

What is AI Prompt Engineering?

Why?

This lesson introduces students to the concept of prompt engineering, teaching them how to craft effective prompts to elicit desired responses from AI systems. Through hands-on activities and discussions, students learn the impact of their word choices and question structures on AI-generated content, reflecting on the broader implications for communication, creativity, and problem-solving. As AI continues to permeate various industries, the ability to effectively interact with and guide AI through prompt engineering is becoming a highly sought-after skill in the job market, making this lesson particularly relevant and valuable.

Materials Needed

Computers with internet access
Student access to a generative AI chatbot text tool such as ChatGPT

Time needed

Approximately 60 minutes

Objectives

- Students will be able to articulate a definition of prompt engineering and explain its significance in the context of AI interactions.
- Students will be able to identify characteristics of effective prompts that lead to more accurate, relevant, and comprehensive AI responses.
- Students will be able to craft detailed and specific prompts to guide AI responses towards a desired outcome or level of detail.
- Students will be able to analyze AI responses to understand how different prompt structures and word choices influence the generated content.

Key Concepts & Vocabulary

Prompt Engineering: The process of crafting inputs or questions for AI systems to guide them toward generating specific or desired types of responses.

Generative AI: Artificial intelligence that can generate content, such as text, images, or music, based on the patterns it has learned from its training data.

Natural Language Processing (NLP): A field of AI focused on enabling computers to understand, interpret, and produce human language in a way that is both meaningful and useful.

Lesson

Start with a Question: Ask students what they know about AI and if they have ever interacted with AI systems like Siri, Alexa, or chatbots. Use their responses to introduce the concept of AI communication.

Define Prompt Engineering: Explain that prompt engineering is the process of crafting questions or prompts that guide AI to produce the most useful and accurate responses. Compare it to asking a friend a question in the right way to get the

information you need.

Demonstration: Show students how different prompts can lead to different types of responses from an AI. Use the example below that applies best to your setting.

* **Example 1:** Tell the chatbot “Tell me a joke.” After it replies, prompt it with more specific information, such as “Tell me a science-related joke.” Keep adding descriptors, such as “About biology,” “Suitable for 5th graders,” “About wild animals” etc.

* **Example 2:** Use a prompt such as “Write a short story.” Then modify the prompt gradually to show how adding more detail or constraints change the response: “Make the story about time travel.” “Include a talking cat.” “The setting should be ancient Egypt.” “The cat is mistaken for a deity.”

* **Example 3:** Tell the chatbot to teach a concept, such as “What is photosynthesis?” Then, provide additional information to modify the prompt: “Explain it for a 7th grade audience.” “Connect to the importance of earth’s ecosystems.” “Students know ____ but haven’t yet learned ____.” “Connect to the importance of the sun.” “Explain how this connects to the color green in nature.”

Discuss how additional details provided in the prompt lead to a more complex and interesting response.

Group / Pair Activity: Divide the class into pairs or small groups and assign each group a subject area (e.g., history, science, literature). Ask them to come up with three different prompts related to their topic and predict how the AI might respond.

Interactive Session: guide each group to input their prompts into a generative AI tool like ChatGPT and observe the responses. Encourage them to modify their prompts based on the AI’s responses to get more precise or detailed answers. Ask them to keep track of how they modified their prompts, and characterize the changes in the responses based on their changed inputs.

Demonstration / Discussion: After groups have experimented with their prompts, discuss what strategies worked best. Have them explain what they did and how it changed the responses. Show this on the screen, if possible and applicable. Highlight how specific words, the structure of the question, and the clarity of the prompt affected the AI’s responses.

Reflect on Learning: Have students share what they found surprising or interesting about how the AI responded to their prompts. Discuss how these skills can be useful in not just interacting with AI but also in clear communication in everyday life.

Real-World Applications: Explain the importance of prompt engineering in various fields like customer service, content creation, and programming. (Some examples appear below. Mention the ones that make the most sense for your setting.) Highlight how being able to communicate effectively with AI can be a valuable skill in the future job market. Ask students to suggest additional examples of how prompt engineering could be an effective tool.

* **Example 1:** Businesses use AI-driven chatbots to handle customer inquiries. Prompt engineering helps in crafting responses that are informative and responsive to customers’ needs.

* **Example 2:** Companies use AI to generate creative content, such as advertising copy, blog posts, or product descriptions. Through prompt engineering, marketers can guide AI to produce content that aligns with company goals and targets specific audiences.

* **Example 3:** AI tools can sift through vast amounts of data to provide market insights.

Prompt engineering is used to direct AI in analyzing trends, customer feedback, and competitor activities.

* **Example 4:** In fields like genomics, astronomy, or climate science, where researchers deal with large datasets, AI can help in data analysis. Scientists use prompt engineering to guide AI in identifying patterns, anomalies, or correlations in data

* **Example 5:** Research often involves complex simulations. Researchers use AI to manage and interpret these simulations, using prompt engineering to refine the AI's focus, adjust parameters, and explore different scenarios.

* **Example 6:** AI can tailor educational content to students' learning styles and knowledge levels. Prompt engineering helps in creating dynamic prompts that adapt to a student's progress.

* **Example 7:** In healthcare, AI can help analyze symptoms, medical histories, and diagnostic images. Prompt engineering enables clinicians to ask the AI system specific questions, guiding it to consider relevant medical data

Discussion Questions

- Can prompt engineering improve AI's ethical decision-making?
- How might businesses leverage prompt engineering effectively?
- How does prompt engineering shape AI-generated content in media?
- How has your understanding of AI communication changed after this lesson?
- In what ways do you think prompt engineering can be useful in your daily life?
- Can you think of a situation where precise prompt engineering might be crucial?
- Reflect on the group/pair activity. What did you learn from your and others' approaches to prompt engineering?

Supplemental Activity Ideas

AI-Generated Creative Writing Contest: Students use prompt engineering to generate a short story or poem using an AI tool, then share and discuss their outcomes, focusing on how different prompts influenced the creative direction.

Science Fair Project Using AI: Encourage students to develop a science fair project that utilizes prompt engineering to solve a problem or provide insights, demonstrating the practical application of AI in scientific inquiry.

AI-Powered History "Time Capsule": Students use prompt engineering to generate detailed descriptions of historical events or figures as if narrated by someone from that period, then present their "time capsules" to the class, enhancing their understanding of history through a creative lens.

Prompt Engineering for Environmental Awareness: Task students with creating prompts that guide an AI to generate informative content about environmental issues, such as climate change or conservation efforts, promoting awareness and understanding of these critical topics.

Cross-Curricular AI Integration Project: Students collaborate across subjects (e.g., Math, Science, Literature) to design a multidisciplinary project using AI, employing prompt engineering to explore connections between different fields of study, fostering interdisciplinary learning.

Sources to Learn More

Overview of prompt engineering -

<https://www.coursera.org/articles/what-is-prompt-engineering>

Overview with examples and tips - <https://www.reliablesoft.net/prompt-engineering/>