

## Problem Set 4

### Interrogating Your Research Proposal with AI

**Objective:** Use a Large Language Model (LLM) as a critical thinking partner to interrogate your research proposal draft. You will engage in a structured dialogue with an AI model to explore the strengths, weaknesses, limitations, risks, and areas for improvement in your research idea. This exercise will also focus on verifying the factual accuracy of the AI's suggestions and citing primary sources.

#### *Exercise 1: Interrogation*

Instructions:

- Select an LLM of your choice (e.g., ChatGPT, Claude, Gemini, etc.). Clearly state which LLM you used, including the model version (e.g., ChatGPT 4.0).
- Upload or input your current research proposal draft into the LLM.
- Set a timer for 20 minutes. You should not spend more than this on the interrogation. The goal is to practice interacting with AI, not to produce a perfect conversation.
- You may use voice dictation if you prefer.
- Interrogate the AI with the **aim to improve your proposal and find flaws**.
- Ask the LLM a series of critical questions, such as:
  - What are the advantages of this research idea?
  - What are the limitations and potential biases?
  - Where do you see risks or challenges in implementation?
  - Are there specific concerns the student (you) should address?
  - What suggestions do you have for improving the proposal?
- **Follow-up questions are required:** You must ask follow-up questions to deepen the conversation. The goal is to improve your proposal, you are free to choose in which direction to go. Examples include:
  - "I don't understand this part; could you explain it more clearly?"
  - "Could I connect your suggestion about topic X with topic Y?"
  - "Can you provide a real-world example or case study to illustrate your point?"

- "How would this approach differ if I applied it in [different context]?"
- "What assumptions are you making with this suggestion?"
- **Stay Critical:** You are already familiar with this research field. Engage critically with the AI's responses. If something does not make sense or seems incorrect, question it.

**Deliverable:**

- Provide the full transcript of your interaction with the LLM.

***Exercise 2: Fact-checking and source verification***

Instructions:

- Select **three factual claims** or suggestions provided by the LLM from your conversation in Exercise 1.
- For each claim:
  - Ask the LLM, "Can you provide a reference for claim x?"
  - Check the provided reference for accuracy:
    - Find and cite a primary research source (not a secondary blog post or a non-peer-reviewed source).
    - If available, copy and paste the relevant excerpt from the primary source into your report.
    - Clearly state whether the AI's claim was correct or incorrect based on your fact-checking.

**Deliverable:**

- A fact-checking table listing the three claims, their verification, primary source citations with excerpts, and a statement for each claim indicating if the AI was correct or incorrect.

***Exercise 3: Summary and take-home messages***

Instructions:

- Answer the following questions:
  1. Proposed changes: Propose 1-3 changes you plan to make to your research plan after the interaction.
  2. Interaction reflection: How was the interaction with the AI? Did you learn anything useful? How did it feel?

***Important notes:***

- **Completion-based grading:** If you complete all required parts of the assignment (full transcript, fact-checking section with verification and citations, reasonable answers to the questions in exercises 3), you will receive full credit.
- Be mindful that LLMs can sometimes "hallucinate" (i.e., generate plausible-sounding but false information). This is why fact-checking is essential.
- Your engagement with the AI should be active and critical, not passive.
- Use reputable databases (e.g., PubMed, JSTOR, ScienceDirect) to find primary sources.