CLEARer Dialogues with AI: Unpacking Prompt Engineering for Librarians

Presenter: Leo S. Lo
Dean, College of University Libraries & Learning Sciences
University of New Mexico
Outline

• Generative AI Basics
• AI Literacy
• Introduction to Prompt Engineering
• CLEAR Framework for Prompt Engineering
• Implications for the Future of Learning and Education
Audience Question

- Have you tried ChatGPT?

- Yes / No
Generative AI

- Immensely powerful but with many flaws and issues

ChatGPT passes exams from law and business schools

By Samantha Murphy Kirk, CNN Business
Updated 1:35 PM EST, Thu., January 26, 2023

After passing another medical exam, ChatGPT is moving one step closer to ChatMD

Sarah Silverman and novelists sue ChatGPT-maker OpenAI for ingesting their books

Reinventing search with a new AI-powered Microsoft Bing and Edge, your copilot for the web

Feb 7, 2023 | Yusuf Mehdi - Corporate Vice President & Consumer Chief Marketing Officer
The Basics of Generative AI

- AI models that learn from data and create new, original outputs, showcasing 'creativity'
- Processes data, learns patterns, and then generates unique content
- Used in art, music, gaming, text generation, and more (ChatGPT, Bard, Mid-journey, etc.)
- Potential uses in scientific theories, personalized entertainment, virtual worlds, etc.
What does it mean for libraries?

- Generative AI is changing information discovery
  - GPT4-powered Bing, Google Bard, etc
  - What does that mean for information literacy?
- Publishers using and protecting their content
  - What will it mean for Open Access?
- Personalized services for users?
- Enhanced workflow for library workers?
  - The future role of librarians?
AI Literacy

• **McKinsey Report**
  • Looking ahead to the next three years, respondents predict that the adoption of AI will reshape many roles in the workforce. Generally, they expect more employees to be reskilled than to be separated.

• **Dept. of Education Report: AI and the Future of Teaching and Learning**
  • Underscores the importance of AI literacy for all educators, including librarians.
  • AI literacy is a multifaceted concept that involves a comprehensive understanding of AI, its applications in education, its ethical implications, and the ability to engage in transparent and authentic dialogue about AI.
After establishing a performance baseline on a similar task, subjects were randomly assigned to one of three conditions: no AI access, GPT-4 AI access, or GPT-4 AI access with a prompt engineering overview.

- **Key findings:**
  - Consultants using AI were **significantly more productive** (they completed 12.2% more tasks on average, and completed task 25.1% more quickly), and **produced significantly higher quality results** (more than 40% higher quality compared to a control group).
  - Consultants across the skills distribution **benefited significantly from having AI augmentation**, with those below the average performance threshold increasing by 43% and those above increasing by 17% compared to their own scores.
AI Literacy Among Academic Library Employees (conducted in May 2023)

- **Moderate AI literacy level:**
  - 45.39% rated their understanding as moderate, 3.68% as very high.

- **Mixed perceptions of AI:**
  - Potential benefits recognized, but significant concerns about ethical issues and potential for misuse.

Overall understanding of AI concepts and principles (1 = very low; 5 = very high)
Barriers to AI Adoption and the Need for Education

- Identified barriers:
  - Lack of resources, lack of technical skills, concerns about data privacy and security.
- Highlighted need for education and training on AI.
- Quote:
  - "Quickly education on AI is needed for librarians. As with anything else, there will be early adopters and then a range of adoption over time."

“I feel adequately prepared to use generative AI tools in my professional work” (1 = strongly disagree; 5 = strongly agree)
Role of AI in Libraries and Ethical Concerns

- Potential for using AI in library services:
  - Collection development, user services, instruction.
- Significant ethical concerns:
  - Data privacy, potential misuse of AI, impact on human elements of librarianship.
- Quote:
  - "I could see a future where only top research institutions have human reference librarians as a concierge service."

How urgent do you feel it is for your library to address the potential ethical and privacy concerns related to the use of generative AI tools and applications? (1 = not at all urgent, 5 = extremely urgent)
How familiar are you with the concept of “prompt engineering”? Rate 1 - 5
(1 being not familiar at all; 5 being extremely familiar)
Librarians and the Emergence of Prompt Engineering

• The concept of prompt engineering

• The potential for librarians
Prompt Engineering in the New Era of Information Discovery

• The transformative power of Generative AI in shaping the information discovery landscape

• The crucial role of prompt engineering

• The implications for librarians
CLEAR Framework

Introduction

• **C**oncise
• **L**ogical
• **E**xplicit
• **A**daptive
• **R**eflective
Concise

• Use clear, simple language
• Prioritize critical information
• Be succinct
• Remove irrelevant details

• Examples:
  • Can you talk about renewable energy and how it can be beneficial in various aspects, like, in terms of the environment, economy and so on, and provide a detailed discourse on this?
  • List the benefits of renewable energy.
Examples – Concise prompts

Can you talk about renewable energy and how it can be beneficial in various aspects, like, in terms of the environment, economy and so on, and provide a detailed discourse on this?

Of course, I’d be happy to discuss renewable energy and its various benefits in terms of the environment, economy, and more.

Renewable energy sources, such as solar, wind, hydro, and geothermal power, are gaining significant attention and importance worldwide due to their numerous advantages:

1. Environmental Benefits:
   * Reduced Greenhouse Gas Emissions: Renewable energy sources produce little to no greenhouse gas emissions during electricity generation. This plays a crucial role in mitigating climate change by reducing the carbon footprint.
   * Clean Air and Water: Unlike fossil fuels, renewable energy sources do not release harmful pollutants into the air or water, contributing to better air quality and water conservation.
   * Preservation of Natural Resources: These sources rely on naturally replenishing resources, ensuring the sustainable use of natural resources.

2. Economic Benefits:
   * Job Creation: The renewable energy sector generates jobs at a higher rate than the fossil fuel industry. It encompasses various roles, from manufacturing and installation to research and development.
   * Energy Independence: By investing in renewables, countries can reduce their reliance on foreign oil and gas, enhancing energy security.
   * Stable Energy Prices: Renewable energy sources provide a more predictable and stable energy price environment compared to fossil fuels, which are subject to price fluctuations.

List the benefits of renewable energy.

Certainly, here is a concise list of the benefits of renewable energy:

1. Environmental Benefits:
   * Reduced Greenhouse Gas Emissions: Renewable energy sources produce little to no greenhouse gas emissions, mitigating climate change.
   * Clean Air and Water: They do not release harmful pollutants, leading to improved air quality and water conservation.
   * Preservation of Natural Resources: Renewable sources rely on replenishing resources, ensuring sustainable use.

2. Economic Benefits:
   * Job Creation: The renewable energy sector generates jobs at a higher rate than fossil fuels, fostering employment growth.
   * Energy Independence: Reduces dependence on foreign energy sources, enhancing energy security.
   * Stable Energy Prices: Provides more predictable and stable energy prices compared to fossil fuels.

This prompt is clear and direct, asking for specific information without any extraneous details.

It allows the model to quickly understand the request and generate a response that focuses on the main topic.
Logical

- Structure information in order
- Establish context and relationships
- Ensure logical flow

Examples:

- "Start by describing the history of renewable energy. Following that, explain the current trends in renewable energy production and finally, forecast the potential developments in the next decade."

- Given the surge in electric vehicle usage, explore how this trend relates to the increased demand for renewable energy sources, particularly focusing on the interconnected dynamics of these two phenomena.

- "Discuss the benefits of renewable energy in a structured manner, beginning with environmental benefits, then moving on to economic advantages, followed by an analysis of technological advancements and concluding with its global implications."
Explicit

• Define instructions and format
• Specify length, sources, terminology
• Set tone, reading level restrictions
• Provide examples

• Examples:

• Give me some ideas to market my library’s services

• Act as a marketing expert who specializes in promoting library services. For our academic library, we would like to help new students learn more about our services, such as "Ask a Librarian" chat service, interlibrary loan, quiet study spaces, collaborative study spaces, research consultation. Give me 20 promotion ideas that would minimize costs and time.
promoting library services effectively is crucial to engage your community and ensure that the resources available are utilized to their fullest potential. here are some ideas to market your library's services:

1. create a vibrant online presence:
   - develop a user-friendly and informative library website.
   - maintain active social media profiles to share updates, events, and resources.
   - start a library blog featuring book recommendations, research tips, and staff insights.

2. engage with the community:
   - organize outreach programs in local schools, colleges, and community centers.
   - host community events, workshops, and lectures on various topics.
   - collaborate with local businesses and organizations for joint programs.

3. leverage email marketing:
   - build an email list of library patrons and send out regular newsletters highlighting upcoming events and new resources.
   - use targeted emails to promote specific services or resources to different user groups.

4. utilize visual content:
   - create visually appealing posters, flyers, and infographics to promote library events and services.
   - use video content to showcase library facilities, interviews with staff, or book reviews.

this prompt is rather vague, with the phrase "some ideas" not offering a clear numeric goal for the ai to strive towards.

the prompt does not provide any background information or specific services that need to be promoted, making it a bit open-ended and likely to receive a varied range of responses.

this prompt is quite explicit in terms of its expectations. it clearly mentions the role that the ai needs to assume (a marketing expert specializing in library services) and the target audience (new students).

the prompt lists specific services that need to be promoted, giving a clear direction on what the focus of the promotion ideas should be. additionally, it specifies the number of ideas (20) required, along with constraints to consider (minimize costs and time).
Adaptive

- Be flexible - rephrase and restructure
- Adjust settings and parameters
- Try different approaches
Example – Adaptive prompting
A user is trying to gather detailed and varied examples of sustainable practices in urban development.

**Prompt 1** "Tell me about sustainable practices in urban development.

**Response 1** "Sustainable practices in urban development often involve environmentally friendly designs and renewable resources. They may include green roofs, rainwater harvesting.

**Adaptation 1:** The user notices that the answer, while correct, is quite general. They decide to adjust the prompt to ask for more varied and specific examples.

**Prompt 2** "Can you provide a diverse set of examples of sustainable practices in urban development worldwide?"

**Response 2** "Certainly! In various parts of the world, different sustainable practices are being implemented in urban development:

In Copenhagen, Denmark, the promotion of cycling through extensive bike lanes has significantly reduced carbon emissions.

In Singapore, the ‘Gardens by the Bay’ utilizes horticultural waste to generate electricity, illustrating energy recovery from waste.

Curitiba, Brazil is known for its efficient public transportation system which has reduced traffic congestion and pollution.

Vancouver, Canada has a goal to become the greenest city by 2020, with initiatives like green roofs and community gardens.

**Adaptation 2:** The user appreciates the variety in the response and now decides to delve deeper into each practice to gather more detailed information.

**Prompt 3** "Great, can you now elaborate on each of these practices, explaining how they contribute to sustainability and any challenges they might be facing?"

**Response 3** "Absolutely, here’s a more detailed look at each of these practices:

**Copenhagen’s Cycling Promotion:**
- Contribution to Sustainability: Reduced carbon emissions, promotion of healthy lifestyles, and reduced traffic congestion.
- Challenges: Ensuring safety for cyclists, maintenance of cycling infrastructure during harsh weather conditions.

**Singapore’s Gardens by the Bay:**
- Contribution to Sustainability: Efficient energy recovery from waste, promotion of biodiversity, and a popular attraction encouraging environmental awareness.
- Challenges: High setup and maintenance costs, dependency on consistent waste generation.

**Vancouver’s Green Initiatives:**
- Contribution to Sustainability: Promotion of green spaces, biodiversity conservation, and fostering community engagement through community gardens.
- Challenges: Meeting ambitious sustainability goals within set timelines, managing urban growth without compromising green initiatives.

**Adaptation 3:** The user, satisfied with the depth of information, decides to explore initiatives in a new region to make their report more comprehensive.

**Prompt 4** "Thank you! Could you also give examples of sustainable urban development practices in African cities?"

**Response 4** "Certainly! In Africa, several cities are embracing sustainable urban development practices:

**Kigali, Rwanda:** Implementation of a ban on non-biodegradable plastics, promoting clean and green surroundings.

**Durban, South Africa:** The development of the ‘Durban Climate Action Plan’ which aims to make the city more resilient to climate change impacts through various initiatives.

**Addis Ababa, Ethiopia:** The introduction of a light rail transit system to reduce traffic congestion and emissions.

**Cairo, Egypt:** The implementation of ‘Cairo 2050’, a plan aiming to enhance urban sustainability through housing, transportation, and green space initiatives."

**Prompt 2** "Tell me about sustainable practices in urban development.

**Response 1** "Sustainable practices in urban development often involve environmentally friendly designs and renewable resources. They may include green roofs, rainwater harvesting.

**Adaptation 1:** The user notices that the answer, while correct, is quite general. They decide to adjust the prompt to ask for more varied and specific examples.

**Prompt 2** "Can you provide a diverse set of examples of sustainable practices in urban development worldwide?"

**Response 2** "Certainly! In various parts of the world, different sustainable practices are being implemented in urban development:

In Copenhagen, Denmark, the promotion of cycling through extensive bike lanes has significantly reduced carbon emissions.

In Singapore, the ‘Gardens by the Bay’ utilizes horticultural waste to generate electricity, illustrating energy recovery from waste.

Curitiba, Brazil is known for its efficient public transportation system which has reduced traffic congestion and pollution.

Vancouver, Canada has a goal to become the greenest city by 2020, with initiatives like green roofs and community gardens.

**Adaptation 2:** The user appreciates the variety in the response and now decides to delve deeper into each practice to gather more detailed information.

**Prompt 3** "Great, can you now elaborate on each of these practices, explaining how they contribute to sustainability and any challenges they might be facing?"

**Response 3** "Absolutely, here’s a more detailed look at each of these practices:

**Copenhagen’s Cycling Promotion:**
- Contribution to Sustainability: Reduced carbon emissions, promotion of healthy lifestyles, and reduced traffic congestion.
- Challenges: Ensuring safety for cyclists, maintenance of cycling infrastructure during harsh weather conditions.

**Singapore’s Gardens by the Bay:**
- Contribution to Sustainability: Efficient energy recovery from waste, promotion of biodiversity, and a popular attraction encouraging environmental awareness.
- Challenges: High setup and maintenance costs, dependency on consistent waste generation.

**Vancouver’s Green Initiatives:**
- Contribution to Sustainability: Promotion of green spaces, biodiversity conservation, and fostering community engagement through community gardens.
- Challenges: Meeting ambitious sustainability goals within set timelines, managing urban growth without compromising green initiatives.

**Adaptation 3:** The user, satisfied with the depth of information, decides to explore initiatives in a new region to make their report more comprehensive.

**Prompt 4** "Thank you! Could you also give examples of sustainable urban development practices in African cities?"

**Response 4** "Certainly! In Africa, several cities are embracing sustainable urban development practices:

**Kigali, Rwanda:** Implementation of a ban on non-biodegradable plastics, promoting clean and green surroundings.

**Durban, South Africa:** The development of the ‘Durban Climate Action Plan’ which aims to make the city more resilient to climate change impacts through various initiatives.

**Addis Ababa, Ethiopia:** The introduction of a light rail transit system to reduce traffic congestion and emissions.

**Cairo, Egypt:** The implementation of ‘Cairo 2050’, a plan aiming to enhance urban sustainability through housing, transportation, and green space initiatives."
Reflective

- Carefully evaluate AI responses
- Identify areas for improvement
- Use insights to further refine strategies for engagement
Implications for the Future of Learning and Education

• Enhancing critical skills through prompt engineering
  • Analytical Thinking
  • Communication Skills
  • Critical Evaluation
  • Reflective Practice
  • Creative Thinking
  • Collaborative Mindset
• Leo S. Lo
• leolo@unm.edu
• https://www.linkedin.com/in/leoslo/


Exploration: Participants experiment with the GPT-4 tool, discovering its potential applications in their diverse professional fields.

Experimentation: Participants develop projects utilizing GPT-4, helping them streamline tasks or explore new possibilities.

Evaluation: Participants document their experiences, analyze the outcomes, and share their findings, allowing us to assess the overall impact and effectiveness of the program.

Knowledge Sharing: Participants' insights are shared within the university and potentially at industry conferences and in academic journals.