



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Use of GenAI as part of your research and learning paths

Good and bad practices

Leonardo Testi (UniBo) & Giuseppe Lodato (UniMi)

Generative AI in teaching and research

GenAI is not just a *divertissement*, it is transforming the way we approach many aspects of our lives, including our approach to teaching, learning and doing research

We believe that the correct approach is to embrace the new opportunities in a conscious and appropriate way: optimizing our workflow and avoid becoming comfortably numb

Some guidelines from UniBo website:

«The use of generative artificial intelligence is based on the centrality of the individual and the maintenance of meaningful human control. GenAI is a support tool that must strengthen judgement, decision-making and responsibility, without ever replacing them. Its use requires transparency, awareness and accountability.»

«GenAI should enhance critical thinking and personal creativity without replacing them»



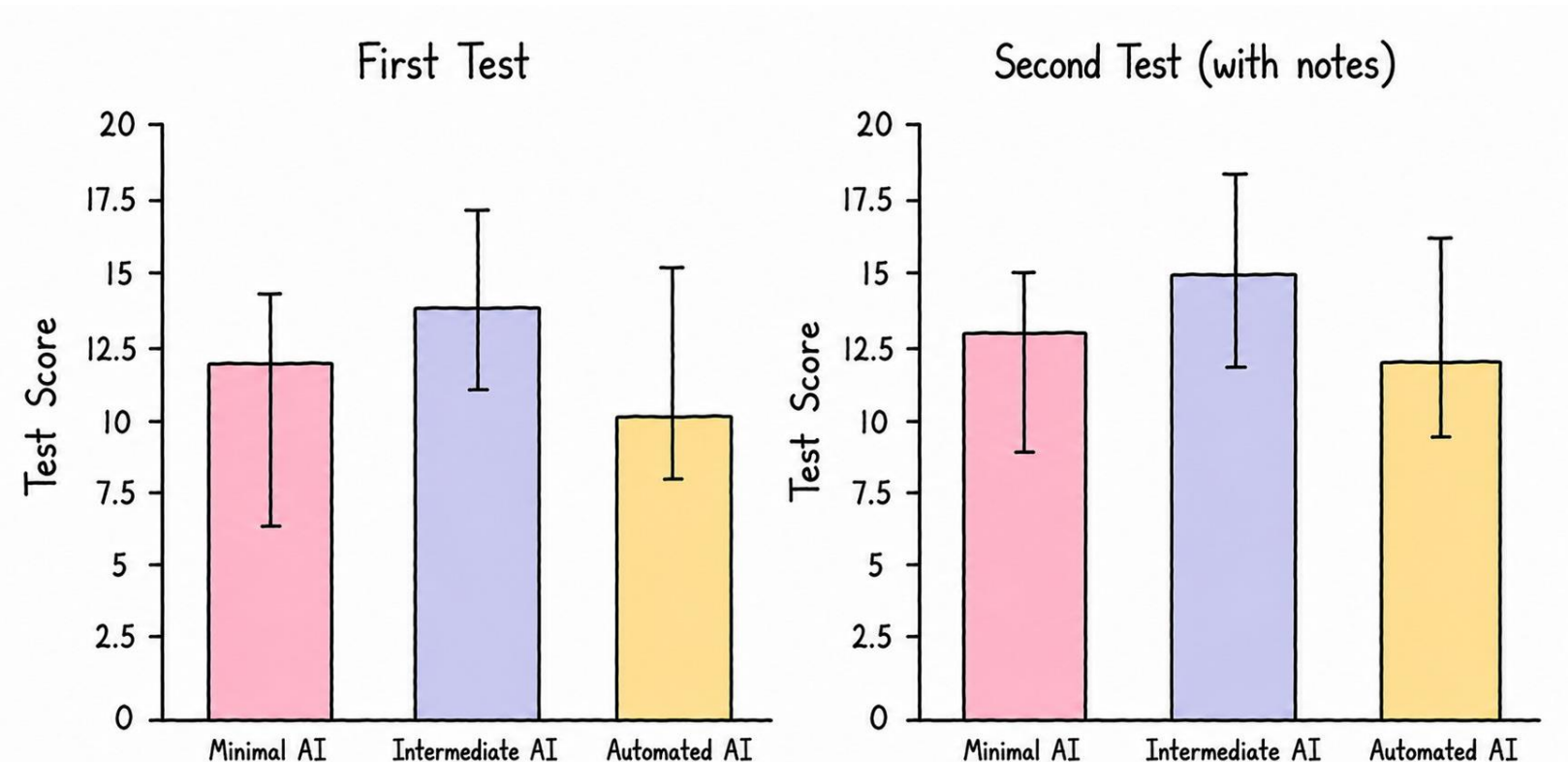
AI as a learning aid

Generally seen very negatively:
there is extensive scientific
literature on the phenomenon of
“cognitive off-loading”

If used properly, AI can be a very
useful aid in learning

Not as a substitute of the hard
work of taking notes
(I have a set of other material on
the importance of taking notes
with “pen” and “paper”, that I
normally inflict on master
students)

1. **Minimal AI** : a direct transcript of the lecture was provided in real-time.
2. **Intermediate AI** : summary blocks of the lecture were provided in real-time.
3. **Automated AI** : structured notes were provided every ~90 seconds.



Scaife (2026) and Chen et al. (2025) <https://doi.org/10.1145/3757632>

AI as a learning aid

This is an example of a useful use of GenAI in learning

If properly trained, Gen AI can be used as a mock trainer

This study refers to study rehearsal for tests, but it can be used for a variety of use cases:

- Job interview questions
- Grant interview questions
- Etc...

Note that you can generate, hostile, misunderstanding, expert, etc... questions



Using GenAI to Support Retrieval Practice

Jonathan G. Tullis & Hosain Heshmati
University of Arizona



Question

Can generative artificial intelligence support student learning by generating practice tests and providing feedback?

Background



Practice tests produce better learning than re-reading.
Jonsson et al., 2021



Yet, students typically choose re-reading over taking practice tests.
Tullis & Maddox, 2020



Students struggle to make own test questions & interpret disfluencies of retrieval as indicating poor learning.
Hui et al., 2021



GenAI & Learning

Meta-analyses show genAI can boost student learning, depending on how it is used.
Ma & Zhong, 2025



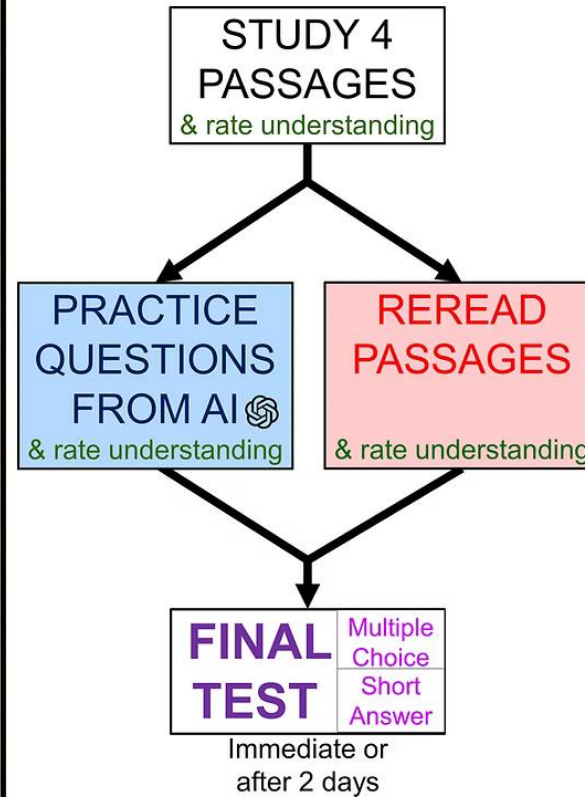
GenAI can overcome limitations of using practice tests by creating countless questions and provide immediate feedback.

References

Hui, L., de Bruin, A. B., Donkers, J., & van Merriënboer, J. J. (2022). Why students do (or don't) choose retrieval practice: Their perceptions of mental effort during task performance matter. *Applied Cognitive Psychology*, 36(2), 433-444.
Jonsson, B., Wiklund-Hörnqvist, C., Stenlund, T., Andersson, M., & Nyberg, L. (2021). A learning method for all: The testing effect is independent of cognitive ability. *Journal of Educational Psychology*, 113(5), 972.
Ma, N., & Zhong, Z. (2025). A Meta-Analysis of the Impact of Generative Artificial Intelligence on Learning Outcomes. *Journal of Computer Assisted Learning*, 41(5), e70117.
Tullis, J. G., & Maddox, G. B. (2020). Self-reported use of retrieval practice varies across age and domain. *Metacognition and Learning*, 19(2), 129-144.

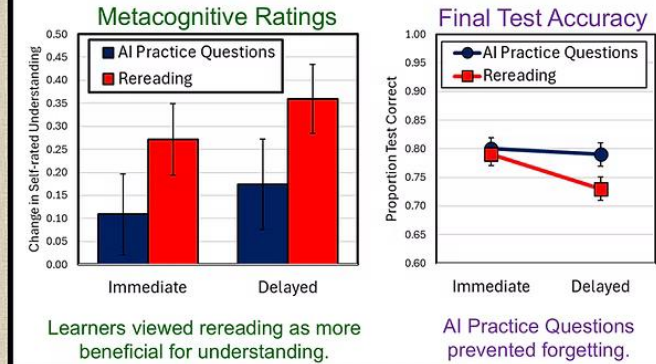
This research was funded in part by the CUES Distinguished Fellowship from the University of Arizona

Procedures



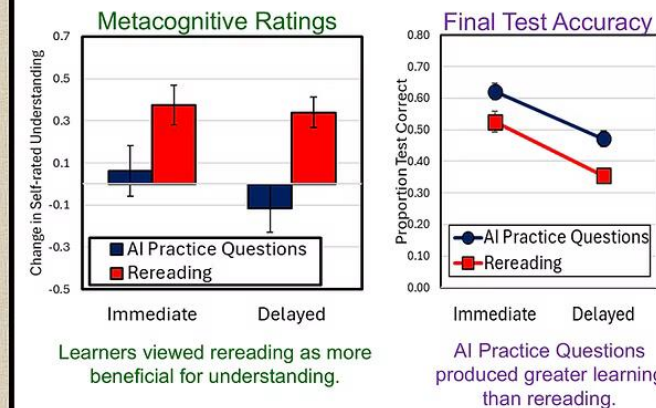
Exp. 1: Multiple Choice Test

n = 90



Exp. 2: Short Answer Test

n = 92



Conclusions

- GenAI can create practice questions and provide feedback to support learning.
- Yet, learners view genAI practice questions as worse for learning than rereading.
- We can use science of learning principles to develop and scale effective and useful genAI tools to support student learning.

Generative AI and research

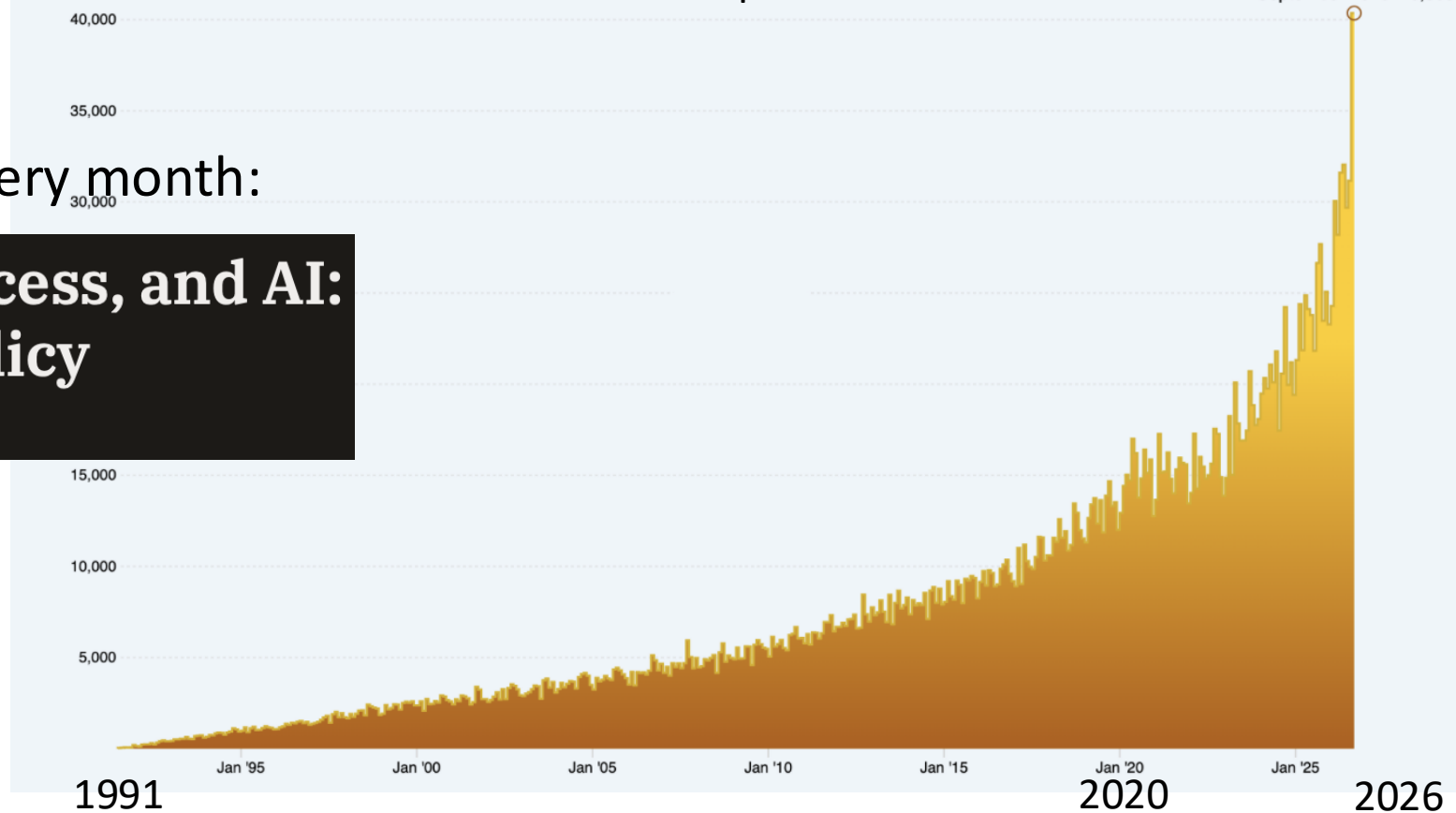
Two alarming (for me) bells this very month:

Fair Moderation, Equitable Access, and AI: arXiv's Updated Rate Limit Policy

By Kat Boboris · October 1st 2026

Total number of submissions as of October 1, 2026 = 3,192,873.

Sep 2026: 40363 submissions September 2026: 40,363



PhD students who write dissertations with AI less likely to stay in academia

US PhD graduates who used artificial intelligence were more likely to work in industry.

Mohana Basu, Nature, 16 October 2026



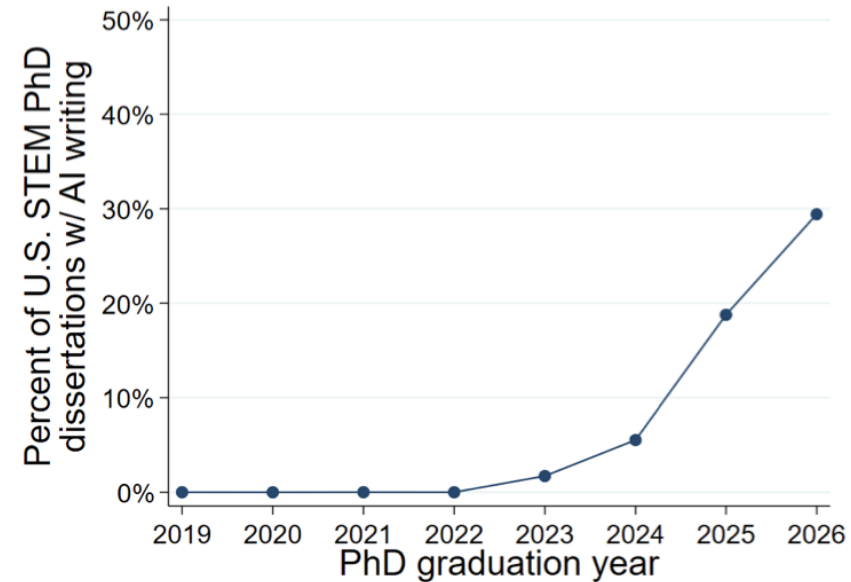
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Generative AI and writing your PhD thesis

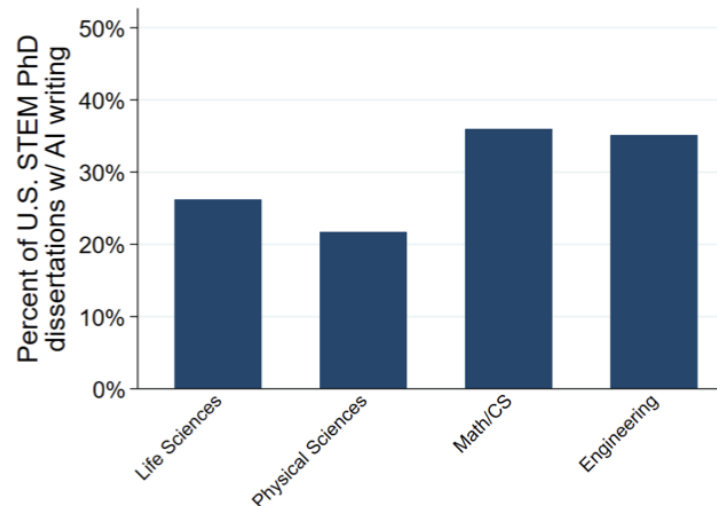
*«Once you start down the dark path,
forever will it dominate your destiny.
Consume you it will.»*

Evidence for increase of GenAI to
generate thesis text (or slides).

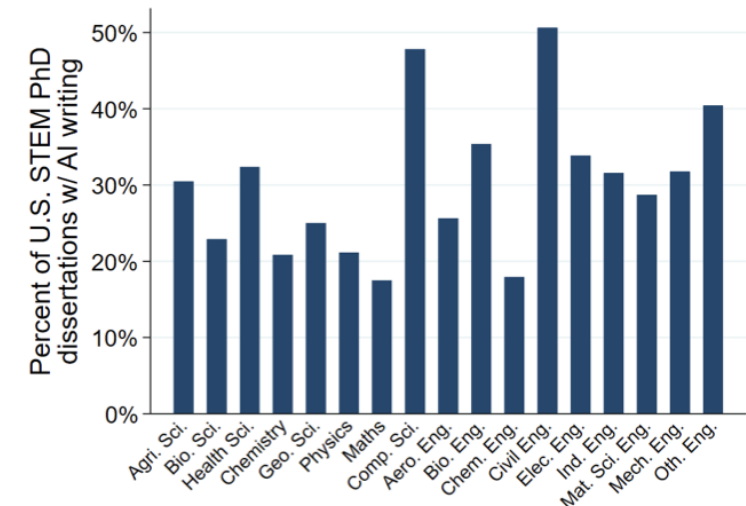
Panel (A): AI share over time



Panel (B): By broad field (2026)



Panel (C): By major field (2026)



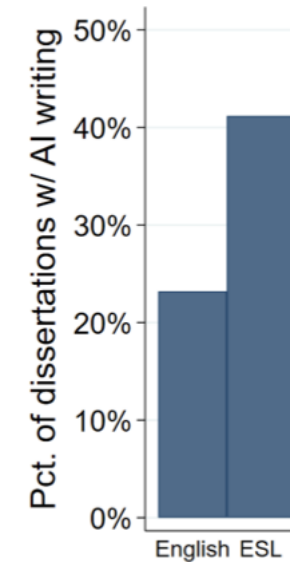
Gross et al. (2026)

Generative AI and writing your PhD thesis

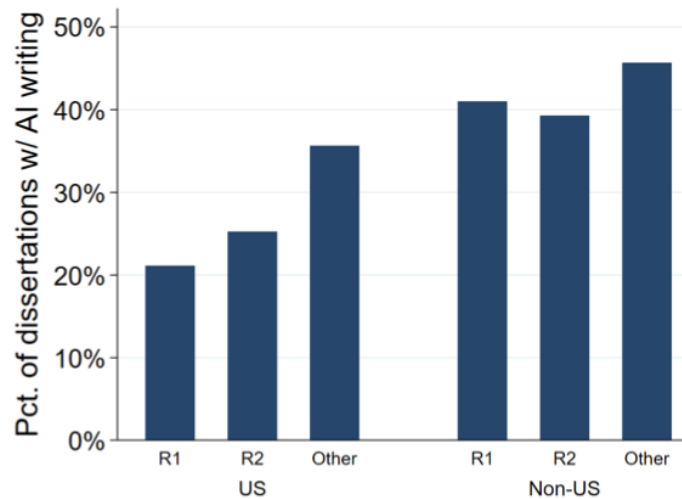
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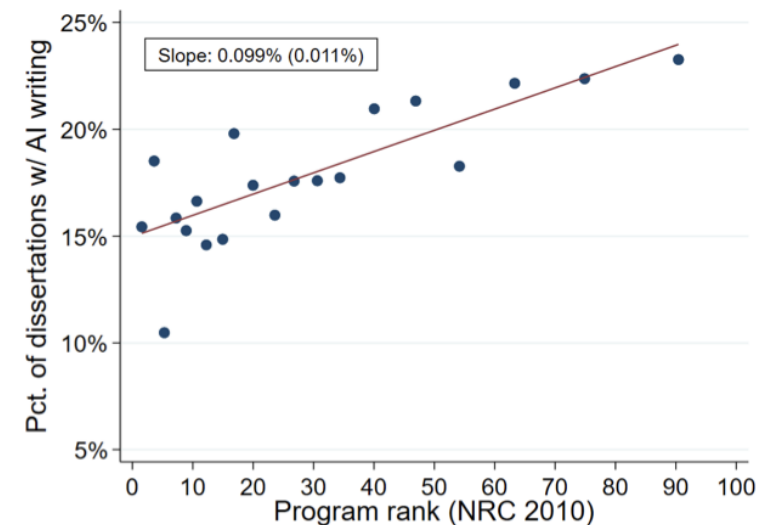
Panel (A): AI use by language and country



Panel (B): AI use by Carnegie Class



Panel (C): AI use by program rank



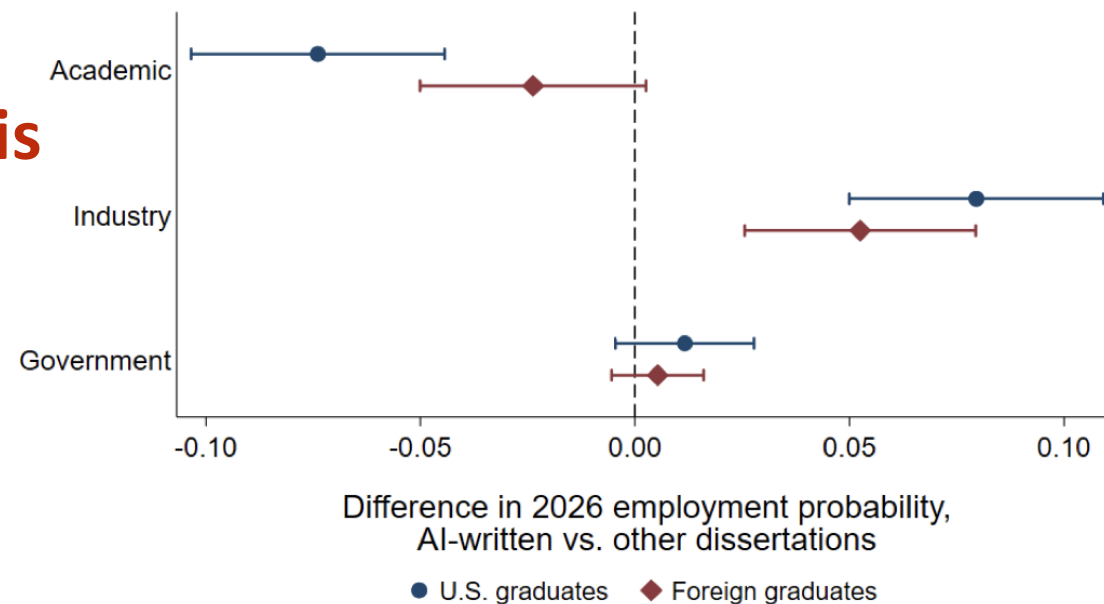
Gross et al. (2026)

Generative AI and writing your PhD thesis

*«Once you start down the dark path,
forever will it dominate your destiny.
Consume you it will.»*

Evidence for increase of GenAI to
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*“If you end your training now,
if you choose the quick and easy path,
you will become an agent of evil”*



How Heavily Are PhD Students Offloading Their Scientific Writing to AI? Evidence from US STEM PhD Dissertations

Gross et al. (2026)

Among US-origin graduates, those with AI-written dissertations are 7.4 p.p. less likely to be employed in academia in 2026 (17% over the 44% base rate) and 8.0 p.p. more likely to be employed in industry (16% over a 50% base), with no difference in government employment. These differences attenuate substantially for likely foreign-origin graduates. We also find differences within academia: conditional on academic employment, graduates with AI-written dissertations are 5.4 p.p. more likely to hold non-tenure-track positions (on a base of 12%), with no significant difference in the likelihood of tenure-track or postdoctoral positions. AI writing thus appears disproportionately common among graduates who exit an academic research career.

Generative AI and writing your PhD thesis

A workflow that instead increases your critical thinking and personal creativity:

- Use (in a smart way) AI to find literature (possibly going beyond the knowledge and suggestions of your supervisor and close group)
- Read it! Decide yourself whether it is relevant for you and your research
- Write your text yourself and maybe run it through AI for *suggestions* on how to improve it
- Review the suggestions and decide what to implement

Such a workflow will help you speed up your work, improve both the *content* and *delivery* in your thesis, through your **active** participation in the process.





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