

AI Virtual Tutor – Effective Prompting Strategies

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Overview

AI Virtual tutors provide self-paced, personalized learning experiences, leading to deeper engagement, analysis, and comprehension. This resource offers a curated set of prompts for use with AI Virtual Tutor bots based on Microsoft Copilot Studio at the University of Toronto. These prompts are grounded in evidence-based learning science principles (Lang, 2016; Mollick & Mollick, 2023) and are designed to guide the virtual tutor in facilitating interactions that enhance knowledge retention and foster critical thinking skills.

Prompting Strategies

Initial Assessment Questions: Identify Topics and Knowledge Gaps

To begin, consider creating an inventory of relevant topics by prompting the tutor to provide initial assessment questions. By answering the questions on your own, you will be able to identify your strengths and knowledge gaps. Rather than reviewing what you already know, consider using the tutor to improve your understanding of that challenging material.

- What are the key topics I should understand about [subject]?
- Could you ask me a few questions to gauge my current understanding of [topic]?
- Can you give me a practice problem on [topic] to solve?

Clarification and Problem-Solving Questions: Address Knowledge Gaps

Virtual tutors can serve as effective resources for getting clarity on challenging problems, concepts, or topics. Once you have identified the questions that you find difficult, consider using the tutor for step-by-step guidance.

- Can you provide an example to explain [concept/theory/theorist]?
- What are the main differences between [related concepts]?
- What are the key components or elements of [concept/theory]?
- I'm not sure I fully understand [concept]. Could you explain it differently?



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Application and Analysis Questions: Integrate and Reinforce Knowledge

To integrate new knowledge, it is important to actively engage with and apply what you learn. This hands-on approach enhances comprehension and promotes long-term retention.

- How would I apply [concept] to a real-world situation?
- What are the implications of [this theory] in real-world scenarios?
- How can [this knowledge] be applied to solve a current issue?
- Can you give me a more challenging problem now that I've grasped the basics?
- What connections should I be making between [concept A] and [concept B]?
- Can you give me a practice problem or question on [topic] to solve?

Critical thinking and Synthesis Questions: Deepen Comprehension

To move beyond surface-level comprehension, consider using the virtual tutor to explain connections between concepts and to evaluate arguments and theories. This will encourage a more nuanced and comprehensive understanding of course material.

- How does [concept] relate to other topics we've covered?
- What evidence supports or contradicts [theory]?
- Can you compare and contrast [idea] with an alternative perspective?
- What are the potential limitations or weaknesses of [approach]?
- How might [concept] evolve in the future based on current trends?
- Can you identify any assumptions behind [argument]?

Progress Check Questions: Plan your Next Steps

Learning science research shows that metacognition—thinking about one's own learning—plays a crucial role in academic success. Regularly checking your progress and planning next steps helps reinforce key concepts and identify areas needing further attention.

- What would be a good next topic for me to explore in [subject]?
- Can you summarize the main points we've covered in this session?
- Based on our discussion, what should I focus on next to deepen my understanding?
- What's a fundamental concept in [topic] that I should understand before moving forward?

References

Lang, J. M. (2016). *Small teaching: Everyday lessons from the science of learning*. Jossey-Bass.

Mollick, E. R., & Mollick, L. (2023). Assigning AI: Seven approaches for students, with prompts. The Wharton School Research Paper No. 33.