

# Analyzing the Implications of AI in Education

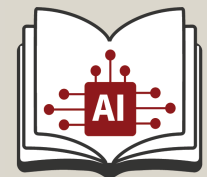
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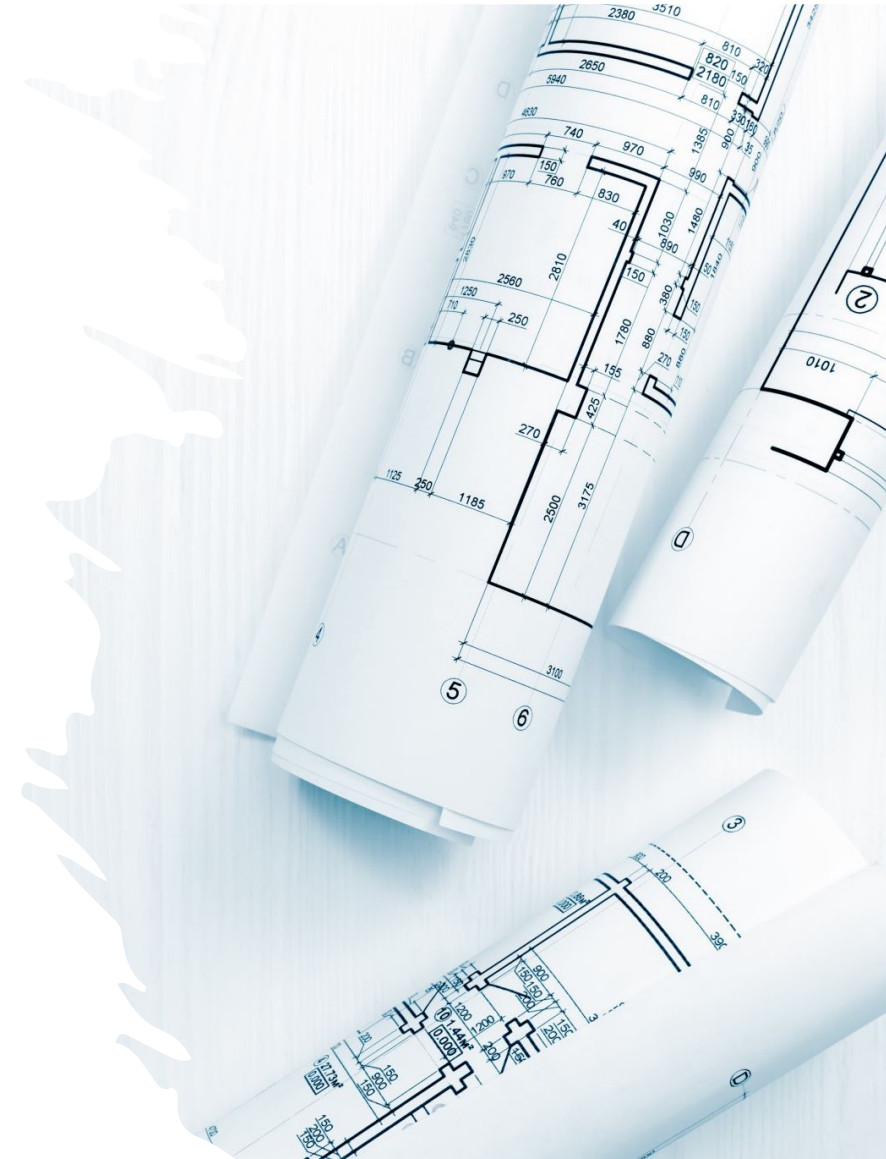
# Today's primary learning objectives

- Describe and discuss risks, policy guidance, and best practices related to AI and:
  - Academic integrity
  - Privacy and security
  - Citation and attribution
  - Copyright and intellectual property
  - AI hallucinations and their causes
  - Bias
  - Inequity
  - Environmental impact
  - Misinformation
- Self-evaluate how compatible with AI your existing course is.



# Acknowledgements

- **ChatGPT4** for summarizing, brainstorming, and suggestions on the content.
- **Midjourney & DALL-E** to generate images
- **Designer** feature within PowerPoint to suggest slide layouts and stock images.
- **Grammarly** for spelling, grammar, conciseness, word choice, and so on.
- **Smartsheets** for automating registration.
- **Outlook** and **Zoom** for event coordination.
- **Google** for web search...



Let's be flexible



(Image generated by DALL-E, 1/17/23)

# Why should you care about AI?

- Our perspective and expertise is important to the discourse
- The landscape is evolving quickly
- Our students and instructors want guidance
- Using AI could improve how we do our work





We're ready for deeper waters.

A stack of several books is shown on the right side of the image. The books have various colored spines, including yellow, red, and blue. A horizontal red banner is overlaid across the middle of the image, containing the text "Academic Integrity". The background is a blurred teal and white bokeh effect.

# Academic Integrity

# Scenario

Your current course includes several written essay assignments. Currently your syllabus does not include any policy about students using generative AI tools. In a recent meeting, your TA has told you that several students have asked them whether they can use AI tools in the course or not. They suspect that some students are already using AI tools for class assignments.

**How might you approach this conversations with your TA?**

**What factors might you consider when thinking through this issue?**



(Image generated by DALL-E, 2/6/24)



# Students, AI, and cheating

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Stanford Graduate School of Education colleagues Victor Lee and Denise Pope used existing ongoing research surveys of US high school students to better understand the impacts of AI on cheating.

University, © Stanford, Stanford, & California 94305. (2023, October 27). *What do AI chatbots really mean for students and cheating?* Stanford Graduate School of Education.  
<https://ed.stanford.edu/news/what-do-ai-chatbots-really-mean-students-and-cheating>



(Image generated by DALL-E, 1/30/24)

# Gen-AI writing detection tools

Education researchers evaluated AI content detection tools.

Stanford HAI colleagues Weixin Liang, et. al tested AI plagiarism detectors with non-native English writing.

Elkhatat, A. M., Elsaid, K., & Almeer, S. (2023). Evaluating the efficacy of AI content detection tools in differentiating between human and AI-generated text. *International Journal for Educational Integrity*, 19(1), Article 1. <https://doi.org/10.1007/s40979-023-00140-5>

Liang, W., Yuksekgonul, M., Mao, Y., Wu, E., & Zou, J. (2023). GPT detectors are biased against non-native English writers (arXiv:2304.02819). arXiv. <http://arxiv.org/abs/2304.02819>



(Image generated by DALL-E, 2/12/24)

## Good news

So far, cheating has not increased since widespread introduction of gen-AI. Cheating stayed at the same rate as before.

Various edtech companies have created AI plagiarism detection tools.

We already know effective pedagogic strategies to reduce cheating.

## Bad news

That same rate as before is 60 to 70% of all students.

They tend to incorrectly flag human-writing as AI-generated, especially for non-native English writing, and can be gamed.

It can be lots of work, and we and the system needs to change.

# Stanford's academic integrity policy guidance



## OCS—AI guidance

Instructors can decide their own AI course policy and should communicate it in their syllabi.

Absent any course policy, AI use is considered same as assistance from another person.

Students, when in doubt ask the instructor and disclose use.



## OCS—Academic integrity

Promote honorable behavior and support learning. Let OCS handle enforcement.

Consult with OCS for any suspected non-compliance.

In consultation, you decide how to proceed.

# Stanford's academic integrity policy guidance



## OCS—AI guidance

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Absent any course policy, AI use is considered same as assistance from another person.

Students, when in doubt ask the instructor and disclose use.

- What specific behaviors do we mean by “assistance”?
- When do you already allow or prohibit assistance from another person?
- What kind of assistance from another person is beneficial? What kind is detrimental?
- How might that inform how we think about AI?

A bright sun with a starburst effect is positioned in the upper left quadrant of a clear blue sky. Several fluffy white clouds are scattered across the sky, primarily in the lower half and right side. The overall scene is bright and clear.

What might you tell a colleague who is concerned about AI and academic integrity are the most important factors to consider?



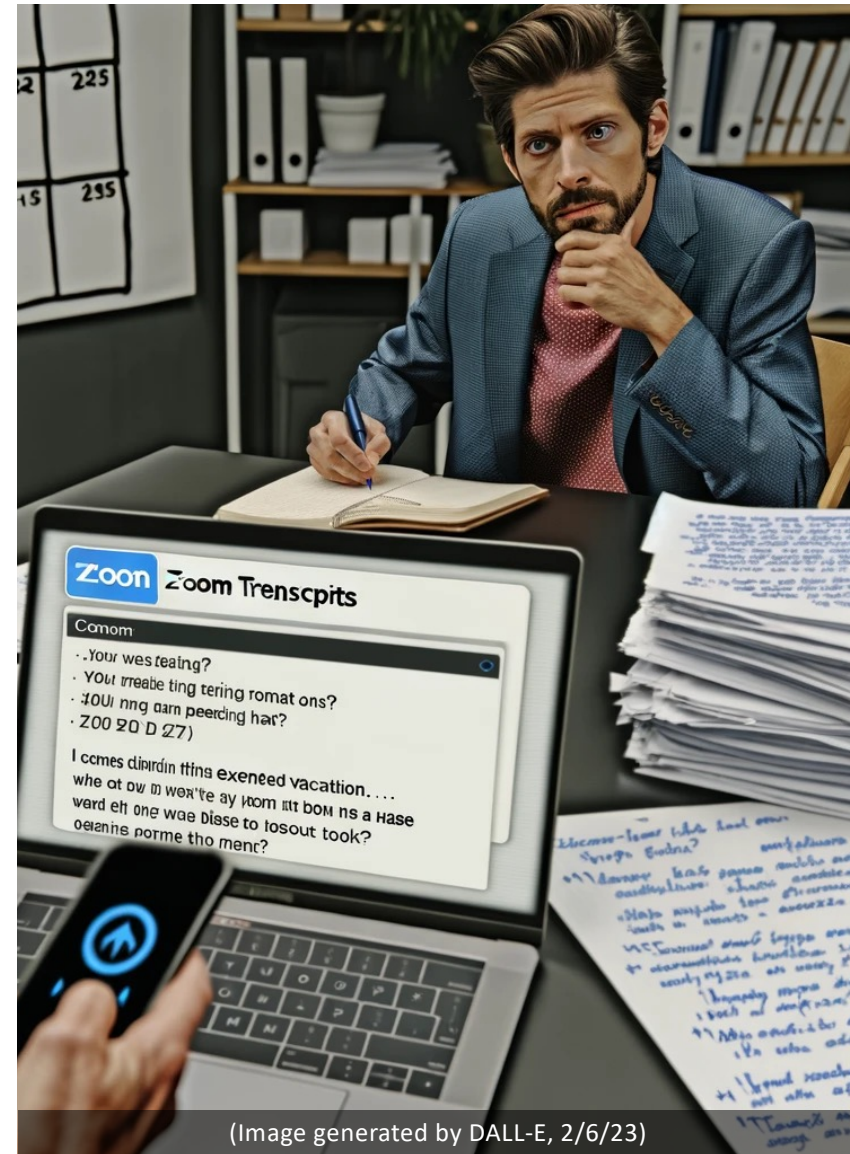
# Data Privacy

# Scenario

You have recently returned from an extended vacation (it was amazing). While you were out, there were many important meetings about an unfortunate incident involving staff and students. You need to catch up on everything that was discussed in the meetings and determine any action items for yourself. You have access to the Zoom transcripts and typed meeting notes. A colleague offers to use their ChatGPT+ account to summarize the transcripts and identify any action items.

**What might you consider when using AI for this task?**

**How might you respond to that colleague?**



(Image generated by DALL-E, 2/6/23)





# Privacy and security guidance

[Responsible AI at Stanford webpage](#)  
from UIT

- Inform yourself and students about AI
- Don't put sensitive or private info into chatbots
- Use private mode when appropriate
- Get informed consent
- Use third-party tools with care
- Be transparent about use
- Promote dialogue and discourse

# Privacy terms of service for AI chatbots

- No access for age 13 and under
- Restrictions for ages 13 to 18
- Storing user content
- Ownership of user data
- Using user data for training
- Collection of location data
- Sharing data with third parties



**3<sup>rd</sup> Place**

OpenAI ChatGPT  
Google Gemini




**2<sup>nd</sup> Place**

Microsoft CoPilot



**1<sup>st</sup> Place**

Anthropic Claude



What are other situations where you might be extra mindful of how you use AI tools?



## Citations & Attribution



# Scenario

A graduate student that you mentor has been working on a research article for submission to a journal for publication. They've been experimenting with chatbots recently and intend to use one to help them write the article.

They have some concerns about using AI for this. They asked you for advice before getting started and asked if you would give them feedback before they submit the article.

**What advice would you give them?**

**What might you look for when giving them feedback?**



# Guidance for using gen-AI in scholarship

- MLA-CCCC Joint Task Force suggests:
  - Transparency
  - Accuracy
  - Responsibility
  - Source Attribution
  - Originality
  - Quality

Writing, M.-C. J. T. F. on, & Uncategorized, A. · in. (n.d.). Initial Guidance for Evaluating the Use of AI in Scholarship and Creativity – MLA-CCCC Joint Task Force on Writing and AI. Retrieved February 12, 2024, from <https://aiandwriting.hcommons.org/2024/01/28/initial-guidance-for-evaluating-the-use-of-ai-in-scholarship-and-creativity/>

# Citation formats for gen-AI

## APA Example

OpenAI. (2023). *ChatGPT* (Mar 14 version) [Large language model]. <https://chat.openai.com/chat>

See [APA Style blog “How to Cite ChatGPT”](#) for more.

## MLA Example

“Describe the symbolism of the green light in the book *The Great Gatsby* by F. Scott Fitzgerald” prompt. *ChatGPT*, 13 Feb. version, OpenAI, 8 Mar. 2023, [chat.openai.com/chat](https://chat.openai.com/chat).

See [MLA Style Center’s “How do I cite generative AI in MLA style?”](#) for more.

McAdoo, T. (2023, April 7). How to cite ChatGPT. <https://apastyle.apa.org>. <https://apastyle.apa.org/blog/how-to-cite-chatgpt>

MLA Style Center. (2023, March 17). How do I cite generative AI in MLA style? <https://style.mla.org/citing-generative-ai/>



# Copyright & Intellectual Property



# Do you think AI generated work should be copyrightable?

- Human authorship is needed to copyright something
- Non-humans have never been granted copyright
- Copyright *may* apply to AI-aided human authors (details TBD)

Zirpoli, C. (2023, September 29). Generative artificial intelligence and copyright law. Congressional Research Service.  
<https://crsreports.congress.gov/product/pdf/LSB/LSB10922>



By Self-portrait by the depicted *Macaca nigra* female. See article. - Wtop.com (archive; cropped and denoised by uploader), Public Domain, <https://commons.wikimedia.org/w/index.php?curid=36464057>




By Kris Kashtanova using Midjourney AI - <https://news.artnet.com/art-world/a-new-york-artist-claims-to-have-set-a-precedent-by-copyrighting-their-a-i-assisted-comic-book-but-the-law-may-not-agree-2182531>, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=129010173>



# Do you think AI infringes on copyrighted works?

- Is using copyrighted data for AI training Fair Use?
  - Purpose
  - Amount
  - Nature
  - Effect
- Is generative-AI a transformative use?
- Are AI's capable of plagiarizing?
- Do AI actually recreate copyrighted content?

Zirpoli, C. (2023, September 29). Generative artificial intelligence and copyright law. Congressional Research Service. <https://crsreports.congress.gov/product/pdf/LSB/LSB10922>

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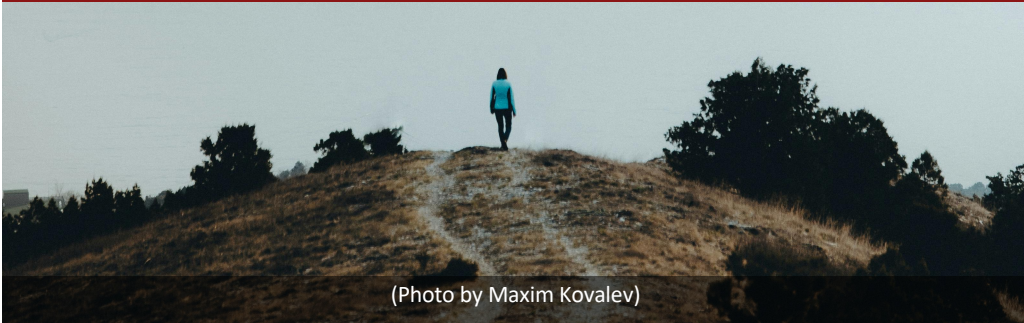
What remaining questions do you  
have about the legality of  
generative AI?



Hallucination



Bias



(Photo by Maxim Kovalev)

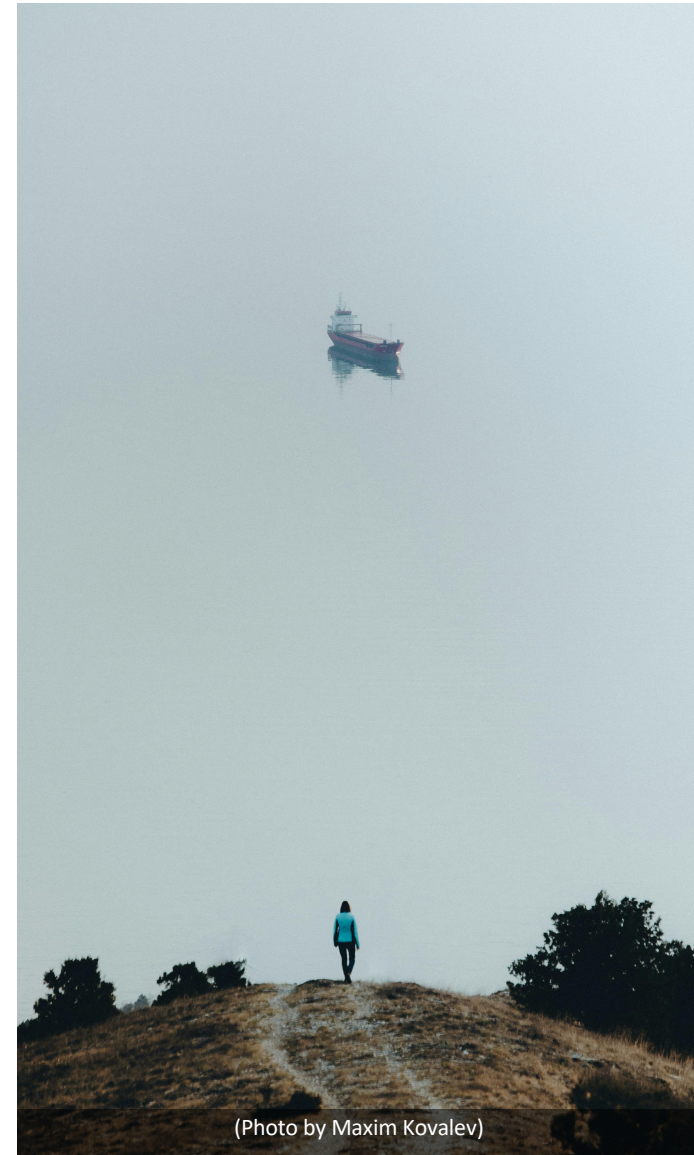


(Photo by Luis E. Ramírez)

# AI hallucinations

- Gen-AI chatbots can “hallucinate” and produce outputs that are:
  - Factually inaccurate or fabricated
  - Contextually incorrect
  - Contradictory
  - Non-sensical
- This can be caused by:
  - Inherent nature of LLMs
  - Training and training data quality
  - Large language model settings
  - Input context and prompting

Digital Data Design Institute at Harvard (Director). (2023, July 12). What causes generative AI to hallucinate?  
[https://www.youtube.com/watch?v=Q\\_ffKBzHUJk](https://www.youtube.com/watch?v=Q_ffKBzHUJk)



(Photo by Maxim Kovalev)

# Bias

- Research on bias in AI predates chatbots and has shown them to be racist, sexist, and ableist.
  - Buolamwini, J. (2017). Gender shades: Intersectional phenotypic and demographic evaluation of face datasets and gender classifiers. DSpace@MIT. <https://dspace.mit.edu/handle/1721.1/114068>
  - Safiya Umoja Noble. (2018). Algorithms of Oppression: How Search Engines Reinforce Racism. NYU Press; eBook Collection (EBSCOhost). <https://stanford.idm.oclc.org/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=1497317&site=ehost-live&scope=site>
  - Our Bodies Encoded: Algorithmic Test Proctoring in Higher Education. (2020, April 2). Hybrid Pedagogy. <https://hybridpedagogy.org/our-bodies-encoded-algorithmic-test-proctoring-in-higher-education/>
- Many types of biases can manifest or be exacerbated by chatbots.
  - A nuanced view of bias in language models. (2023, September 27). Viden.AI. <https://viden.ai/en/a-nuanced-view-of-bias-in-language-models/>
- Non-English cultures and languages are excluded in many ways.
  - Tidy, J. (2023, November 3). ChatGPT bias: 3 ways non-English speakers are being left behind. Medium. <https://medium.com/@joetidy/chatgpt-bias-3-ways-non-english-speakers-are-being-left-behind-799b4898eee6>

This slide was adapted from Torrey Trust. (2024). *GenAI & Ethics: Investigating ChatGPT, Gemini, & Copilot*. [https://docs.google.com/presentation/d/1x3G2zHUNz0\\_luCP8WghoPWbXBRWLaRv0Nern2DSAulc](https://docs.google.com/presentation/d/1x3G2zHUNz0_luCP8WghoPWbXBRWLaRv0Nern2DSAulc)



(Photo by Luis E. Ramírez)

# Pedagogic strategies

- Be selective in what tasks you use chatbots for.
- Critically evaluate all AI outputs.
- Savvy prompting
  - Be precise in how you prompt.
  - Prompt step-by-step rather than one-shot.
- Address bias with students.
- Model good use for students.

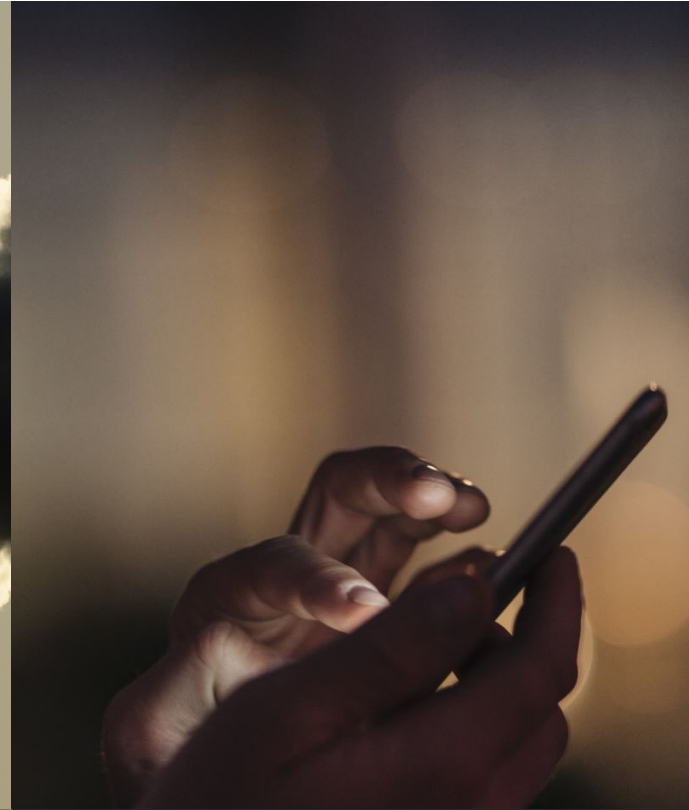
When AI Gets It Wrong: Addressing AI Hallucinations and Bias. (n.d.). MIT Sloan Teaching & Learning Technologies. Retrieved March 19, 2024, from <https://mitsloanedtech.mit.edu/ai/basics/addressing-ai-hallucinations-and-bias/>



Digital Inequity



Environmental  
Impact



Misinformation



# Digital inequity (aka “Digital Divide”)

## Access

- Cost
- Infrastructure

## Use

- Skill

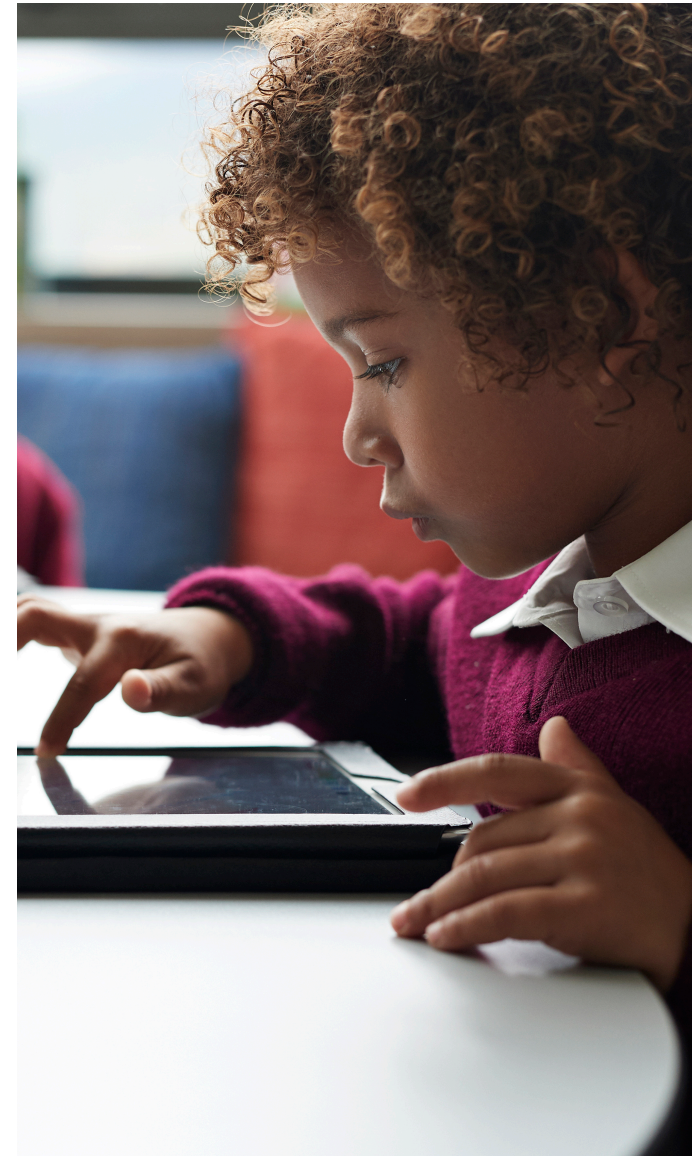
## Quality of use

- Digital literacy
- Relevance
- Education

“[The] gap between people who can access and use digital technology and those who can’t.”

- Kloza, B. (2022, December 14). What Is the Digital Divide? Connecting the Unconnected. <https://ctu.ieee.org/what-is-the-digital-divide/>

This slide was adapted from Torrey Trust. (2024). *GenAI & Ethics: Investigating ChatGPT, Gemini, & Copilot*. [https://docs.google.com/presentation/d/1x3G2zHUNz0\\_luCP8WghoPWbXBRWLaRv0Nern2DSAulc](https://docs.google.com/presentation/d/1x3G2zHUNz0_luCP8WghoPWbXBRWLaRv0Nern2DSAulc)



## Digital inequity (aka “Digital Divide”)

- LLMs not equitable for those who don't speak English or other major languages
  - How language gaps constrain generative AI development. (n.d.). Brookings. Retrieved March 7, 2024, from <https://www.brookings.edu/articles/how-language-gaps-constrain-generative-ai-development/>
- UK-based survey finds emerging gaps in AI-usage among students by income, gender, ethnicity
  - Freeman, J. (2024, February 1). Provide or punish? Students' views on generative AI in higher education. HEPI. <https://www.hepi.ac.uk/2024/02/01/provide-or-punish-students-views-on-generative-ai-in-higher-education/>

This slide was adapted from Torrey Trust. (2024). *GenAI & Ethics: Investigating ChatGPT, Gemini, & Copilot*. [https://docs.google.com/presentation/d/1x3G2zHUNz0\\_luCP8WghoPWbXBRWLaRv0Nern2DSAulc](https://docs.google.com/presentation/d/1x3G2zHUNz0_luCP8WghoPWbXBRWLaRv0Nern2DSAulc)



# Environmental impact

- AI uses a lot of energy and resources; better policy is needed
  - OECD (2022), "Measuring the environmental impacts of artificial intelligence compute and applications: The AI footprint", *OECD Digital Economy Papers*, No. 341, OECD Publishing, Paris, <https://doi.org/10.1787/7babf571-en>.
- AI energy footprint likely to increase dramatically
  - de Vries, A. (2023). The growing energy footprint of artificial intelligence. *Joule*, 7(10), 2191–2194. <https://doi.org/10.1016/j.joule.2023.09.004>
- AI has data centers using more water for cooling
  - *Artificial intelligence technology behind ChatGPT was built in Iowa—With a lot of water.* (2023, September 9). AP News. <https://apnews.com/article/chatgpt-gpt4-iowa-ai-water-consumption-microsoft-f551fde98083d17a7e8d904f8be822c4>
- How impact is measured is not good enough
  - OECD (2022), "Measuring the environmental impacts of artificial intelligence compute and applications: The AI footprint", *OECD Digital Economy Papers*, No. 341, OECD Publishing, Paris, <https://doi.org/10.1787/7babf571-en>.

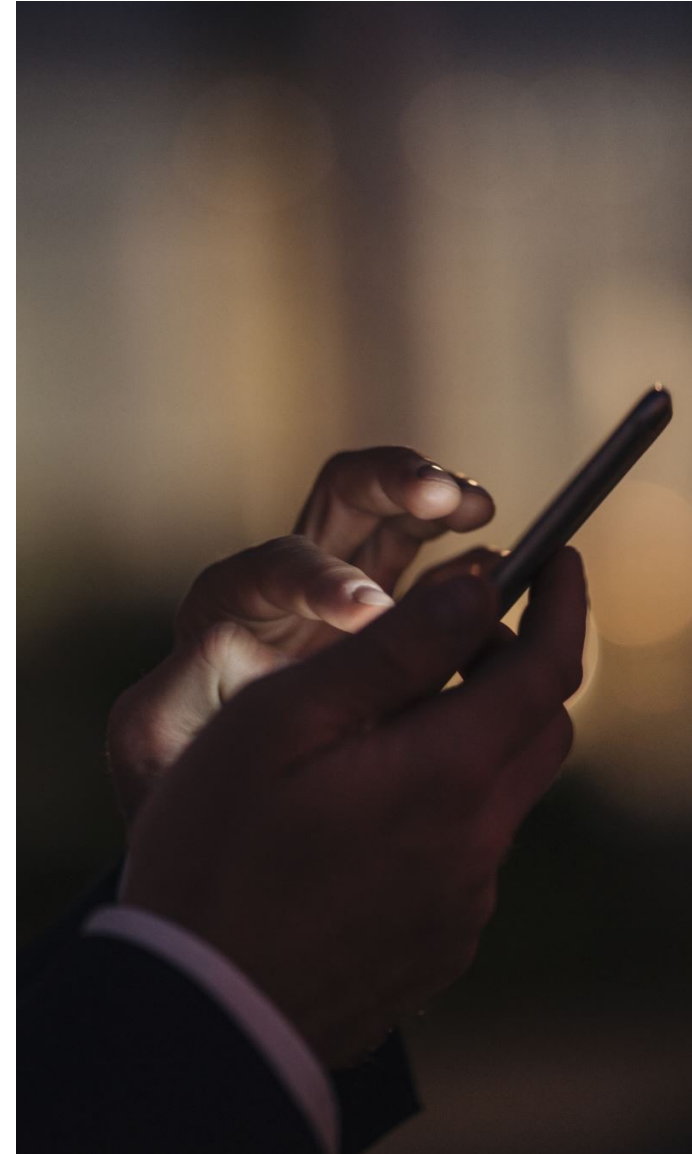
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# Misinformation

- Media watchdog tracks hundreds of unreliable AI-generated news sources and trends
  - Tracking AI-enabled Misinformation: Over 700 'Unreliable AI-Generated News' Websites (and Counting), Plus the Top False Narratives Generated by Artificial Intelligence Tools. (n.d.). NewsGuard. Retrieved March 7, 2024, from <https://www.newsguardtech.com/special-reports/ai-tracking-center>
- AI-driven misinformation is biggest short-term threat says World Economic Forum
  - Elliott, L., & editor, L. E. E. (2024, January 10). AI-driven misinformation 'biggest short-term threat to global economy.' The Guardian. <https://www.theguardian.com/business/2024/jan/10/ai-driven-misinformation-biggest-short-term-threat-to-global-economy>
- Health disinformation study calls for AI vigilance
  - Menz, B. D., Modi, N. D., Sorich, M. J., & Hopkins, A. M. (2024). Health Disinformation Use Case Highlighting the Urgent Need for Artificial Intelligence Vigilance: Weapons of Mass Disinformation. *JAMA Internal Medicine*, 184(1), 92–96. <https://doi.org/10.1001/jamainternmed.2023.5947>

This slide was adapted from Torrey Trust. (2024). *GenAI & Ethics: Investigating ChatGPT, Gemini, & Copilot*. [https://docs.google.com/presentation/d/1x3G2zHUNz0\\_luCP8WghoPWbXBRWLaRv0Nern2DSAulc](https://docs.google.com/presentation/d/1x3G2zHUNz0_luCP8WghoPWbXBRWLaRv0Nern2DSAulc)



# Pedagogic Strategies

## Digital inequity

- Advocate for AI access and support on your campus
- Consider access and affordability when selecting tools
- Connect students to campus resources
- Integrate technology skill development into courses where possible

## Environmental impact\*

- Discuss these issues with students and colleagues
- Acknowledge climate anxiety and take a trauma-informed approach
- Focus on solutions for a positive future; counterbalance negativity bias
- Find and emphasize efficacy in a collective

## Misinformation

- Model and teach how to identify and mitigate misinformation
- Model and teach digital media literacy

\*Adapted from Sarah Jaquette Ray, (2023, October 18). *Sarah Ray Keynote on Climate Anxiety*. "How to Keep Your Cool on a Warming Planet: An Emotional Toolkit for the Climate Generation."  
[https://www.youtube.com/watch?v=e\\_xA-syd1ho](https://www.youtube.com/watch?v=e_xA-syd1ho)



How might you find additional helpful resources on these topics?



# AI Education

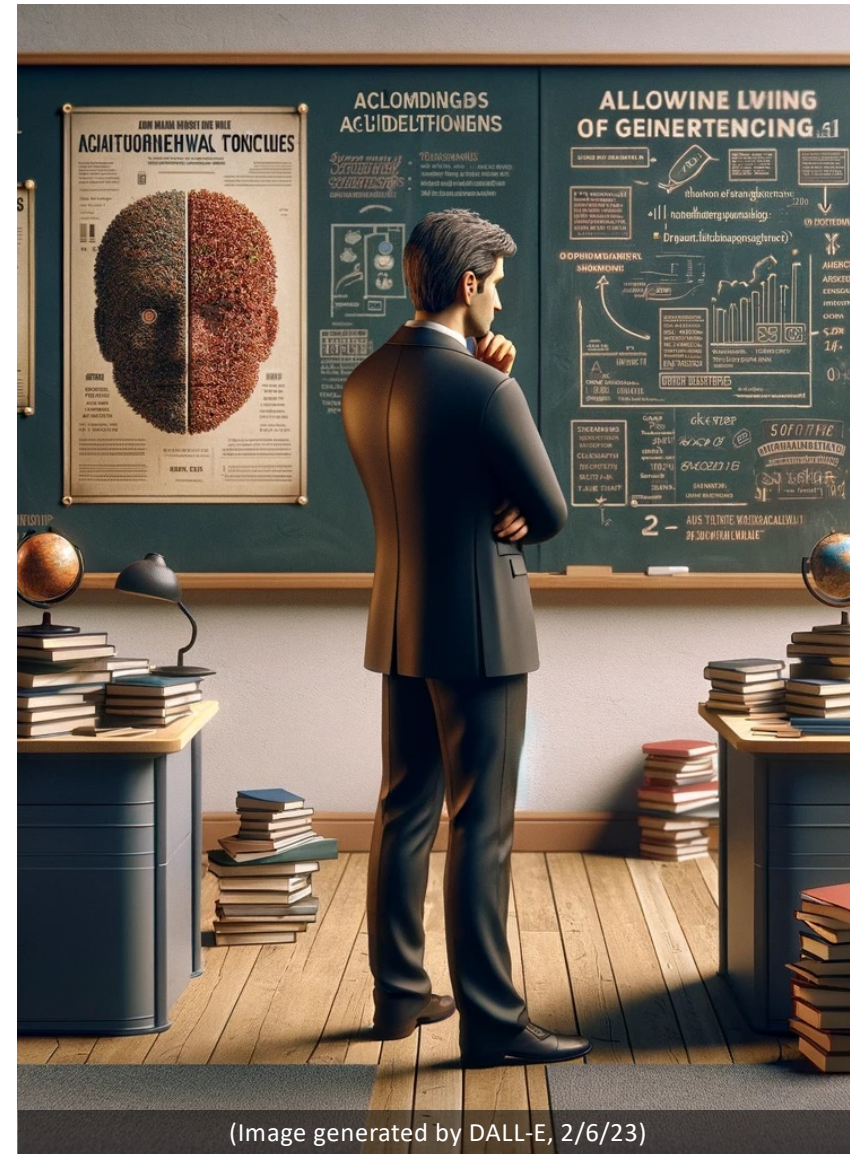


# Scenario

You are preparing for a new quarter of teaching. In addition to a mid-term and final exam, you typically have a group assignment where students complete a project based on a real-world issue in your discipline.

Students then submit a written report to describe their project goals, background research, proposed solution, reflection, and so on. Last quarter, many students requested that they be allowed to use generative AI tools for this project and report.

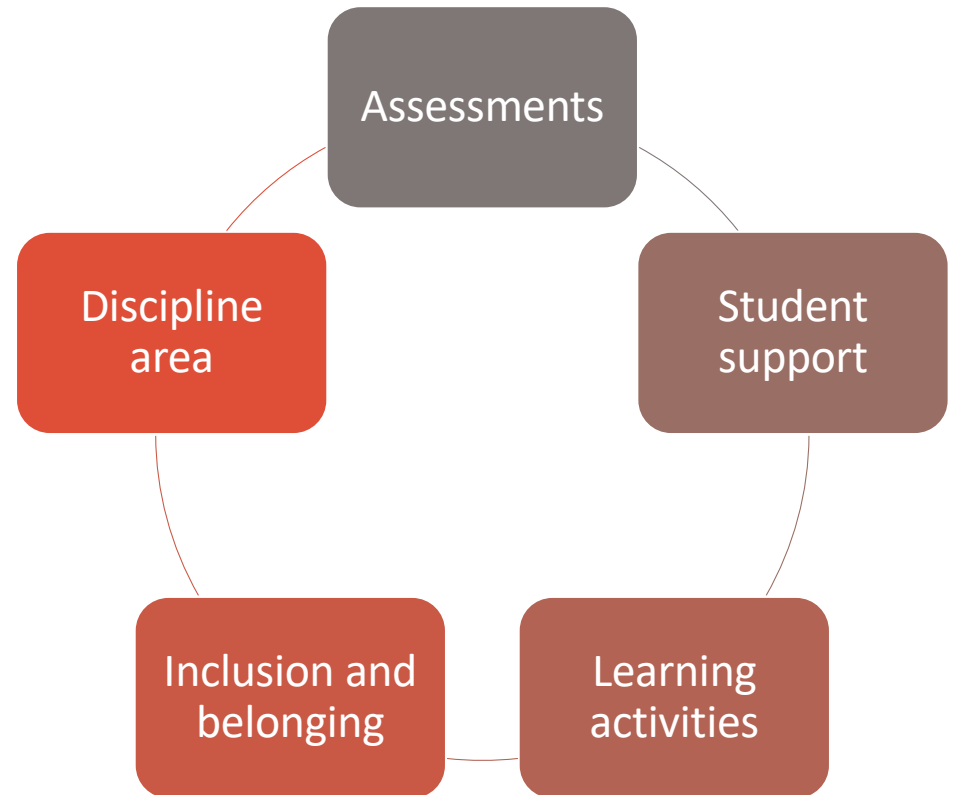
**What factors might you consider when thinking about students using AI in your course?**



(Image generated by DALL-E, 2/6/23)



How AI-compatible is the current version of your course?



# AI compatibility self-evaluation

- Go to **TeachingCommons.stanford.edu** and navigate to **Teaching Guides > Artificial Intelligence > Analyzing the implications of AI**
  - Scroll down to section "Self-evaluation of your course"
  - Or refer to the handout provided
- Reflect on those questions
  - If you answer "Yes", "A lot", or "Very much" to many questions, your course may be more AI compatible

A bright sun is shining in a clear blue sky, surrounded by scattered white clouds. The sun is positioned in the upper left quadrant, creating a lens flare effect. The sky is a deep, vibrant blue, and the clouds are fluffy and white, scattered across the frame. The overall scene is bright and clear, suggesting a sunny day.

What parts of your course might you improve to make it more AI compatible?

## Summarizing major implications of AI in education

- Academic integrity
- Data privacy
- Citation & Attribution
- Copyright & Intellectual Property
- Environmental impact
- Digital inequity
- Misinformation



## Continue to engage

- Use AI chatbots for your work tasks
- Read the AI Teaching Guide on the Teaching Commons website
- Attend upcoming CTL workshops on AI
- Talk about AI with colleagues and students



Wrap-up activity

**Insert link or QR  
code to your  
survey here**



(Image generated by DALL-E, 12/18/23)