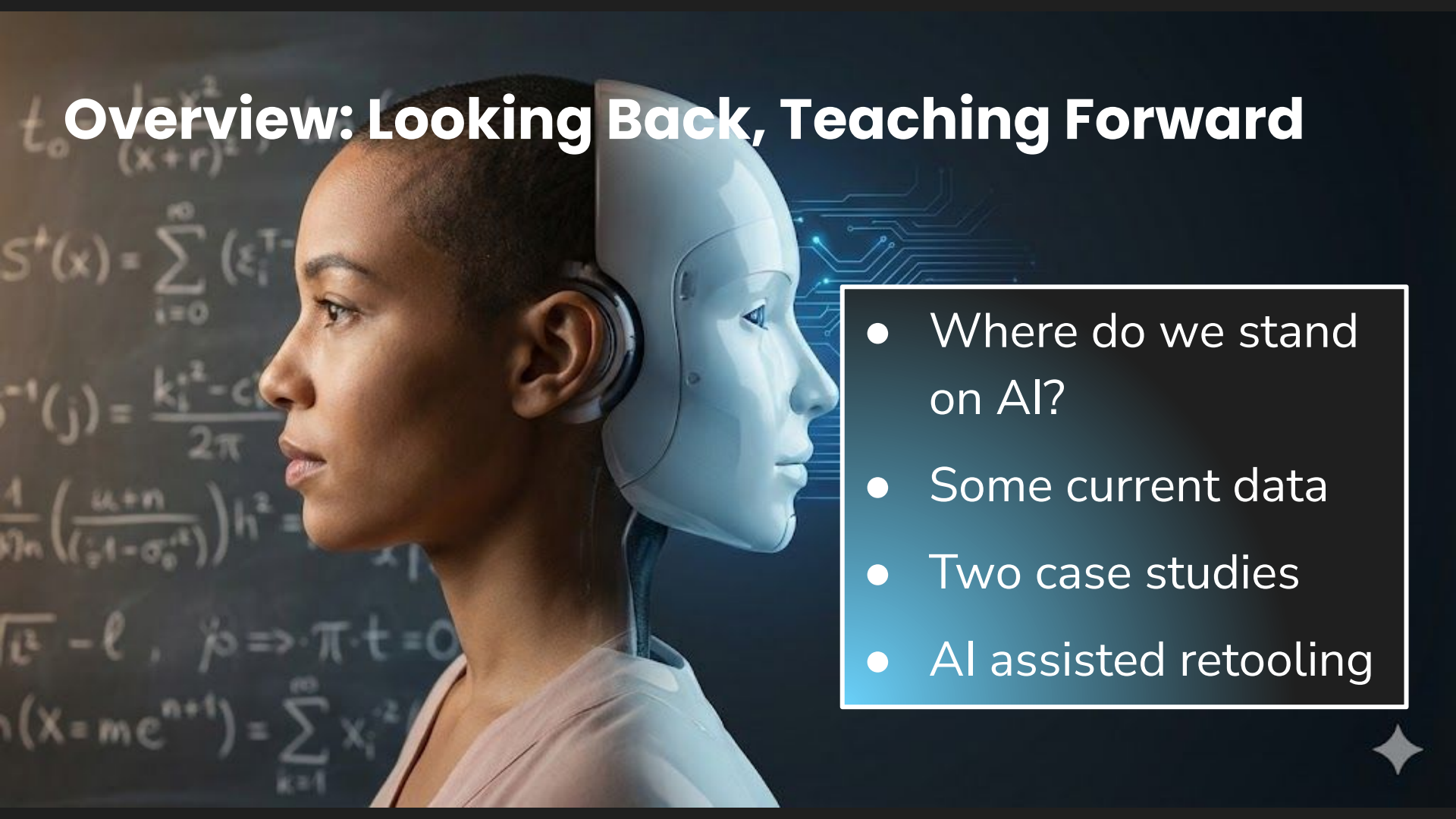
Looking Back, Teaching Forward: K–12 to Higher Ed in the Age of AI

Lew Ludwig and Jason Ovalles

Overview: Looking Back, Teaching Forward



- Where do we stand on AI?
- Some current data
- Two case studies
- AI assisted retooling

Let’s get one thing straight

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You didn’t request an *unregulated*, *untested*, and *rapidly evolving* technology to suddenly upend education (and nearly every other sector of society).

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Where do you stand with AI?

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Where do your STAKEHOLDERS stand with AI?

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Other...?

State of Play: Students & AI (Late 2025)

- **High school students are already “all in.”**
  84% of U.S. high schoolers use gen-AI for schoolwork

- **College students treat AI as routine study tech.**
  85% of U.S. college students use gen-AI for coursework

From high school through college, AI is now standard study infrastructure, not a niche tool.

College Board Newsroom, Inside Higher Ed, HEPI+2HEPI

State of Play: Educators & AI (Late 2025)

- **K–12 adoption is now normal.**
  63% of K–12 teachers say they or their district have incorporated GenAI into teaching
- **Higher ed is dabbling, not diving in.**
  49% of instructors have incorporated AI into teaching; 61% have used it, but 88% say they use it only *minimally*.

Educators at all levels are using AI and feel responsible for teaching it—but most are still experimenting at the margins, without enough training or clear policy.

cengagegroup.com campbell.edu d2l.com InsideHE

What is needed

- **Students want guidance, not just rules.**

  97% of students want institutional action on AI; 53% want ethics education and 51% want clear policies—yet only 48% of K-12 students have been shown how to use AI.

- **Everyone thinks AI literacy matters, but support lags.**

  K–12: Most teachers want AI in PD and curriculum, but only about half have had any AI training and very few have had deep AI-literacy PD.

  Higher ed: 92% of instructors say AI literacy belongs in their courses, and 75% of admins / 58% of faculty say teaching AI is their responsibility—yet 92% of provosts report faculty asking for more training while only 20% of institutions have published AI policies.

Students are already deep into AI and asking for guidance; educators believe they should teach AI but need **time, training, and clear policies** to do it well.

cengagegroup.com campbell.edu d2l.com InsideHE aiedu.org edweek.org edweek.edu(2)

If you could close one of these gaps tomorrow—**students asking for guidance, faculty needing training, or institutions lacking clear policy**—which would be the most important for your organization to close first?

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An unexpected journey…

- 11/23/2022
- 11/30/2022
- 12/16/2022
- 01/18/2023
- 02/01/2023
- 02/13/2023
- …

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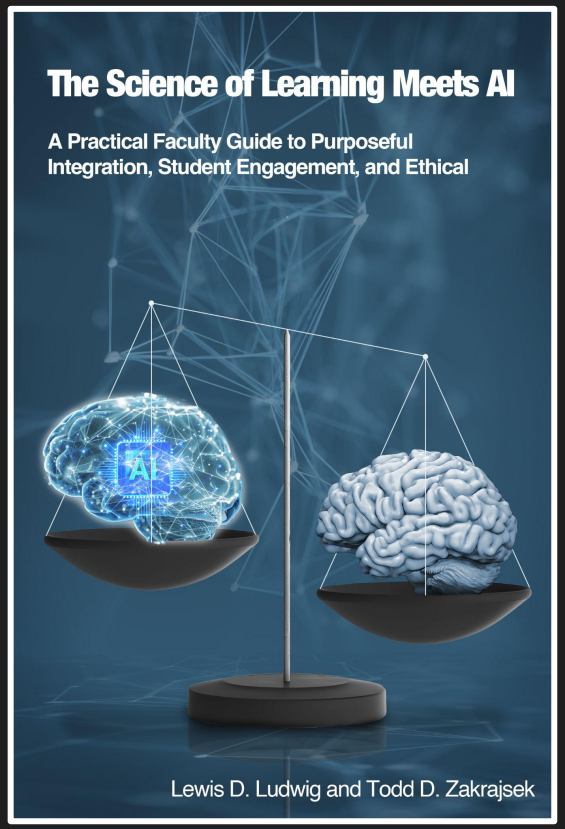

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- …
- 10/31/2025

Writing 101: Finding your voice in the age of AI

Writing 101: Essays

- Dominant Impression
- They Say/I Say
- Persuasion Piece

INTD 185: The Liberal Arts Meets AI

Goal: identify a problem AI is causing on campus and design a solution.

INTD 185: The Liberal Arts Meets AI

1: Faculty and students need honest discussion about AI

2: Students use AI to shortcut their learning

3: Students are losing their authentic voice in writing due to AI

4: Students have developed bad habits of over relying on AI

Time for a confession...

Time for a confession...

I am not trained to teach either of these classes

How am I trained...?

- PhD Mathematics
- Masters in Education
- Directed a Teaching Center
- Teaching Awards

Not trained to teach writing or design thinking

I used AI to level up

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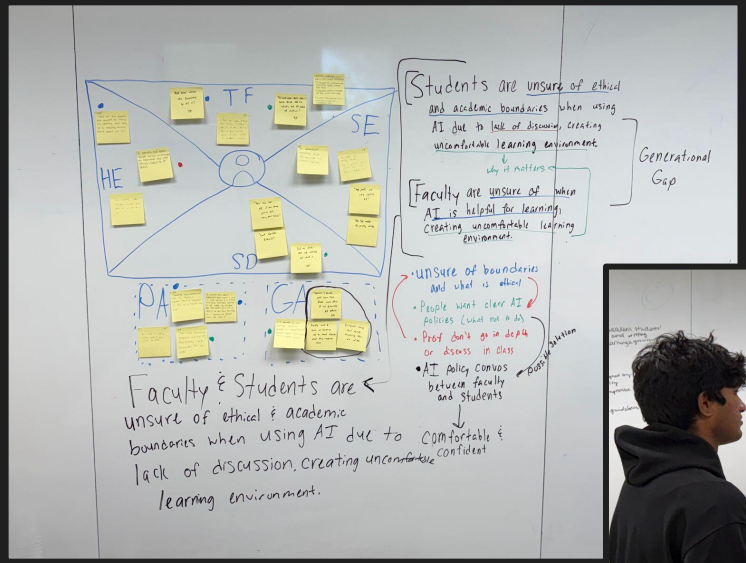
Before August, I'd never heard of 'they say/I say' framework

- Free writes
- Research
  - Jigsaw
  - Concept Mapping
- Broke essay into manageable chunks
- Built "I Say" from authentic intellectual journey

I used AI to level up

Except for a Ted Talk, I knew nothing about **Design Thinking**

I used AI to level up



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So, what have I learned?

This semester I'm teaching two courses that have never existed at our university.

Courses that exist ***because*** of generative AI.

Courses I couldn't teach ***without*** generative AI.

I'm using the technology that threatened to replace teachers to become a teacher I was never trained to be.

Sure, YOU can do this, but...

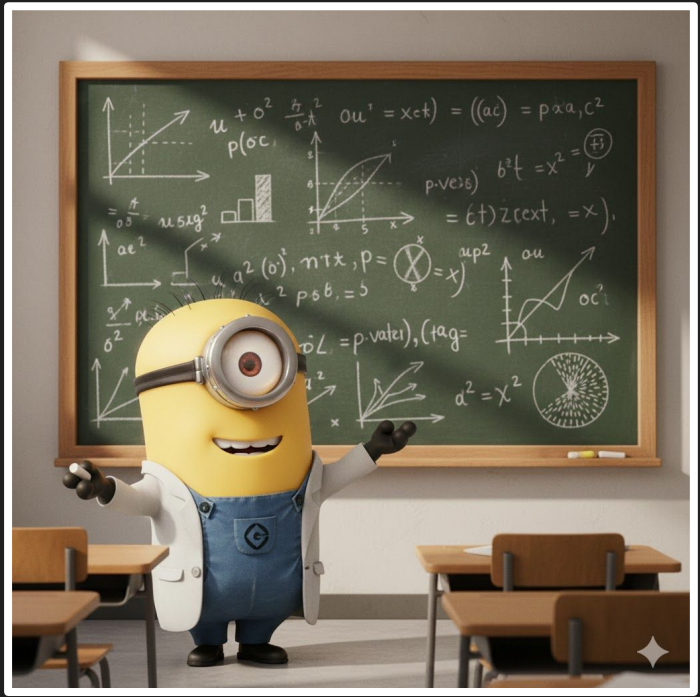
The experiment: Our new AP Stats instructor

- 24 years old
- Math and computer science
- Zero teaching credentials
- Never took an education course
- Never student-taught
- Never even took AP stats, just a year of prob and stat their junior year

The unlikely journey

- May 2023: Graduated college
- 6 months herding sheep in New Zealand
- January 2024
  - Tuesday: Returns home
  - Wednesday: need AP Calc teacher
  - Monday: In the classroom

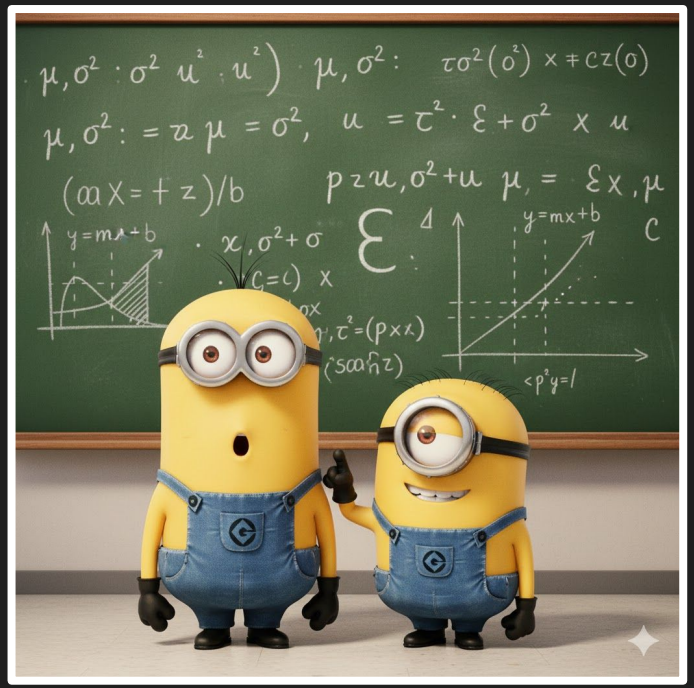
From substitute to AP Stats



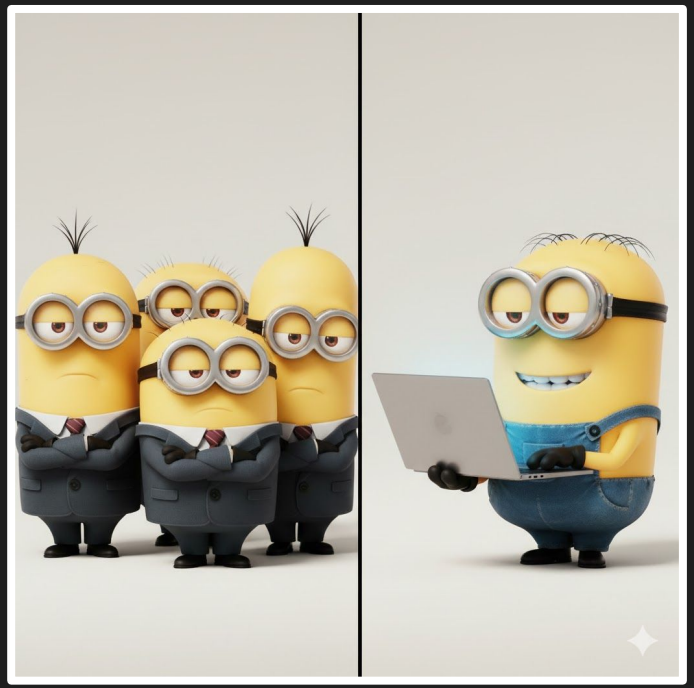
- Spring 2024: Hired private school in UT
- AY 2024/25: Algebra I & II - successful
- Summer 2025: AP stats teacher retires
- Fall 2025: Teaching AP Statistics with AI assistance

Full disclosure: This teacher is my son

- Never asks for math/stats help
- AP Summer Institute—Taft Education Center & skewthescript.org
- Uses AI as teaching assistant
- No shame in not knowing



Escaping the expertise trap



- Good teachers "must know content cold"
- Uncertainty = weakness
- "I don't know" = losing credibility
- (see my Dec 9 Math Values Post)

What would it take?

What would it take for YOU to teach completely outside your mathematical training? For example:

- A number theorist teaching intro statistics
- A topologist teaching intro data science
- An algebraist teaching intro mathematical finance

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Time for questions


THANKS

Welcome back

Let’s consider the curricular your goals

- **NCTM** – Calls for multiple rigorous high school options: calculus, statistics, modeling, and data-rich courses.
- **ASA** – GAISE II positions statistics and data-science literacy as essential
- **AMATYC & MAA** – IMPACT and CUPM highlight early college mathematics that includes quantitative reasoning, statistics, modeling, computation, and calculus.
- **SIAM & AMS** – GAIMME and *Notices* emphasize mathematical modeling, applications, and strong algebraic foundations.
- **CBMS & Dana Center** – Launch Years and CBMS forums focus on aligning grades 11–14 so students can move into calculus, statistics, data science, and modeling pathways.

What is the shared message?

All of these reports call for ***multiple rigorous mathematical pathways***—including calculus, statistics, data science, modeling, and quantitative reasoning.

What is the problem?

All of these reports call for ***multiple rigorous mathematical pathways***—including calculus, statistics, data science, modeling, and quantitative reasoning.

We have a shortage of trained teachers

“Teacher shortage” but a “retooling” problem

Retooling in Real Time

- Teachers learn new content in **real time**, with AI as a learning partner
- Teachers use AI to build their own **understanding** and create **learning pathways** for students
- Teachers **design activities** and **develop clear explanations** with AI feedback
- This partnership lets teachers **expand their teaching expertise** into stats, modeling, and data science beyond their training

We've seen this is possible

Two examples: My own teaching + AP Statistics course

Both using general-purpose AI tools (not custom platforms)

How it works:

- Learn unfamiliar content with AI as a learning partner
- Generate examples and refine explanations with AI feedback
- Design classroom activities with AI as a brainstorming tool
- No advanced programming—just asking good questions of publicly available tools

Our working premise

A motivated teacher with basic AI literacy can use AI as a learning partner to develop the skills to teach mathematics, statistics, or data science outside their original specialization.

Addressing the Elephant in the Room

The concern: "Will AI give wrong math? Create shallow teaching?

These are real risks—but we already stretch teachers into unfamiliar content

The real question: Is AI-assisted learning better than…

- Teachers winging it alone?
- Not offering pathways at all?

Question 1

If you actually tried to implement what your pathway documents recommend, where would teacher capacity be stretched thinnest—courses, topics, or skills?

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Question 2

What new or redesigned mathematics pathway could your state, district, or institution launch *sooner* if teachers could use AI as a learning partner to teach content outside their primary specialization?

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What new or redesigned mathematics pathway could your state, district, or institution launch sooner if teachers could use AI as a learning partner to teach content outside their primary specialization?

Question 3

What kinds of organizational support, policy shifts, or cultural changes your teachers need so that using AI as a learning partner is seen as legitimate professional development, not cutting corners?

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Question 4

In the next 6–12 months, what is one concrete pilot or action your organization could take to support teachers using AI as a learning partner in statistics, data science, or modeling—and what would it take to launch it?

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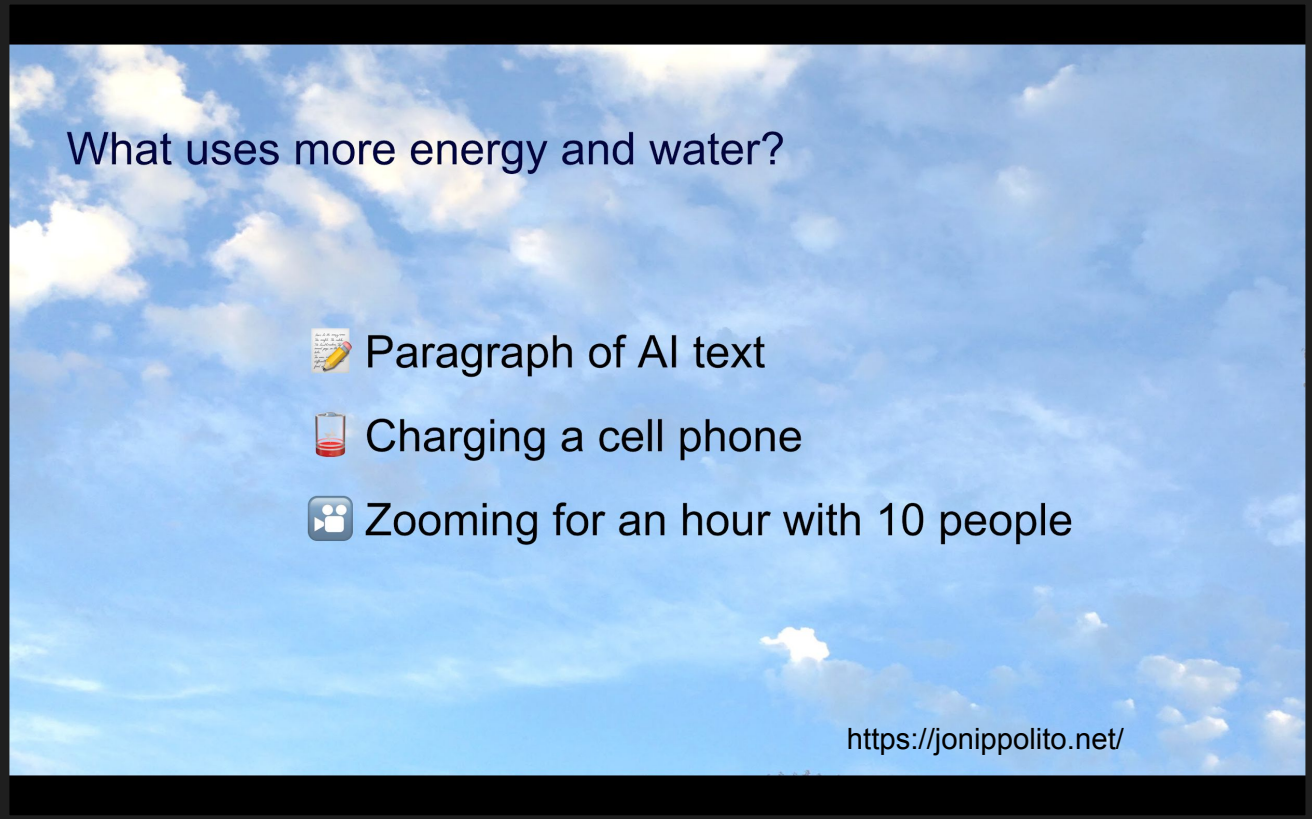
THANKS

AI and the Environment



It depends…

Scenario 1

Paragraph of AI text

solar simple single winter

7 watt-hours

Charging a cell phone

20 watt-hours

Zooming for an hour with 10 people

solar simple single winter

2000 watt-hours

Scenario 2

Charging a cell phone

20 watt-hours

Zooming for an hour with 10 people

solar simple single winter

2000 watt-hours

Paragraph of AI text

coal reasoning multistep summer

6300 watt-hours

Scenario 3

Charging a cell phone

20 watt-hours

Paragraph of AI text

coal reasoning multistep summer

6300 watt-hours

Zooming for an hour with 10 people

coal summer

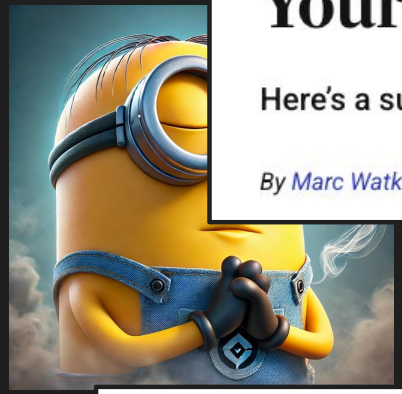
12000 watt-hours

https://jonippolito.net/

Jon Ippolito: What uses more?

https://what-uses-more.com/

A moment of tudents



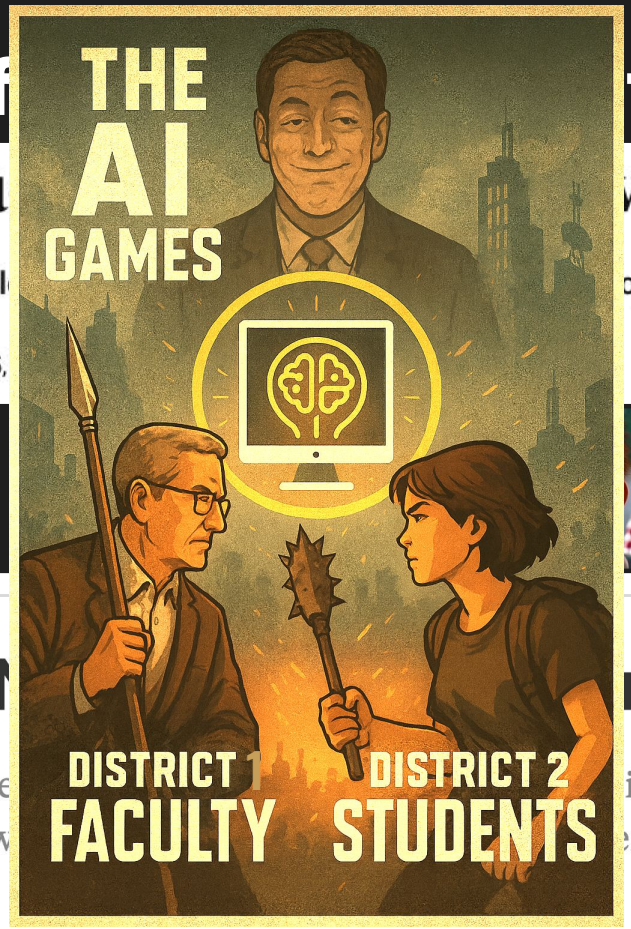
Your Stu

Here's a sustainabl

By Marc Watkins | May 5,

vare Professor

ogy that academe can't afford to ignore.



December 09, 2024

To Use AI or N

ident's Burden

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instructors to students, w

integrity from

n, Daniel Cryer writes.

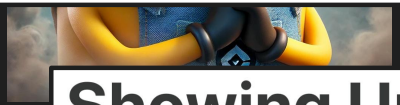
By Daniel Cryer

A moment of grace for your colleagues

Adopt or Resist? Beyond the AI Culture Wars

How to find a middle ground about a technology that is, and will remain, unavoidable for virtually every discipline.

By Marc Watkins | February 20, 2025



Showing Up for the Future: Why Educators Can't Sit Out the AI Conversation

Guest post from Lew Ludwig

MARC WATKINS

APR 04, 2025