AI for the Sceptical Scholar: Practical Strategies for Using LLMs in Research

Teal Emery

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Preface

This book accompanies the workshop **AI for the Skeptical Scholar: Practical Strategies for Using LLMs in Research** for SOAS College of Social Sciences. In two hours, we'll explore how this new technology—despite its limitations—can enhance your research capabilities by handling routine tasks while you focus on critical analysis and theoretical contributions.

Learning Objectives

By the end of this workshop, you will be able to:

- Evaluate and select appropriate LLM tools for your research needs
- Design effective prompts that leverage your domain expertise
- Use LLMs to enhance literature reviews and cross-disciplinary understanding
- Apply LLMs for coding assistance and data analysis support
- Understand validation approaches for LLM-generated content
- Recognize both the transformative potential and important limitations of these tools

Who This Workshop Is For

This workshop is designed for experienced researchers who want to explore how LLMs might enhance their work. We assume you have:

- Deep expertise in your research domain
- Healthy skepticism about new technologies and their promises
- No prior knowledge of LLMs or coding experience
- Interest in practical tools that could streamline routine research tasks

Your skepticism is justified—LLMs have real limitations we'll address directly. This workshop provides a realistic assessment of both capabilities and constraints.

Workshop Scope

Artificial Intelligence is a vast and rapidly evolving field. In two hours, we can only cover a small portion of this landscape. This workshop aims to provide you with three core concepts that will equip you with immediately useful tools and a framework for continued learning:

1. **A mental model** for understanding when and how to use AI effectively
2. **Practical techniques** for common research tasks
3. **Validation strategies** to maintain research integrity

What We Will Cover

- Consumer-friendly LLM interfaces you can use immediately
- Hands-on practice with real research applications
- Introduction to programmatic possibilities for larger projects
- Case studies demonstrating successful academic use

What We Will Not Cover

- Comprehensive discussion of AI's social implications (though we acknowledge them)
- Detailed API programming instruction
- Exhaustive review of AI startup tools
- Solutions to replace human critical thinking

Understanding LLMs in Research Context

Large Language Models represent a new category of research tool. Like any emerging technology, they come with significant limitations: training data biases, lack of contextual understanding, tendency to generate plausible-sounding but incorrect information, and important ethical considerations around consent and knowledge production.

However, when used strategically and with appropriate validation, these tools can transform research workflows. By automating time-consuming routine tasks—initial literature categorization, draft translations, basic coding—LLMs free researchers to dedicate more time to what humans do best: critical analysis, theoretical development, contextual interpretation, and ethical judgment.

About Your Instructor

Our Two-Hour Journey

Part 1: Foundations (20 minutes)

Understanding LLMs as Research Tools

- The "Jagged Frontier": Where AI excels versus where humans remain essential
- Key concepts: model capabilities, cost structures, context windows
- Why Google Gemini for academic work (citations, extended context, NotebookLM)

Part 2: Practical Applications (70 minutes)

Hands-On Tools and Techniques

- Prompt engineering fundamentals with practice exercises
- Creating reusable "Gems" for common research tasks
- Enhancing literature reviews across languages and disciplines
- Getting coding assistance without programming expertise
- Brief exploration of complementary tools (Perplexity, ChatGPT, Claude)

Part 3: Advanced Possibilities (15 minutes)

Scaling Your Research

- Case study: How I classified 18,000 Chinese overseas lending projects in 15 hours (versus 1,500 hours manually).
- Validation strategy: achieving 91.8% agreement with human raters
- Enabling policy-relevant analysis: quantifying green lending patterns across the Belt and Road Initiative
- Introduction to programmatic approaches for large-scale research
- When and how to consider API-based workflows

Part 4: Q&A and Discussion (15 minutes)

Your Questions and Next Steps

Approaching This Material

This workshop takes a pragmatic stance. We neither dismiss AI's real limitations nor accept inflated claims about its capabilities. Instead, we focus on practical applications where LLMs demonstrably save time and enhance research capacity while maintaining academic standards.

Throughout, we'll use clear language and define technical terms as they arise. When we discuss "context windows," we'll explain this means how much text an AI can process at once. When we mention "hallucinations," we'll clarify this refers to AI's tendency to generate false but plausible information.

Preparing for the Workshop

You'll need:

- A free Google Gemini account (setup instructions in Appendix A)
- A research question or paper you're currently working on
- Willingness to experiment while maintaining healthy skepticism

How to Use This Book

Each chapter provides:

- Clear explanation of concepts without unnecessary jargon
- Step-by-step instructions with visual guides
- Hands-on exercises using real research scenarios
- Common pitfalls and how to avoid them
- Validation strategies specific to each application

This book serves as both a workshop companion and a reference for future exploration. The goal is not to make you an AI expert but to provide practical tools that enhance your existing research practice.

Let's begin exploring how these tools can support your important work.

1 About Your Instructor

1.1 How I Got Here

Carlos Oya reached out after seeing a recent ODI Global paper I co-authored with Yunnan Chen called **Greener on the other side? Mapping China's overseas co-financing and financial innovation**. We used a novel LLM-based approach to classify "green" Chinese lending projects—something that would have taken a large research team months to do manually.

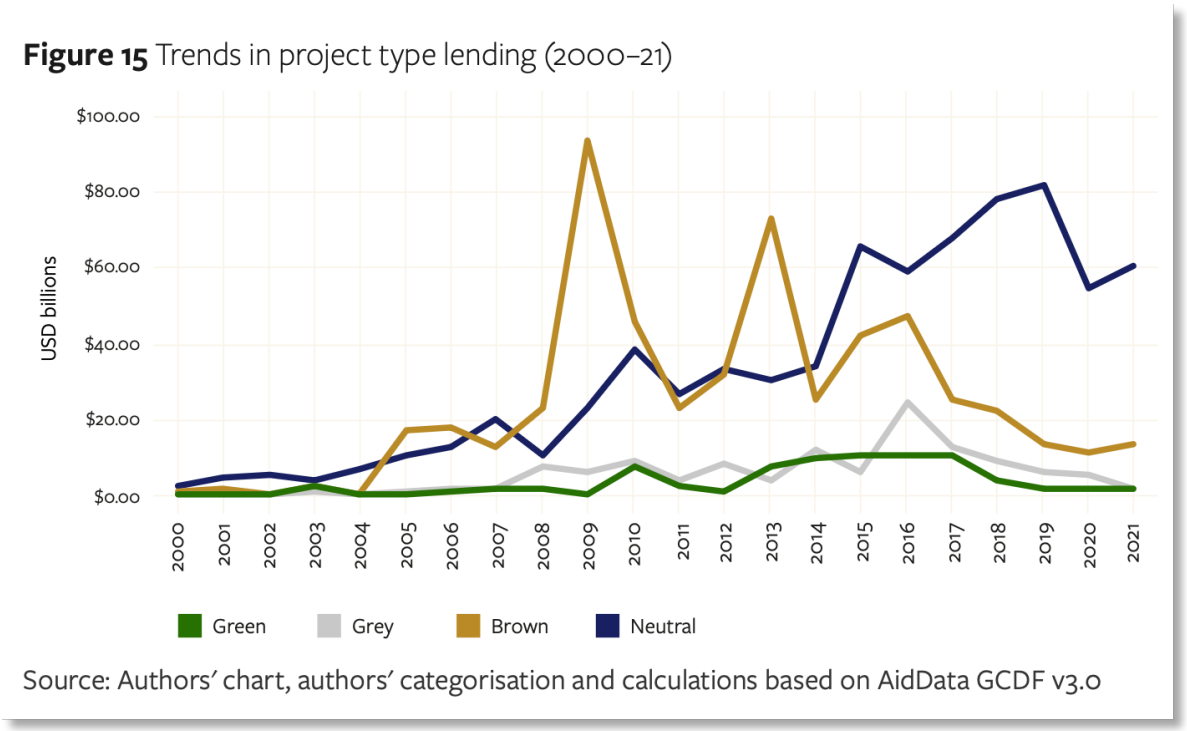

Figure 1.1: Source: Chen & Emery 2025

When we did this work, I looked for "best practices" for validating LLM findings. There weren't many. So we developed our own validation method and published both a methodological

appendix and our GitHub repository. It's not perfect, but it's something for others to build upon.

> **Key Numbers from Our Chinese Lending Project**
>
> - **18,000 projects** classified in 15 hours using Deepseek v3
> - **$1.58 total cost** vs. estimated $22,500 for manual classification
> - **91.8% agreement** with human raters on validation sample
> - **First comprehensive analysis** of China's green overseas lending portfolio

This experience showed me how LLMs can enhance what's possible for policy-relevant research. Two policy researchers on a tight budget accomplished what traditionally required large, grant-funded research teams. There's a long way to go to establish best practices for the use of LLMs in policy research, so I'm trying to do my best to move the conversation forward.

1.2 What I Do Now

Day job: Running Teal Insights, where we help Global South finance ministries navigate complex debt sustainability and climate investment challenges. We're philanthropically funded with a mandate to build open-source tools—including LLM tools—so countries don't have to pay exorbitant fees to financial advisors.

Our approach: Small team (US, Nigeria, Kenya) using AI tools heavily to amplify our impact in research and code development.

1.3 Other Relevant Experience

- **EM sovereign debt resarch analyst**, Morgan Stanley Investment Management
- **Adjunct Lecturer**, Johns Hopkins SAIS (teaching students to do real-world data analysis on financial and sustainability data)

- **Thought leadership** on sovereign debt + sustainability, World Bank
- **Chinese debt restructuring & flows** research, AidData
- **Big nerd**

1.4 Why This Workshop?

! A Note on Expertise

This technology is very new. Nobody is really an "expert" yet. But since we're using these tools extensively, we've learned hard lessons about how to use them well—and badly.

When Carlos asked me to teach this, I figured it was a great excuse to organize my thoughts on something I discuss with skeptical, curious researchers all the time.

This is my first attempt at articulating practical guidance for academics who want to use AI responsibly. I hope it's useful, and I invite all feedback on how to make it better.

Part I

Foundations

2 Introduction

Hi, let's try this out