Trust but Verify:

A Case Study of Using Agentic AI in Teaching Graduate Research Methods

Subhayan Mukerjee
Department of Communications and New Media
Faculty of Arts and Social Sciences

For full survey questionnaire, reading list, and the online tutorial used for this exercise, scan the QR code!

National University of Singapore

Teaching Context and Pedagogical Opportunities

NM6103 is a graduate Quantitative Research Methods seminar for first-year PhD and MA (by Research) students. The cohort is computationally diverse: while some are power users already experimenting with AI agents, others come from qualitative backgrounds and are taking the course as a mandatory requirement. As agentic AI looks to be becoming the standard for quantitative analysis[1], my goal was to future-proof students' research careers by moving them from basic "chatting" to command line-based research agents (e.g., Claude Code, Gemini CLI). This shift offered a unique way to:

- **Scale Ability:** Empower students to handle large-scale data via command-line interfaces.
- **Enhance Rigour:** Integrate AI directly into reproducible, file-based programming workflows.

The Challenges

- **Skill Asymmetry:** Supporting qualitative-track students while challenging advanced researchers.
- **Computational Friction:** Syntax debugging and data cleaning often stall high-level methodological learning.
- **The "New Norm":** The need to train researchers for a landscape where autonomous data analysis is becoming routine[1], while ensuring they remain critical "verifiers"

Underlying Teaching Principles

- **Practitioner-Led Application:** Move beyond theoretical mastery toward the functional ability to execute.
- **Rigour:** AI can assist with the mechanics, it cannot substitute for statistical understanding.
- **Productivity through Scaffolding:** By automating busywork, students can focus on higher-order research design and complex problem-solving.
- **Radical Self-Criticism & Intellectual Humility:** "Trust but Verify" mindset, where AI output is treated as a starting point for rigorous human validation
- **Technical Empowerment:** Equipping students with power tools to remove the friction of research, provided they maintain the critical distance.

Implementation Details

- **Terminal-Based Workflows:** Students moved from browser-based "chats" to CLI agents.
- **Context-heavy Prompting**: Students learned to move beyond simple prompts toward context-heavy Markdown based prompting using online tutorials[2]
- **Sentiment Survey:** Students were surveyed to evaluate their attitudes towards "AI as a research agent"

Fig 1. Word cloud based on student answers to "How would you define Agentic AI compared to a standard Large Language Model?"

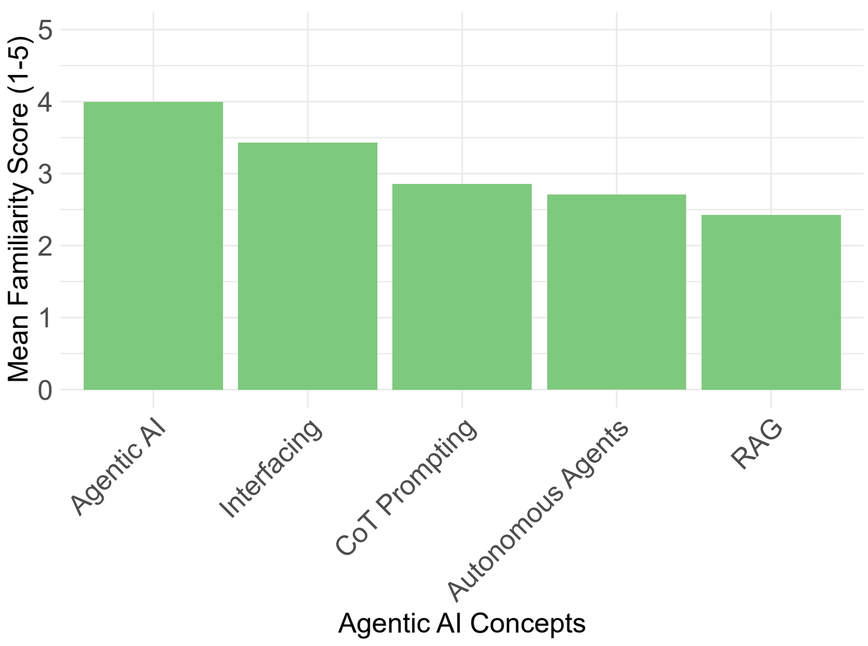


Fig 2. Level of Familiarity with Agentic AI concepts

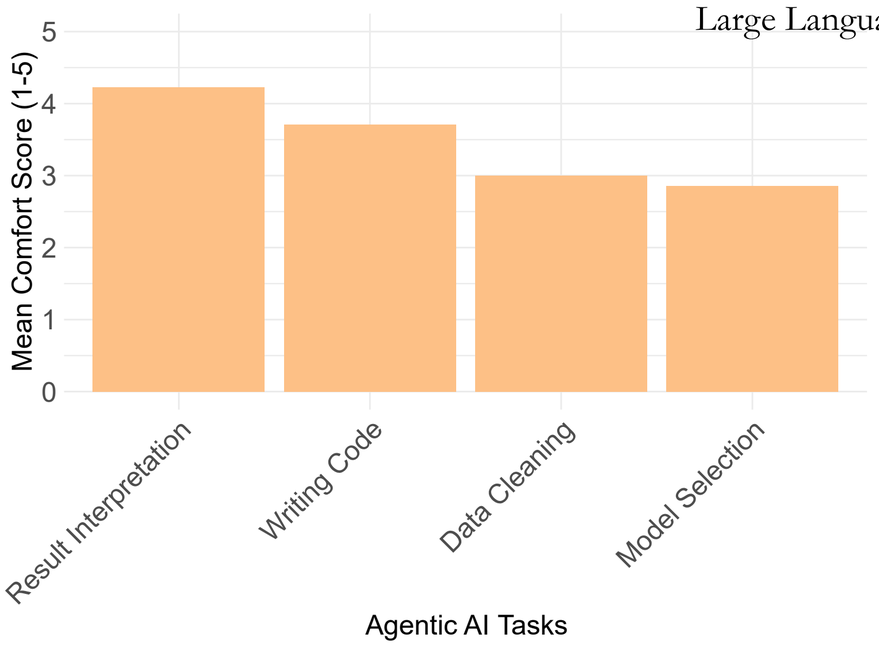
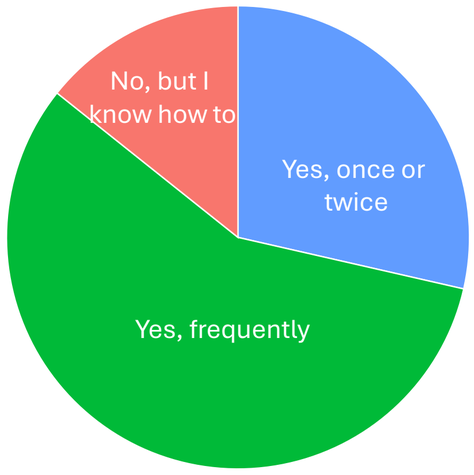


Fig 3. Level of Comfort with using Agentic AI with Minimal Supervision in Research



Have you used agentic AI in your research?

Fig 4. Frequency of Agentic AI use in Research

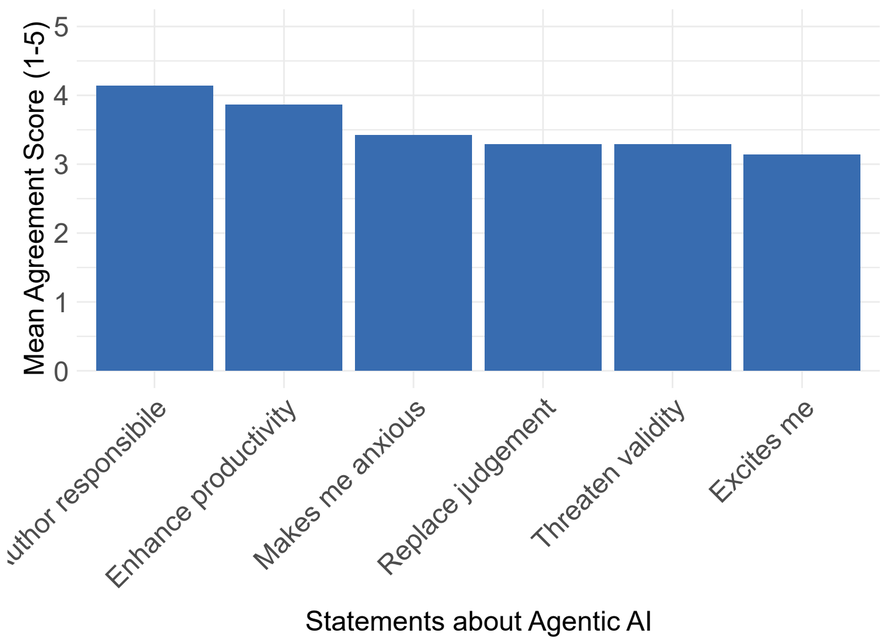


Fig 5. Attitudes towards use of Agentic AI in Research

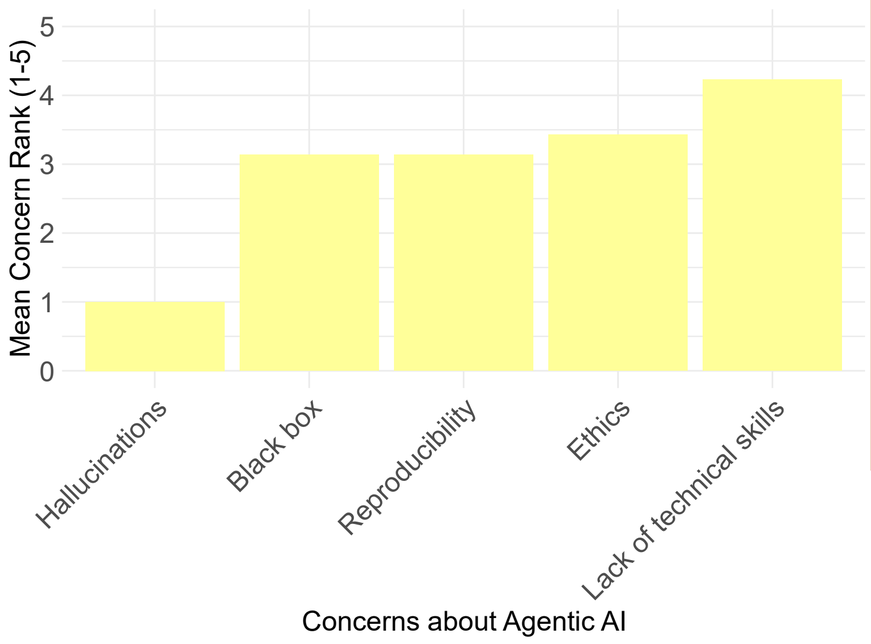


Fig 6. Ranking student concerns towards using Agentic AI in Research

Reflections

- High levels of basic familiarity, low levels of familiarity with advanced concepts
- Students are already moving beyond chatbots and deploying agents for diverse research tasks.
- Attitudes reflect a healthy mix of anxiety and excitement.
- High agreement that AI agents could replace human methodological judgment is concering
- Unlike AI chatbots, CLI-based agents can exacerbate skill inequality

References

[1] Messing, S and Tucker, J. (2026) The train has left the station: Agentic AI and the future of social science research. Brookings Institution Report.
[2] Garimella, K (2026) Using Agentic AI for Research and Analysis. YouTube Playlist.