practical Uses of LLMs:[1]

Educational	Clinical-Administrative	Research/Discovery
• One-on-one personalized coach, rehearsal partner • Dynamic study prep for rounds, lectures, or clinic • Diagnostic reasoning / case conferences • Aligning content of lectures with learning objectives	• Clinical question generation • Voice to text and audio input (DAX and ambient scribing) • Mobile voice recognition (Haiku) • Tailored patient information/educational materials/Message Basket	• Retrieval Augmented Generation (RAG)'ing curricular documents, medical textbooks, resources • Assistive chatbots that respond/run when humans tire • Synthetic assessment and competency evaluation • Conversational learning support and streamlined processes
Early detection, algorithmo-vigilance,[9] keyboard liberation[10] for clinicians, researchers, administrators		

Additional Resources:

1. Practical Uses of LLMs for Medical Education (DOMAIN workgroup), 5.14.24
2. "From Chalk Talks to Chat Bots," Thomas A. Hazinski Workshop, 4.24
3. UNESCO Chat GPT and AI in higher education Quick start guide
4. VUMC-Managed Generative AI Tools Webpage
5. Generative AI Policies – VU and VUMC
6. Bloom's Taxonomy Revisited (Oregon State Univ)
7. Competencies for the Use of AI by HCPs (Academic Medicine), Miller et al
8. AI Ethics and Safety (Consult service)
9. VUMC ADVANCE
10. Eric Topol, Might AI Catch What Doctors Miss? TEDx Talk 12.2023