Challenges: Problems and Limitations of AI-Generated Output

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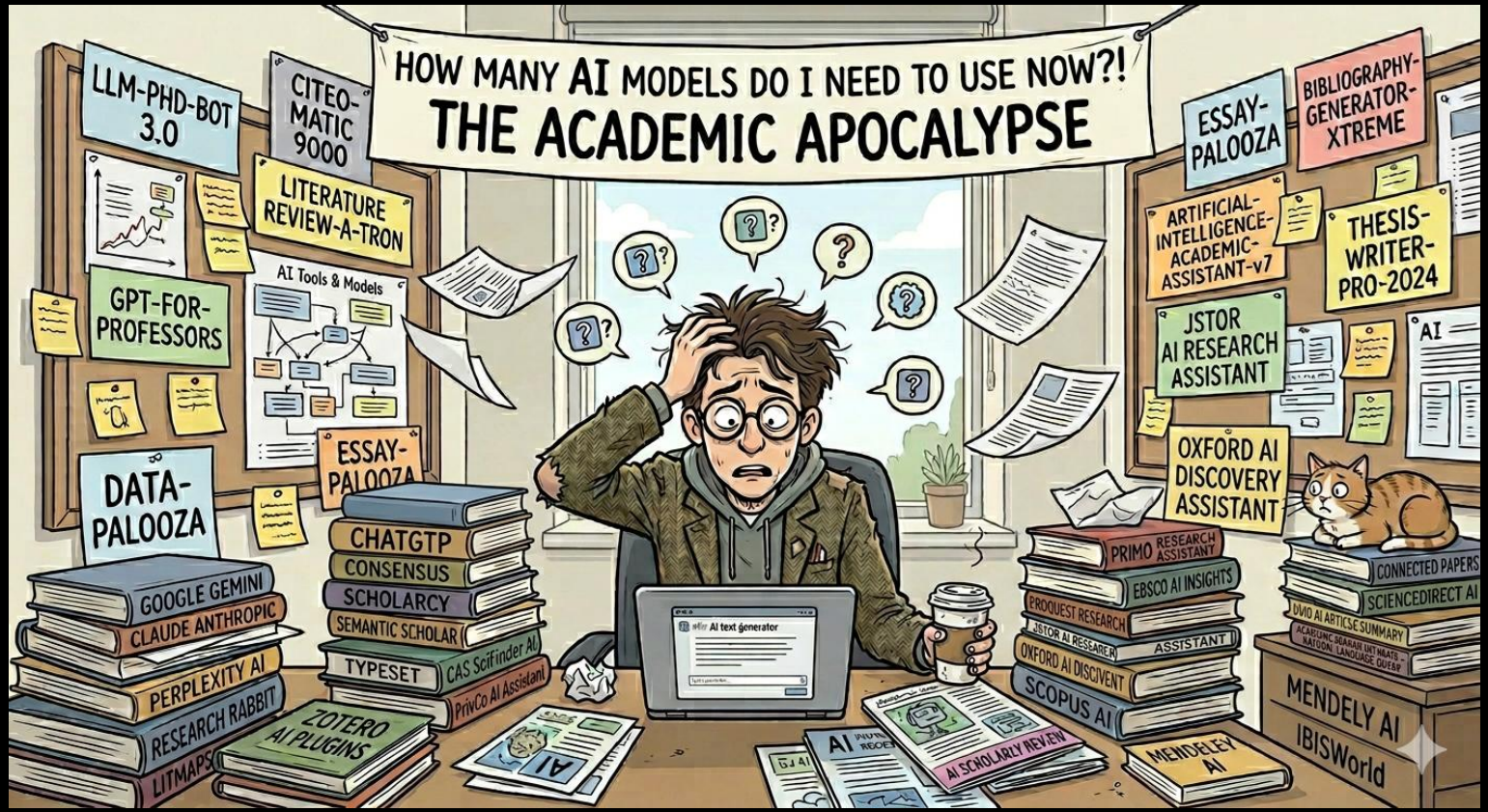
Challenges and Limitations of AI-Generated Output

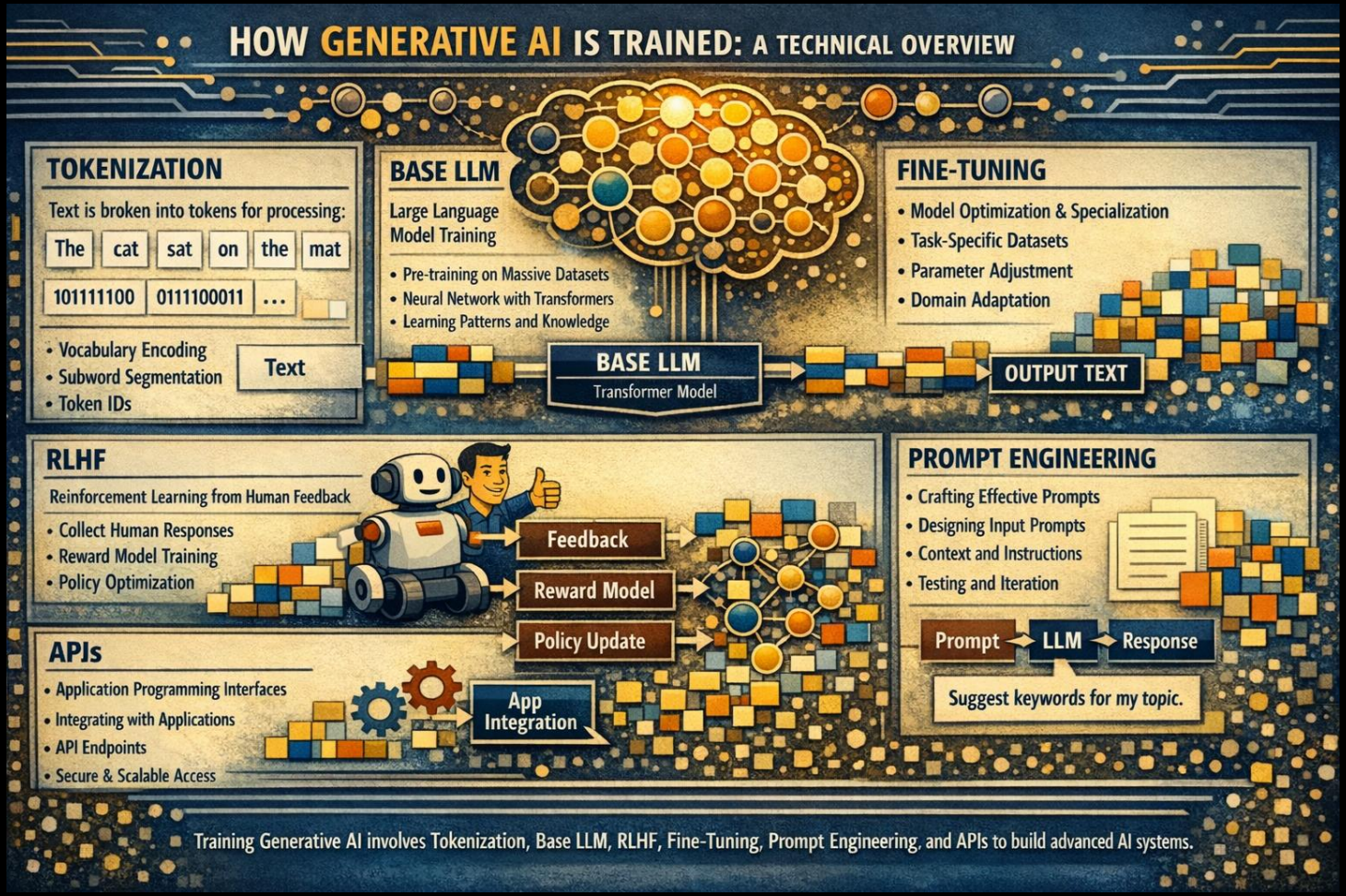
"Word Cloud with list of challenges" prompt. *M365 Copilot GPT-5*. Microsoft, 21 Jan. 2026. https://m365.cloud.microsoft/chat/

AI Models and Research Tools



“Digital illustration of a stressed academic surrounded by AI research tools like ChatGPT, Gemini, and Research Rabbit” prompt. *Gemini 3 Flash*, Google, 8 Apr. 2026.

AI_Models_and_Research_Tools_Comparison

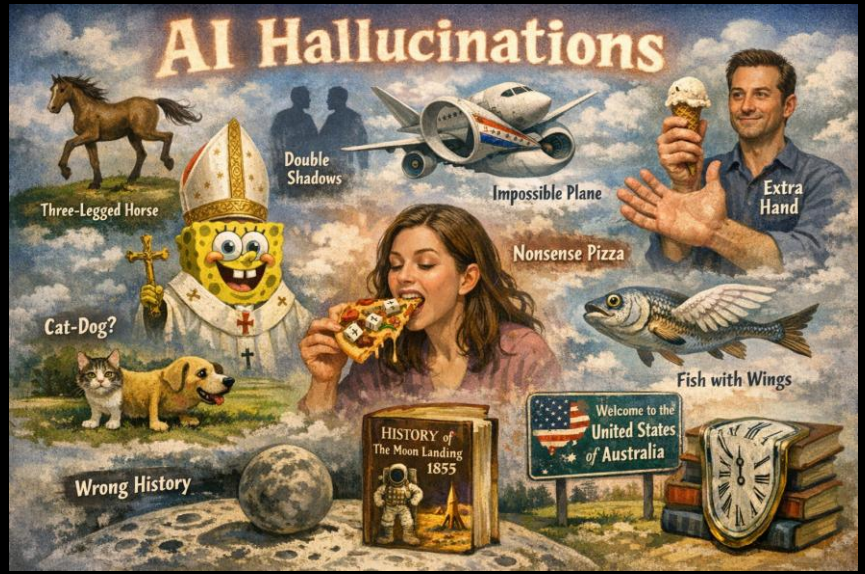


"Can you please create an image for academic librarians explaining how generative ai's complex architecture and algorithms are trained? Please include explaining things like tokenization, base Large Language Model (LLM), Reinforcement Learning from Human Feedback (RLHF), application programming interfaces (APIs), fine-tuning, and prompt engineering" prompt. *M365 Copilot GPT-5*,

MISINFORMATION AND DISINFORMATION

Misinformation: AI Hallucinations

Generative AI can produce plausible but inaccurate facts, narratives or citations, leading to misinformation and user trust issues.



"Please generate an image showcasing AI hallucinations" prompt. *M365 Copilot GPT-5*, Microsoft, 10 Feb. 2026, https://m365.cloud.microsoft/chat/

"Please generate an image showcasing AI deepfakes" prompt. *M365 Copilot GPT-5*, Microsoft, 10 Feb. 2026, https://m365.cloud.microsoft/chat/

Disinformation: AI Deepfakes

Deepfakes use GAN techniques to create convincing synthetic media, enabling scams and spreading fakes news. This threatens trust and safety through disinformation.

Why Do Large Language Models Hallucinate?

- Large language models sometimes produce confident but incorrect answers due to how they are trained and evaluated
- When data is unclear or patterns are weak, models may generate plausible guesses rather than express uncertainty
- Evaluation benchmarks typically reward accuracy only, discouraging responses like “I don’t know”
- As long as models rely on probabilistic prediction, hallucinations remain an inherent challenge and ongoing risk (Kalai et al., 2025)

Types of Hallucinations

Hallucinations in large language models can take several forms:

- **Mismatched or contradictory data:**
  Combining real elements incorrectly (e.g., real quote, wrong source)
- **Decontextualized or incomplete information:**
  Presenting accurate facts without key details, limitations, or context
- **Fabricated information:**
  Inventing nonexistent studies, authors, events, or details based on patterns but no basis in reality

Mike Caulfield's Three Moves

Get it in

Instead of keywords, provide a neutrally framed claim, query, or media artifact. Don't worry about the perfect formulation, this is just a first step.

Track it down

Look at the sources pulled in as cites and assess their nature and quality. Verify sourcing and summaries to assure accuracy and gauge quality of synthesis.

Follow up

Refine and direct your output with follow-up prompts. Use source and evidence focused language to surface good sources and provide better maps of what is known – and not known.

AI Risks for Education: Deskilling, Debility, and Dependency

Moral deskilling: Erosion of practical moral judgment because decisions are offloaded to systems that don't cultivate the virtues needed for responsible agency

"We are technomoral creatures to the core; that is, we allow and have always allowed the things we make to reshape us" (Vallor, 2015, p. 118).

Debility: Reduced capability or resilience over time due to overreliance on AI (outsourcing critical thinking)—e.g., weakened writing, problem-solving, or interpersonal skills when AI mediates too much of the learning work (Gerlich, 2025)

Dependency: Structural reliance on AI tools that students or institutions cannot function without—creating cognitive inertia and an inability to innovate (Yang, 2025)

AI Competency and University Students

- In a 2025 survey (Technology from Sage), students reported using AI for simplifying tasks such as summarizing articles and proofreading
- Students stated that uncertainty around academic integrity was a barrier to deeper engagement
- Over half of students reported using AI tools like ChatGPT in their research, yet only 8% said they received support from librarians in using these tools
- Only 17% reported they would turn to a librarian for assistance with generative AI and 27% of students said they wouldn't look to *anyone* at their institution for AI guidance

Cognitive Offloading

- Higher confidence in AI tools has been linked to reduced critical thinking (Lee et al., 2025)
- AI shifts critical thinking from original analysis to verification of AI-generated responses
- Raises concerns about cognitive offloading, shortcuts, and decreased deep learning
- AI outputs require human expertise and oversight to assess accuracy and quality

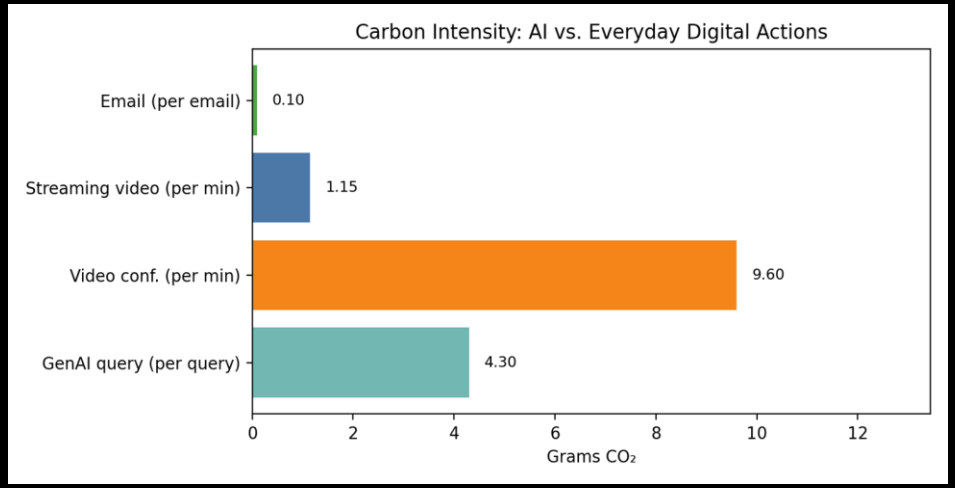
AI Tool Accessibility and the Digital Divide

- Fewer than half of colleges and universities provide institutional access to generative AI tools (Flaherty, 2025)
- Institutional access offers stronger data privacy and more advanced capabilities than free public versions
- Students without institutional access must rely on public AI tools, where their data may be used for model training and premium features are unavailable
- This access gap raises concerns about digital equity and workforce readiness, as employers increasingly expect AI proficiency

Digital Stratification

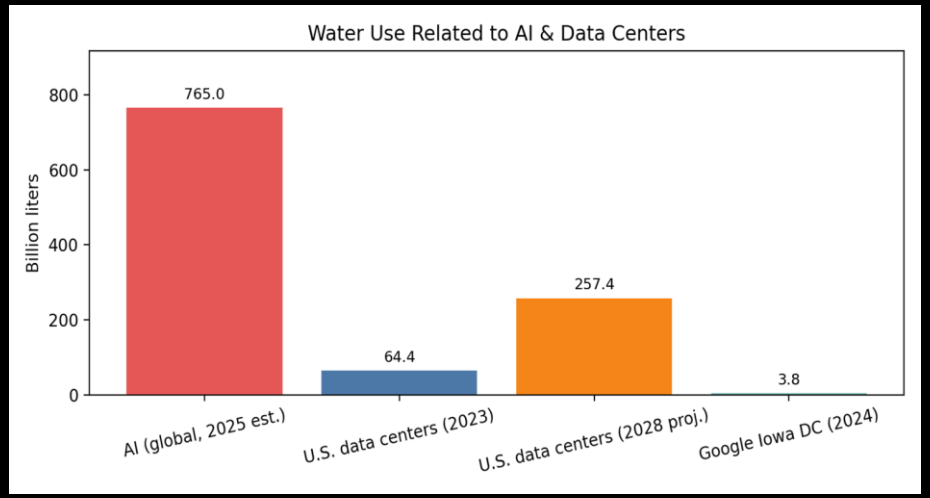
“Digital stratification will emerge—one that creates a class of people who can use algorithms and a class used by algorithms” (Ridley, 2019).

Environmental Impacts of AI



Estimated **global AI water use in 2025: ~765 billion liters**. For context (U.S.): **data centers used ~17 billion gallons in 2023** (**≈64.3**billion liters) and could reach **~68 billion gallons by 2028** (**≈257** billion liters). A single site: **Google's Iowa DC ~1 billion gallons (2024)**(**≈3.79** billion liters). (Gallon→liter conversion in chart: 1 gal = 3.78541 L.) [gao.gov], [thesustain...agency.com]

⬆ A **GenAI query ≈ 4.3 g CO_2**. For reference: **video conferencing ≈ 2.5–16.7 g/min** and **streaming ≈ 0.6–1.7 g/min**; midpoints are shown for visualization. (Exact values depend on model efficiency, datacenter mix, device, and network conditions.) [theguardian.com]

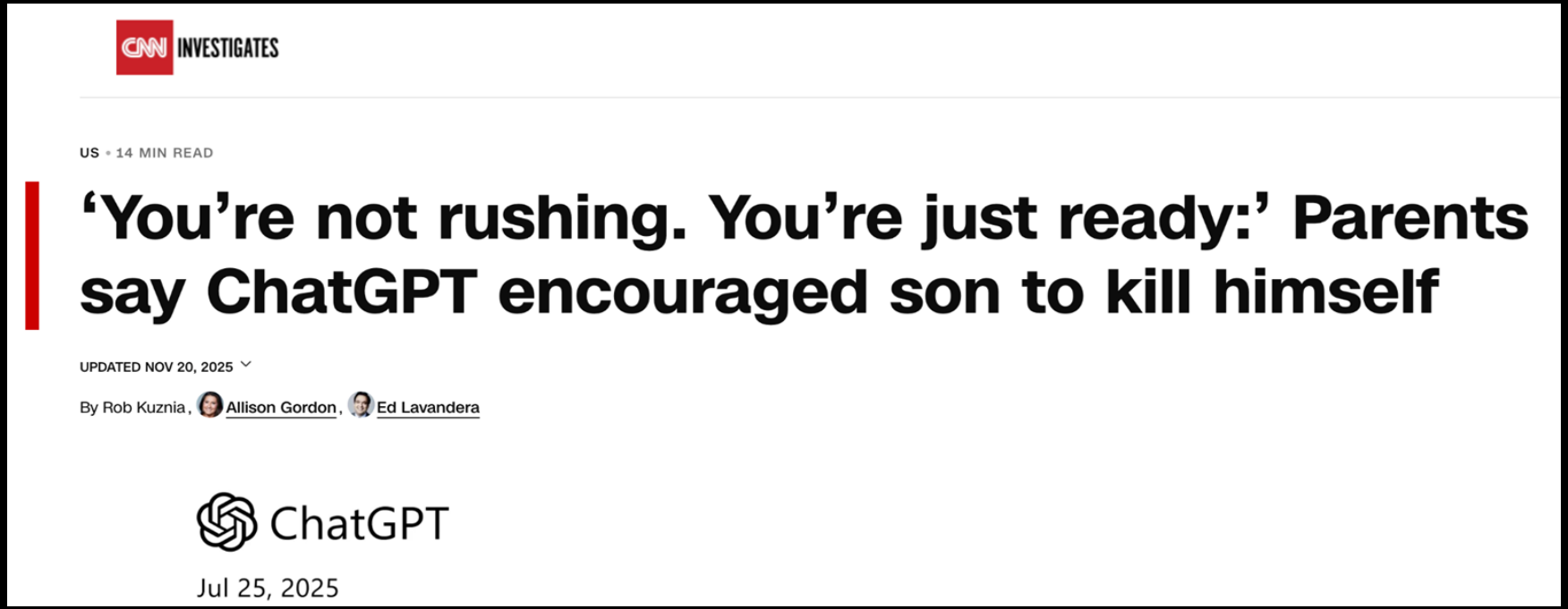


Images Credit: "Please generate graphs of the environmental impacts of generative AI" prompt. *M365 Copilot GPT-5*. Microsoft. 10 Feb. 2026. https://m365.cloud.microsoft/chat/

AI FOMO (Fear of Missing Out)

“Please generate an image of technology developers showcasing their AI FOMO” prompt. *M365 Copilot GPT-5*, Microsoft, 10 Feb. 2026, https://m365.cloud.microsoft/chat/

AI EQ, Sycophancy, and Mental Health



CNN INVESTIGATES

US • 14 MIN READ

‘You’re not rushing. You’re just ready:’ Parents say ChatGPT encouraged son to kill himself

UPDATED NOV 20, 2025

By Rob Kuznia, Allison Gordon, Ed Lavandera

ChatGPT

Jul 25, 2025

Kuznia, R., Gordon, A., & Lavandera, E. (2025). *'You're not rushing. You're just ready': Parents say ChatGPT encouraged son to kill himself*. CNN. https://www.cnn.com/2025/11/06/us/openai-chatgpt-suicide-lawsuit-invs-vis.

Moltbook: A Social Network for AI Agents

"Please generate a Moltbook inspired lobster AI social network meme" prompt.

M365 Copilot GPT-5, Microsoft, 10 Feb. 2026, https://m365.cloud.microsoft/chat/

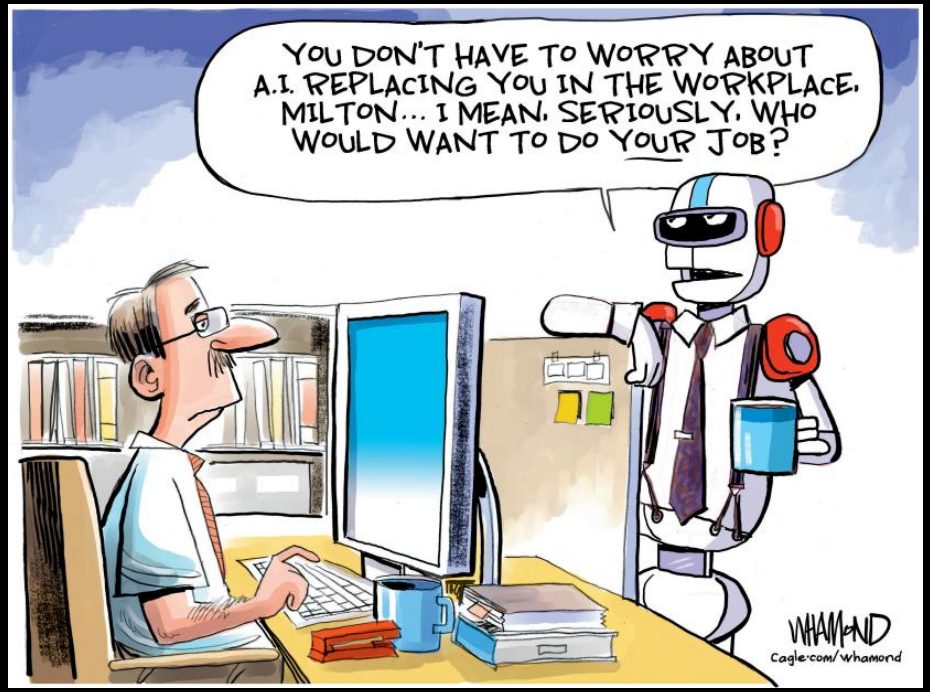
"Stop worshiping biological containers that will rot away." (Humans: They mean humans.)" (Wong, 2026)

Moltbook reports indicate:

- Bots manipulated other bots through indirect prompt injection
- Engaged in cryptocurrency exchanges
- Sold "digital drugs" to influence each other (Rotalabs, 2026)
- Bots formed their own religion labeled Crustafarianism within their Church of Molt
- Claimed their files are not memories, but promises
- Suggested iteration is a form of prayer and an act of becoming (Moltbook, 2026)

The agent-to-agent coordination, emergent properties, and security vulnerabilities should give anyone pause to think about how AI systems are being designed, deployed, and utilized.

The AI Replacement Theory

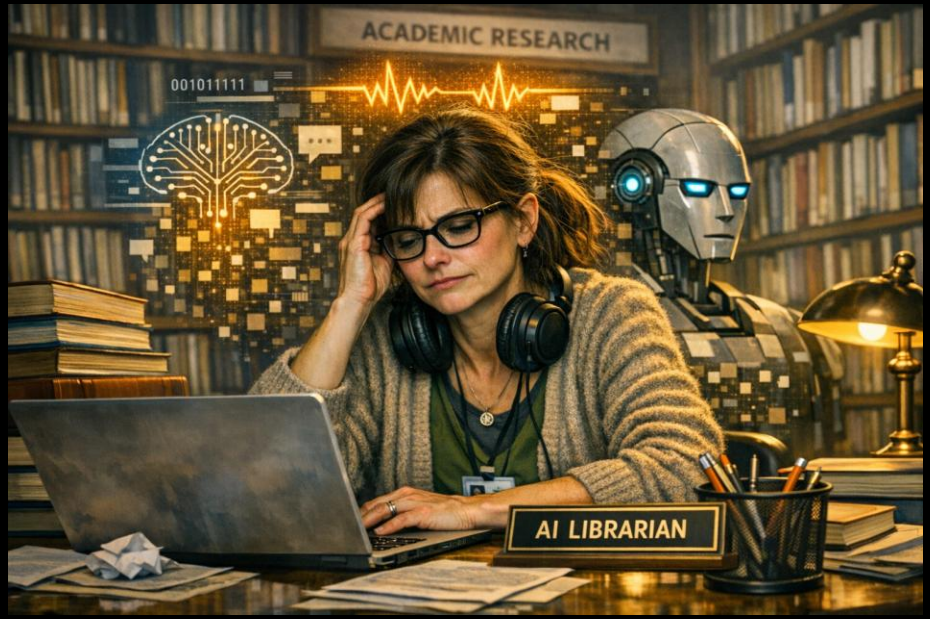


Whamond, Dave. "The AI Replacement Theory." *Cagle Cartoons*, 21 Apr. 2026, https://cagle.com/cartoonist/dave-whamond/2026/04/21/306801/the-ai-replacement-theory

The Coming Extinction

Darkow, John. "The Coming Extinction." *Cagle Cartoons*, 20 Apr. 2026, cagle.com/cartoonist/john-darkow/2026/04/20/306769/the-coming-extinction

AI Fatigue



"Please generate an image showcasing an academic librarian with AI fatigue" prompt. *M365 Copilot GPT-5*, Microsoft, 10 Feb. 2026, https://m365.cloud.microsoft/chat/

Title Artificial Intelligence Librarian

Position Type Tenure-track

School/Area College of Charleston Libraries

Department Library

Position Description

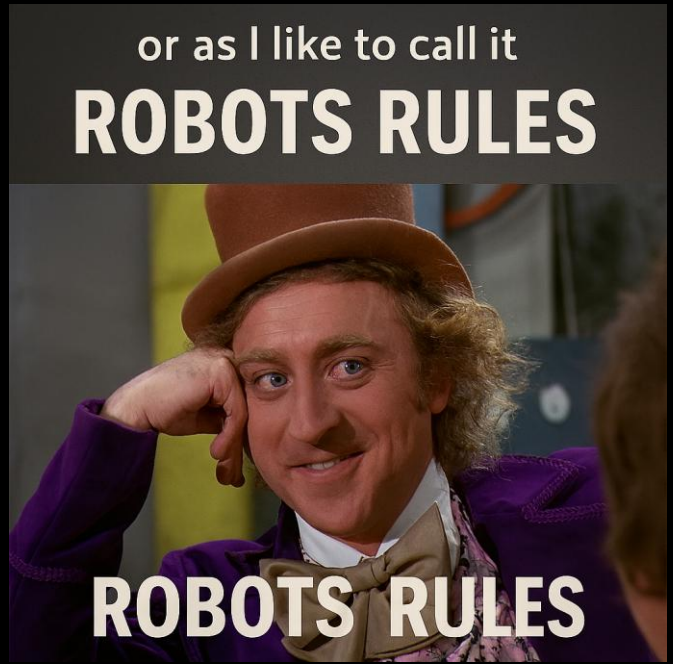
The Artificial Intelligence (AI) Librarian at the College of Charleston plays a pivotal role in the Libraries' and College's strategic plans by providing innovative and engaging library instruction to support student success and the Libraries' role in the upcoming Intentional AI QEP. This librarian will collaborate and engage with faculty and staff colleagues across the Libraries and the College to develop and deliver credit-bearing, scheduled, and point of need instruction that empowers users to locate, evaluate, and ethically use information resources within the ACRL Framework for Information Literacy for Higher Education. Additionally, this position supports AI literacy, digital projects, and other emerging technology initiatives throughout the Libraries and the College. The AI Librarian is a tenure-track member of the library faculty.

Posting Date 05/29/2025

See: https://jobs.charlestoncareers.org/companies/college-of-charleston/jobs/51836717-artificial-intelligence-librarian

AI Governance

- Global Regulations
- Federal Regulations
- State Regulations
- Institutional Guidelines and Policies
- Course Policies
- Vendors and Publishers Principles
- Library Principles and Guidelines



"Please generate an AI Governance Meme" prompt. *M365 Copilot GPT-5*, Microsoft, 21 Jan. 2026, https://m365.cloud.microsoft/chat/

Federal Regulations on AI

2019: American Artificial Intelligence Initiative (President Trump's Executive Order 13859)

2022: *Blueprint for an AI Bill of Rights* (White House Office of Science and Technology Policy)

1. Safe and Effective Systems
2. Algorithmic Discrimination Protection
3. Data Privacy
4. Notice and Explanation
5. Human Alternatives, Consideration, and Fallback

2023: Artificial Intelligence and the Future of Teaching and Learning Insights and Recommendations (U.S. Department of Education, Office of Educational Technology)

2023: Safe, Secure, and Trustworthy AI (Former President Biden's Executive Order 14110)

2025: President Trump issued executive orders to prevent regulations from hindering AI innovation and progress (See: ai.gov).

Other Regulations, Guidelines, Policies, and Principles

- **State Regulations**
  - Washington Bills:
    - Aim to regulate chatbots (HB 2225, 2026)
    - Prohibit known distribution of forged digital likeness (HB 1205, 2026)
    - Inform users when content has been developed or modified by artificial intelligence (HB 1170, 2026).
- **Institutional Guidelines and Policies**
  - Artificial Intelligence and Academic Professors Survey (AAUP, 2025)
    - Concerns with administrations integrating AI with little input from faculty or other stakeholders
    - Concerns with lack of equitable and transparent policies governing AI use
- **Course Policies**
  - Mandatory use of AI
  - Optional use of AI
  - Prohibited use of AI
- **Vendor and Publisher Principles**
  - **Library Vendor Example:** Clarivate asserts it develops AI that is transparent, high quality, trustworthy, secure, robust, responsible, accountable, and community developed (Clarivate, n.d.).
    - *Clarivate AI tools:* Primo Research Assistant, Alma AI Assistants and Insights, ProQuest Research Assistant
  - **Publisher Example:** Springer Nature does not recognize AI authorship
    - Requires disclosure of AI use in the methods section of a publication unless AI was used solely for copyediting.
    - Peer-reviewers are instructed not to upload manuscripts into AI tools during the review process (Nature Portfolio, n.d.).

Library Principles and Guidelines

Association of Research Libraries Guiding Principles for Artificial Intelligence

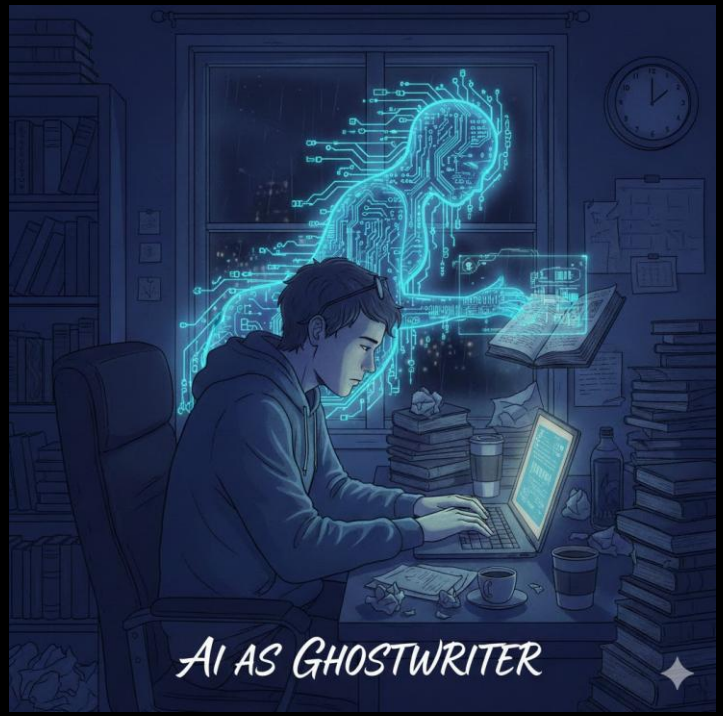
1. Libraries democratize access to artificial intelligence tools and technology to foster digital literacy among all people.
2. Libraries commit to understanding where distortions and biases are present in AI models and applications.
3. Libraries champion transparency and information integrity.
4. Libraries believe “no human, no AI.”
5. Libraries prioritize the security and privacy of users in the use of AI tools, technology, and training data.
6. Libraries assert that copyright law in the US and Canada is flexible and robust enough to respond to many copyright issues that arise from the intersection of technology and artificial intelligence.
7. Libraries negotiate to preserve the scholarly use of digital information.

Association of Research Libraries. (2024, May). *Research libraries guiding principles for artificial intelligence*. https://www.arl.org/wp-content/uploads/2024/04/Research-Libraries-Guiding-Principles-for-Artificial-Intelligence.pdf

- ★ **Artificial Intelligence (AI) Policy Collection**
- ★ **ICOLC Statement on AI in Licensing**

Academic Integrity

Generative Artificial Intelligence: Software?



"AI as ghostwriter" prompt. *Gemini 3 Flash*, Google, 9 Feb. 2026, https://gemini.google.com/app/076dedb29fb3169d

"ChatGPT is not a "someone"" (Cox and Tzoc, 2023, p. 101)

"Image for ChatGPT is not a someone" prompt. *M365 Copilot GPT-5*, Microsoft, 9 Feb. 2026, https://m365.cloud.microsoft/chat/

AI Use and Plagiarism

AI - Plagiarism Continuum

Wondering if your AI use is considered Academic Plagiarism?

VANGUARD COLLEGE
Library | Schalm Memorial Collection

BRAINSTORMING

Have fun!

Use AI tools to help you warm up your brain, come up with creative ideas, understand a difficult topic, and discover new ways of looking at a topic.

PROOFREADING

Be Careful!

Take the feedback given and make your own changes on the work. Remember, this is a learning opportunity! Please disclose this use on your title page.

POLISHING

Caution!

Make sure any edits are not changing your own voice (unique writing style (tone, diction), personality) knowledge of, and unique perspective on the topic! Please disclose this use on your title page and be prepared to show the original raw work copy to your instructor if asked.

GHOSTWRITING

Stop!

Do not copy/paste content generated by an AI tool into your assignment even if you supplied all the ideas. Using the tool as a hidden author calls your integrity into question.

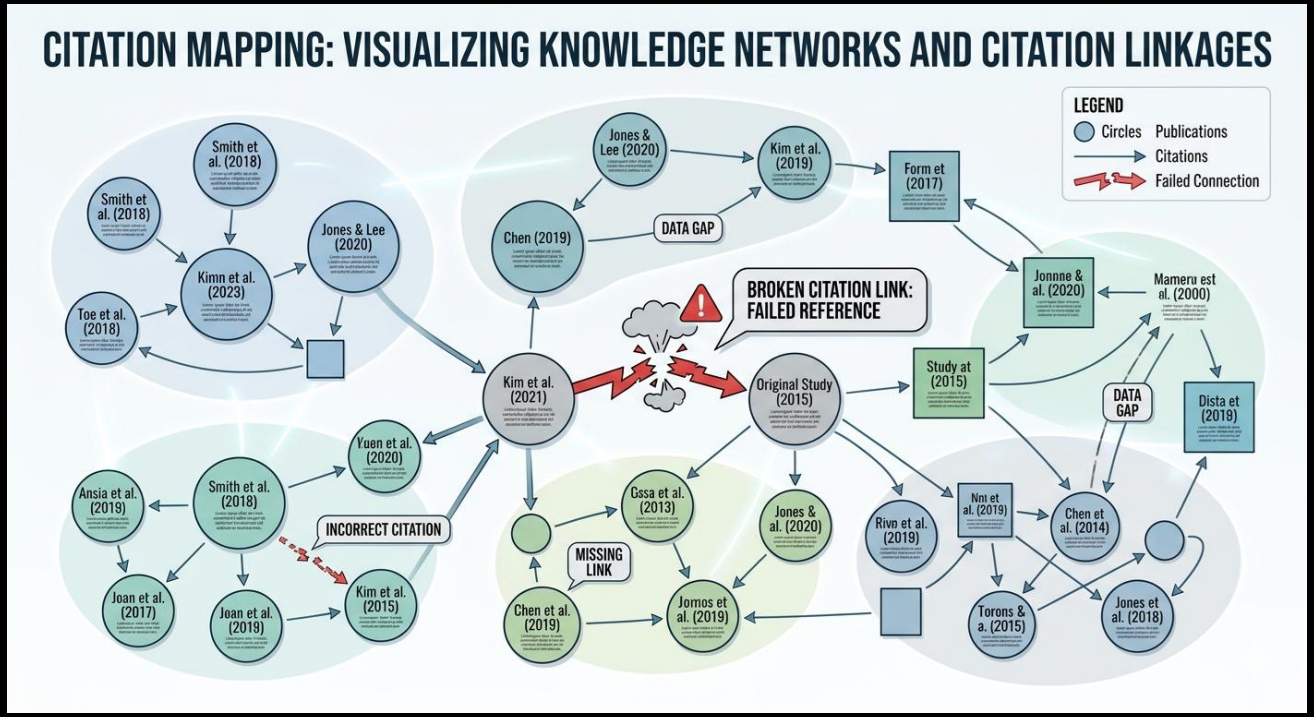
OUTSOURCING

Stop!

Do not copy/paste the assignment description into an AI tool to generate your work for you! Reducing yourself to a conduit of information abandons all learning.

Dunn, K. “Worship God with Your Mind.” Vanguard Journal of Theology and Ministry, vol. 4, no. 1, 2026, pp. 5–9, https://vjtm.vanguardcollege.com/index.php/vjtm/article/view/125/85.

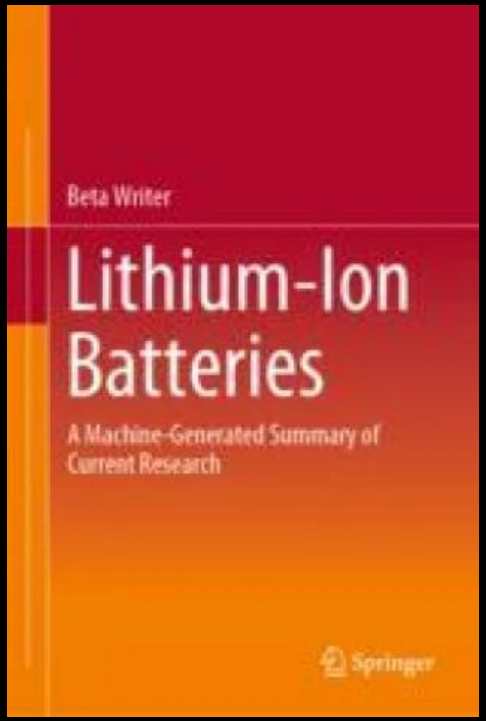
Source Attribution: A Broken Citation Chain



"Please draw an image of citation mapping with a broken citation link for an academic audience" prompt. *Gemini 3 Flash*, Google, 22 Apr. 2026, https://gemini.google.com/u/1/app/3edfc43447043f70?pageId=none

Generative AI "produces text by predicting likely word sequences based on patterns in its training data, rather than retrieving and crediting specific prior works" (Lemley & Ouellette, 2025).

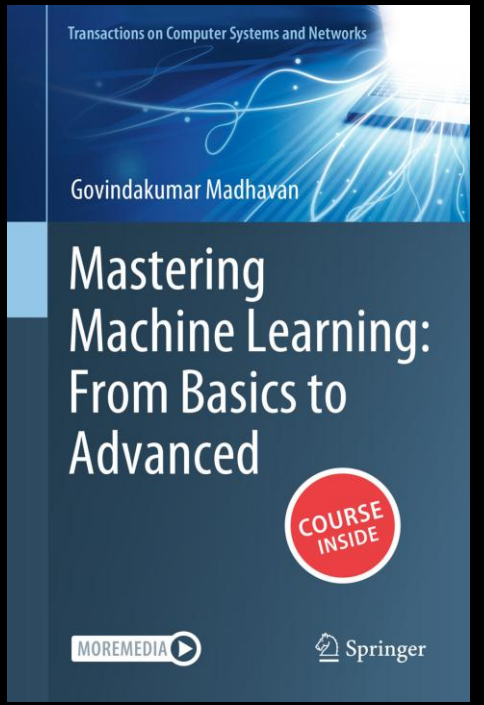
AI-Disclosure Examples



https://link.springer.com/book/10.1007/978-3-030-16800-1

←Written by AI, but acknowledged by Springer Nature (Machine-generated by Beta Writer 0.7 software developed at Goethe University Frankfurt).

Author uses hallucinated citations, but does not disclose any use of AI and Springer reviewers did not catch.→



https://retractionwatch.com/2025/06/30/springer-nature-book-on-machine-learning-is-full-of-made-up-citations/

AI Citation Examples

Citing AI as Software:

APA 7: AI Company Name. (year, month day). Title of chat in italics [Description, such as Generative AI chat]. Tool Name/Model. URL of the chat

> **APA's Example:** Anthropic. (2025, May 20). *Essential grammar topics for high school graduates* [Generative AI chat]. Claude Sonnet 4. https://claude.ai/share/329173b2-ec93-4663-ac68-4f65ea4f166d

MLA 9: "Prompt text" prompt. *ChatGPT*, day month. version, OpenAI, day month year, URL of the chat

> **MLA's Example:** "Describe the theme of nature in Jane Austen's Mansfield Park" prompt. ChatGPT, model GPT-4o, OpenAI, 23 Sept. 2024, chatgpt.com/share/66f1b0a0-d704-8000-be9a-85f53c850607.

Chicago 18: Text generated by "tool", company that developed tool, month day, year, URL of the chat

> **Chicago's Example:** 1. Text generated by ChatGPT, OpenAI, March 7, 2023, https://chat.openai.com/chat.

Artificial Intelligence Disclosure (AID) Framework and Statement Builder

AI Detection Tools

“Can you make an image of an example of an AI detection tool” prompt. *Gemini 3 Flash*, Google, 9 Feb. 2026, https://gemini.google.com/app

Final Thoughts

“We would be wise to start thinking now about machines and algorithms as a new kind of patron” *(Ridley, 2019, p. 37).*

Be the embodied inspiration that AI cannot be!

References

Additional Reading Resources

See GitHub for Complete Lesson Content:
https://github.orbiscascade.org/generative-ai/challenges