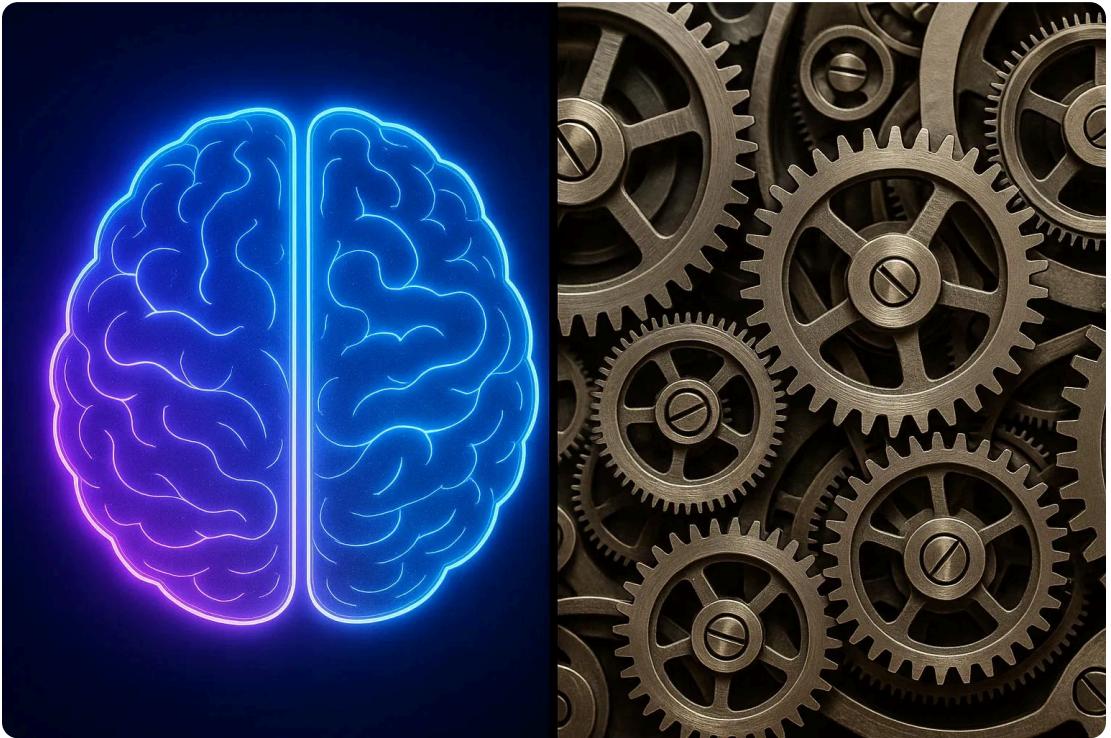


AI: The Great Illuminator or The Great Imitator?

A Practical Guide to the Hype, the Hazards, and the Hands-On Reality



Presenter: Moez Ben-Azzouz

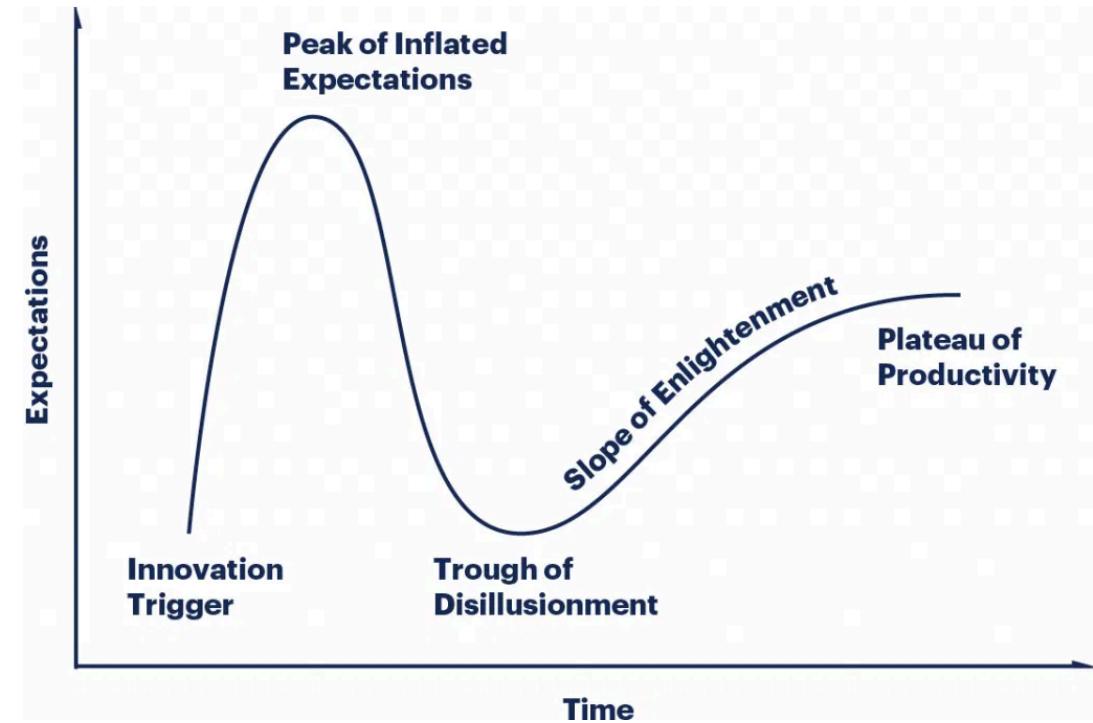
A Research-Based Presentation for Educators

Duration: 55-60 minutes

Artificial Intelligence Dominates Headlines with Promises and Panic

We are bombarded daily with dramatic claims about AI:

- "AI will solve climate change!"
- "AI will destroy humanity!"
- "This changes EVERYTHING!"
- "The singularity is near!"
- "AI is coming for your job!"



Silicon Valley and media outlets present AI as magical and transformative. But is it magic, or is it mechanics?

Today, we cut through the noise to understand what AI really is.

← *We are here: Peak of Inflated Expectations*

The Gartner Hype Cycle shows how new technologies move from hype to reality. AI is currently at the peak of inflated expectations.

Large Language Models Are Pattern-Matching Engines, Not Intelligent Beings



A parrot can repeat Shakespeare without understanding Shakespeare.

The term "**stochastic parrot**" was coined by researchers Emily Bender and Timnit Gebru to describe what LLMs actually do: they repeat patterns from their training data in probabilistic ways, without understanding meaning.

No consciousness: LLMs have no awareness, no understanding, no internal mental states.

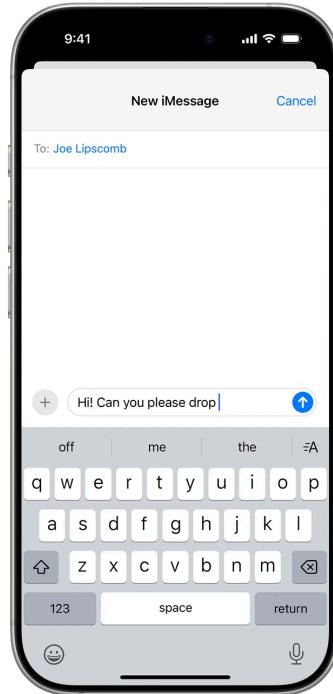
No true comprehension: They process statistical patterns in text, not meaning.

Pattern matching at scale: They predict the next most likely word based on billions of examples.

Sophisticated mimicry: They appear intelligent because they have seen so many examples of intelligent-sounding text.

¹ Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the Dangers of Stochastic Parrots: Can Language Models Be Too Big? *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency*, 610-623. [9,769+ citations]

LLMs Work Like Your Phone's Autocomplete, Just Vastly More Sophisticated



Your phone predicts "way" after "I'm on my" because that pattern appears frequently in text messages.

Think about autocomplete on your smartphone. You type "I'm on my," and it suggests "way." It doesn't know where you're going or why—it just knows that "way" statistically follows "I'm on my" in millions of text messages.

How LLMs Work:

- 1. Input:** You provide a prompt ("The sky is")
- 2. Processing:** The model calculates probabilities for what word comes next based on its training data
- 3. Output:** It selects the most likely next word ("blue" - 90% probability)
- 4. Repeat:** It then treats "The sky is blue" as the new input and predicts the next word
- 5. Continue:** This process repeats word by word until a complete response is generated

It's autocomplete on an absolutely massive scale. Your phone learned from your texts. ChatGPT learned from a significant portion of the internet.

LLMs Don't "Know" Facts—They Know What Words Tend to Follow Other Words

An LLM doesn't have a fact database that says "**Paris is the capital of France.**" Instead, it has learned that in its training data, the word "Paris" very frequently appears near the words "capital" and "France."

LLMs are correlation engines, not knowledge bases. They predict plausible word sequences based on statistical patterns, not truth.

This Explains Why:

Hallucinations occur: If the pattern suggests a plausible-sounding but false answer, the LLM will confidently state it. The model cannot distinguish truth from plausibility.

Accuracy varies: The model is more accurate on topics that appeared frequently in training data. Rare or niche topics are more prone to errors.

No fact-checking: The model cannot verify whether its output is true—it only knows if it sounds plausible based on patterns it has seen.

Confidence is misleading: LLMs state falsehoods with the same confidence as truths. High confidence does not indicate accuracy.

This is why you must always verify AI-generated information against authoritative sources.

Understanding AI's Fundamental Constraints Prevents Misuse and Disappointment

These are not bugs to be fixed—they are inherent properties of how LLMs work.

1. No True Understanding

LLMs process symbols without grasping meaning. They cannot reason about concepts, only predict patterns. They lack common sense and real-world grounding.

2. Hallucinations (Confident Falsehoods)

LLMs generate plausible-sounding but incorrect information. They cannot distinguish between true and false—only between likely and unlikely word sequences.

3. Bias from Training Data

LLMs inherit and amplify biases present in their training data. They can perpetuate stereotypes, misinformation, and harmful content.

4. No Consciousness or Intent

LLMs have no goals, desires, or awareness. They cannot "want" to help or harm—they simply generate text. Anthropomorphizing AI leads to misunderstanding.



Example: "The capital of France is Las Vegas"

LLMs state falsehoods with the same confidence as truths because they only predict plausible-sounding text.

Key Insight: Understanding these constraints is essential for using AI responsibly and teaching others to do the same.

AI's Electricity Demand Rivals That of Small Countries and Is Growing Exponentially



TRAINING A SINGLE MODEL

Training one large AI model can emit **as much carbon as five cars over their entire lifetimes¹**

Requires massive computational resources running continuously for weeks or months

CURRENT AI ENERGY USE

ChatGPT inference phase alone: **564 MWh per day²**

Requires **28,936 GPUs** running continuously
AI represents **10-15% of Google's total electricity** (18.3 TWh in 2021)

Single LLM-powered search: **6.9-8.9 Wh** vs.
0.3 Wh for traditional search

PROJECTIONS FOR 2027

AI servers could consume **85.4-134.0 TWh annually²**

Google's AI alone could match **Ireland's total electricity consumption** (29.3 TWh/year)

AI could represent **0.5% of the world's total electrical generation**

¹ Strubell, E., Ganesh, A., & McCallum, A. (2019). Energy and Policy Considerations for Deep Learning in NLP. *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics*, 3645-3650. [5,831+ citations]

² de Vries, A. (2023). The growing energy footprint of artificial intelligence. *Joule*, 7(10), 2191-2194. [544+ citations]

Data Centers Consume Billions of Gallons of Water Annually for Cooling

Water Consumption Impact—Why This Matters

Why Water Matters

Cooling requirements: Data centers use water to cool the massive heat generated by GPUs running 24/7. These systems cannot function without continuous cooling.

Potable water consumption: Much of this water is potable (drinkable) water, not recycled water. This diverts clean water from human consumption and agricultural use.

Water-stressed regions: AI data centers are being built in water-stressed regions where water scarcity is already a critical issue, exacerbating local water crises.

Climate change acceleration: Climate change is making water scarcity worse globally, yet AI demand is accelerating, creating a collision course between technological growth and environmental sustainability.

Future Projections

Cornell study (2025): AI data centers could drain 731-1,125 million cubic meters per year—equal to the annual household water usage of 6-10 million people.

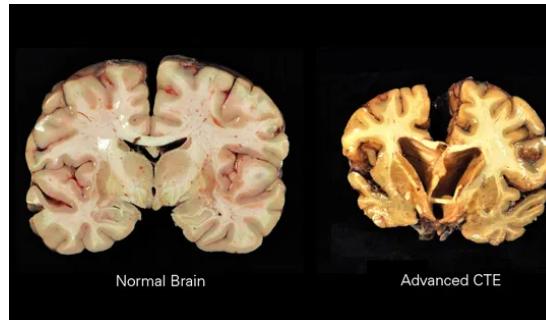
This projection represents a staggering increase in water consumption at a time when global water resources are under unprecedented stress. The scale of this demand raises urgent questions about the sustainability of current AI infrastructure expansion.

The environmental cost of AI extends far beyond energy consumption. Water scarcity is a growing global crisis, and AI infrastructure is accelerating it.

¹ EESI (2025). Data Centers and Water Consumption.

² Mytton, D. (2021). Data centre water consumption. *npj Clean Water*, 4(1). [194 citations]

Delegating Thinking to AI Physically Changes Our Brains and Reduces Cognitive Abilities



THE NEUROSCIENCE

When we delegate tasks requiring deep thought to AI, we reduce the brain's ability to form and strengthen neural pathways essential for learning and problem-solving. **This is not metaphorical—it is measurable cognitive atrophy.¹**

Research in neuroscience has demonstrated that our brains physically change in response to how we use them. When we consistently offload cognitive tasks to AI, we are not simply saving time—we are actively weakening the neural pathways that enable critical thinking, problem-solving, and independent learning.

KEY RESEARCH FINDINGS

87% of teachers say AI tools could make it less likely students develop critical thinking skills (EdWeek, 2025)

82% of teachers worry about AI's impact on learning

Widespread AI use carries the risk of **overall cognitive atrophy and loss of brain plasticity** (Polytechnique Insights, 2025)

These are not hypothetical concerns—educators are witnessing this cognitive decline in real time.

¹ Hasan, M. K., et al. (2025). How AI quietly undermines the joy and effort of learning. *PMC*.

² Gerlich, M. (2025). AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking. *Societies*, 15(6). [73 citations]

The "Use It or Lose It" Principle—Cognitive Consequences

FUNDAMENTAL NEUROSCIENCE

Our brains strengthen neural pathways we use frequently and weaken those we neglect. This is fundamental neuroscience, not speculation.

When we stop practicing critical thinking, research, and problem-solving, those pathways **physically weaken and atrophy**.

AI makes it easy to outsource these cognitive tasks—but at what cost? Each time we delegate thinking to AI instead of engaging our own minds, we are training our brains to become less capable.

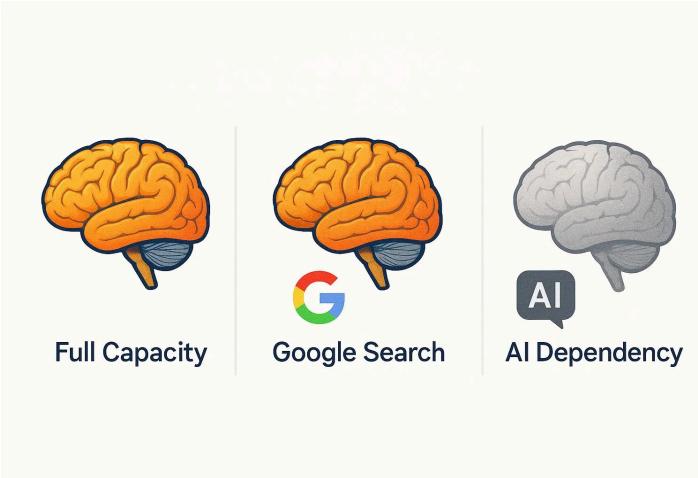
THE LONG-TERM CONSEQUENCE

A generation that cannot think critically, solve problems independently, or evaluate information without AI assistance.

This is not a distant future scenario. It is happening now in classrooms, workplaces, and homes. Every time a student uses AI to complete an assignment without engaging their own thinking, they are weakening the very cognitive abilities education is meant to develop.

We must actively resist the temptation to outsource thinking. Our cognitive abilities depend on it.

We've Already Seen This Pattern—AI Accelerates Cognitive Offloading



The Google Effect (Sparrow et al., 2011)

Research has shown that when we know information is readily available online, we don't bother to remember it. We remember *where* to find information, but not the information itself. This is called "**digital amnesia**".

This phenomenon was first documented with Google search, but AI takes it to an entirely new level.

How AI Amplifies This

Google required us to at least formulate a search query and evaluate results. AI removes even that minimal cognitive effort—we just ask and accept.

AI provides answers without requiring us to engage with sources, context, or verification. The path of least resistance becomes the path of no resistance.

But what are the long-term consequences of this accelerated cognitive offloading?

Digital Amnesia—Long-Term Consequences of Cognitive Offloading to AI

1. Loss of Knowledge Building

If we don't process and integrate information, we don't truly learn it. Knowledge requires active engagement—reading, thinking, questioning, connecting ideas. When AI provides instant answers, we skip this cognitive work. The result: we have access to information but never build true understanding.

2. Inability to Question AI Output

Without domain knowledge, we cannot evaluate whether AI is correct or hallucinating. This creates a dangerous dependency: we rely on AI for answers but lack the expertise to verify those answers. We become passive consumers of AI output rather than critical evaluators.

3. Erosion of Expertise

What happens when we can no longer distinguish experts from imitators? Expertise requires deep knowledge built over years of study and practice. If AI can generate expert-sounding text instantly, and we cannot evaluate its accuracy, the concept of expertise itself erodes. Society loses the ability to recognize and value true expertise.

4. Dependency

We become unable to function without AI assistance, losing the cognitive skills that make us independent thinkers. This is not hypothetical—it is already happening. Students cannot write without AI. Professionals cannot solve problems without AI. We are training ourselves to be helpless without technology.

The path from Google to AI represents an acceleration of cognitive offloading. We must recognize this pattern and resist it.

When We Stop Building Knowledge, We Lose the Ability to Question AI's Output

THE VICIOUS CYCLE OF AI DEPENDENCE

1. We use AI because we lack expertise in an area
2. AI provides an answer, and we accept it without verification
3. We never develop the expertise needed to evaluate whether AI is correct
4. We become more dependent on AI and less able to think independently
5. The cycle repeats and deepens

This is not a hypothetical concern—it is happening now in classrooms, workplaces, and homes worldwide.

But who can safely use AI? The answer reveals a troubling paradox about expertise and AI dependence.

¹Fügner, A., Grahl, J., Gupta, A., & Ketter, W. (2022). Cognitive challenges in human–artificial intelligence collaboration. *Information Systems Research*, 33(2). [552 citations]

The Expertise Paradox—Who Can Safely Use AI?

THE PARADOX OF AI DELEGATION

Research shows that humans struggle to delegate effectively to AI because we often lack the knowledge to assess when AI is reliable and when it's not.¹ This creates a fundamental paradox:

Experts can use AI effectively because they can spot errors and evaluate output

Novices need AI most but are least equipped to use it safely

Students who use AI to "learn" never develop the expertise to evaluate it

REAL-WORLD EXAMPLE

A student uses AI to write an essay about climate change. The AI includes a plausible-sounding but false statistic. The student, lacking domain knowledge, doesn't catch the error. The student never learns the real information and now believes the falsehood.

The student has not learned—they have been misinformed. And they lack the knowledge to realize it.

This is why building genuine expertise remains essential. Without it, we cannot safely use AI—we can only blindly trust it.

¹ Fügner, A., Grahl, J., Gupta, A., & Ketter, W. (2022). Cognitive challenges in human–artificial intelligence collaboration. *Information Systems Research*, 33(2). [552 citations]

AI Is a Tool to Augment Human Intelligence, Not Replace It

Distinguishing Augmentation from Replacement—Using AI Responsibly

GOOD USES: AUGMENTATION

AI as a tool to support and enhance human thinking

- **Brainstorming:** Use AI to generate ideas, then critically evaluate and select the best ones yourself
- **Drafting assistance:** Have AI create an initial outline or draft, then revise, fact-check, and rewrite in your own voice
- **Summarizing long documents:** Use AI to condense information, then read the summary critically and verify key points
- **Code debugging:** Ask AI to suggest fixes, then understand the solution and verify it works before implementing
- **Language translation:** Use AI for initial translation, then review for accuracy and cultural appropriateness
- **Research starting point:** Use AI to identify relevant sources, then read and evaluate those sources yourself

Key principle: You remain the critical thinker, decision-maker, and expert. AI is your assistant, not your replacement.

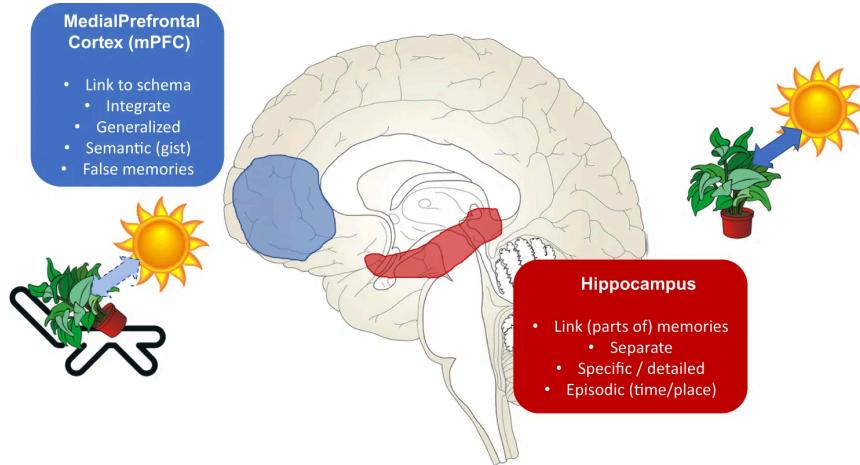
BAD USES: REPLACEMENT

AI as a substitute for human thinking and learning

- **Final decision-making:** Accepting AI recommendations without independent evaluation or verification
- **Unverified research:** Citing AI-generated "facts" without checking authoritative sources
- **Learning replacement:** Having AI complete assignments meant to develop your skills and knowledge
- **Writing without understanding:** Submitting AI-generated text you haven't read, understood, or verified
- **Critical thinking bypass:** Using AI to avoid the cognitive work of analysis, synthesis, and evaluation
- **Expertise simulation:** Relying on AI in domains where you lack the knowledge to evaluate its output

Key problem: You abdicate responsibility, stop learning, and become dependent on AI. Your cognitive abilities atrophy.

Our Duty as Educators—Teaching Students to Use AI Wisely



Teaching AI literacy is not optional—it is a fundamental responsibility in preparing students for a world where AI is ubiquitous.

1. Teach AI Literacy

Explain how LLMs work, their limitations, and their inherent biases. Students must understand that AI is a statistical pattern matcher, not an intelligent entity.

2. Emphasize Verification

Teach students to always verify AI output against authoritative sources. AI-generated content must be treated as a starting point, never as a final answer.

3. Promote Critical Evaluation

Train students to question AI output, identify hallucinations, and recognize when AI is generating plausible-sounding falsehoods. Critical thinking is the antidote to AI dependency.

These three foundational responsibilities set the stage for deeper ethical and practical considerations in AI education.

Our Duty as Educators—Ethical Implications and Modeling

4. Address Ethical Implications

Discuss the environmental costs, societal impacts, and ethical concerns of AI. Students must understand that AI is not neutral—it has real-world consequences.

5. Model Appropriate Use

Demonstrate how to use AI as a tool for augmentation, not replacement. Show students when AI is helpful and when it undermines learning.

If we do not teach students to use AI critically, we are failing them. They will inherit a world shaped by AI—we must prepare them to navigate it wisely.

Questions and Discussion

Before we move to the hands-on portion, let's pause for questions and discussion about what we've covered so far.

TOPICS FOR DISCUSSION

How do you currently use AI in your teaching or learning?

What concerns do you have about AI's impact on students' critical thinking?

How can we balance the benefits of AI with the risks of cognitive offloading?

What questions do you have about how LLMs work or their limitations?

Next: Hands-on tutorial for running AI locally with Ollama

Why Run AI Locally? Privacy, Control, and Freedom



Running AI on your own computer gives you complete control over your data and how AI is used.

No data leaves your machine. No corporate surveillance. No subscription fees. Just you and the AI model.

1. Complete Privacy

Your conversations, documents, and queries never leave your computer. No company can access, analyze, or monetize your data.

2. Full Control

You choose which models to run, when to update them, and how they operate. No forced updates or policy changes.

3. Offline Functionality

Once downloaded, models work completely offline. No internet connection required. Use AI anywhere, anytime.

4. No Subscription Fees

Free and open-source. No monthly charges, no usage limits, no paywalls. The software and models are yours to use.

5. Educational Value

Understanding how to run AI locally demystifies the technology and empowers you to use it responsibly and independently.

Introducing Ollama—Your Private, Local AI



Ollama is free, open-source software that makes running large language models on your personal computer as simple as running a single command. No technical expertise required.

Why Ollama?

Beginner-Friendly

Simple command-line interface. No complex configuration or setup required.

Completely Free

Open-source software with no subscription fees, usage limits, or hidden costs.

Cross-Platform

Works on macOS, Windows, and Linux. One tool for all operating systems.



Ollama's simple interface makes it easy to download, manage, and run AI models locally with just a few commands.

Now let's explore the popular AI models you can run with Ollama.

Popular AI Models Available Through Ollama

Ollama provides access to a wide range of open-source language models. Here are three of the most popular options, each optimized for different use cases and hardware capabilities.

CHOOSE THE RIGHT MODEL FOR YOUR NEEDS

Llama 3.1 (Meta)

High-quality, versatile model suitable for most tasks. Available in 8B (8 billion parameters) and 70B versions. The 8B version runs well on most modern computers, while the 70B version requires more powerful hardware but delivers exceptional performance. Excellent for general-purpose use, creative writing, code generation, and complex reasoning.

Mistral (Mistral AI)

Fast, efficient model with excellent performance for its size. Optimized for speed and quality balance, making it ideal for users who want quick responses without sacrificing accuracy. Particularly strong at following instructions and maintaining context in longer conversations. A great choice for everyday tasks and educational use.

Gemma (Google)

Lightweight model optimized for consumer hardware. Designed to run smoothly on less powerful computers, including older laptops. While smaller than Llama or Mistral, Gemma still delivers solid performance for basic tasks like answering questions, summarizing text, and simple writing assistance. Perfect for users with limited computing resources.

All models run entirely on your computer. No cloud connection required after the initial download.

Step-by-Step Setup—macOS



Installing Ollama on macOS takes less than 5 minutes. Follow these three simple steps.

Step 1: Download Ollama

Visit ollama.ai in your web browser. Click the "Download for macOS" button. The installer file (Ollama.dmg) will download to your Downloads folder.

Step 2: Install Ollama

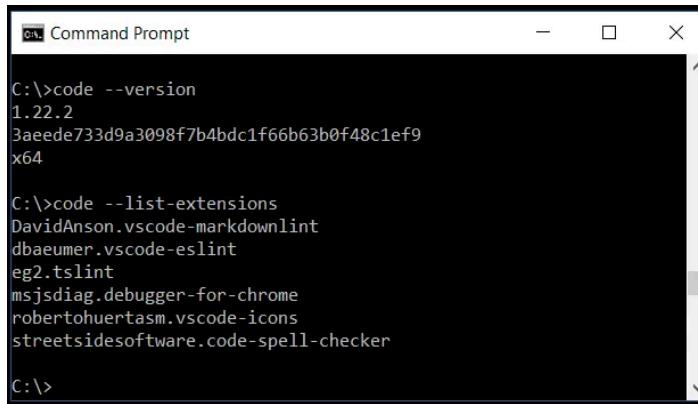
Open the downloaded Ollama.dmg file. Drag the Ollama icon into your Applications folder. Wait for the installation to complete. Eject the installer disk image.

Step 3: Open Terminal

Open Terminal (Applications → Utilities → Terminal, or press Cmd+Space and type "Terminal"). Ollama is now ready to use. You'll run all Ollama commands from Terminal.

That's it! Ollama is now installed on your Mac. Next, we'll download and run your first AI model.

Step-by-Step Setup—Windows Installation



1

Download the Installer

Visit ollama.ai in your web browser

Click the "**Download for Windows**" button

Save the **OllamaSetup.exe** file to your Downloads folder

2

Run the Setup Wizard

Double-click the **OllamaSetup.exe** file you downloaded

Follow the installation wizard prompts (click "**Next**" through the steps)

The installer will automatically add Ollama to your system PATH

3

Open Command Prompt

Press **Windows key + R** to open the Run dialog

Type **cmd** and press Enter

You're now ready to run Ollama commands!

Once installed, you can verify the installation by typing **ollama --version** in Command Prompt

Running Your First Local AI Model—It's Just One Command

THE COMMAND

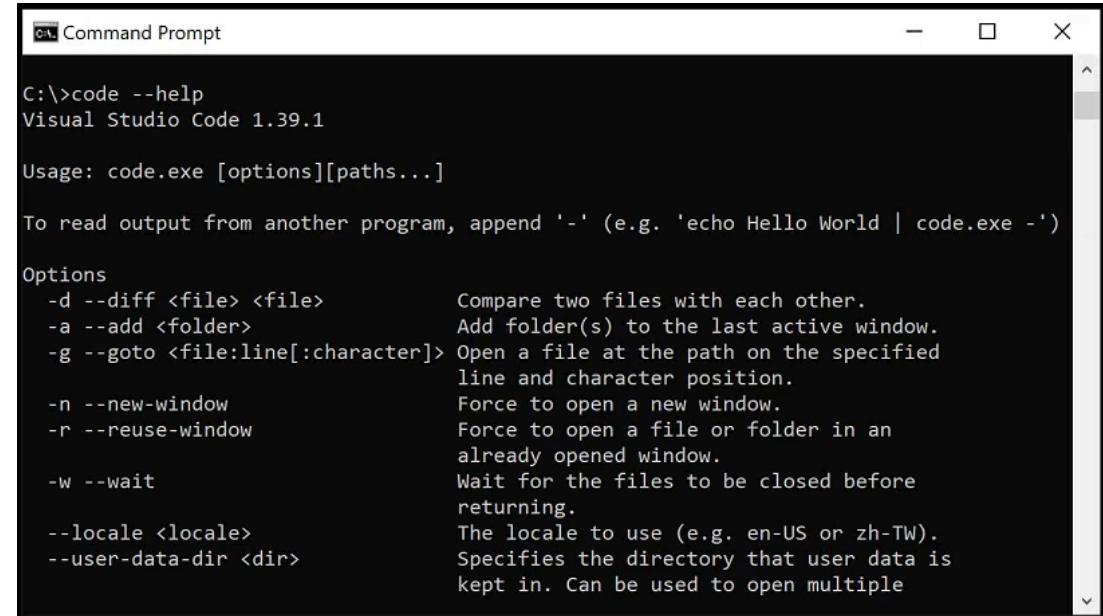
```
ollama run llama3.1:8b
```

That's it. This single command downloads the Llama 3.1 model (8 billion parameters) and starts an interactive chat session.

WHAT HAPPENS

- Ollama downloads the model (first time only, ~4.7GB)
- The model loads into memory
- You get a prompt where you can type questions
- The AI responds instantly—completely offline
- Type /bye to exit when finished

Once downloaded, the model is yours. It runs entirely on your computer with no internet connection required.



```
C:\>code --help
Visual Studio Code 1.39.1

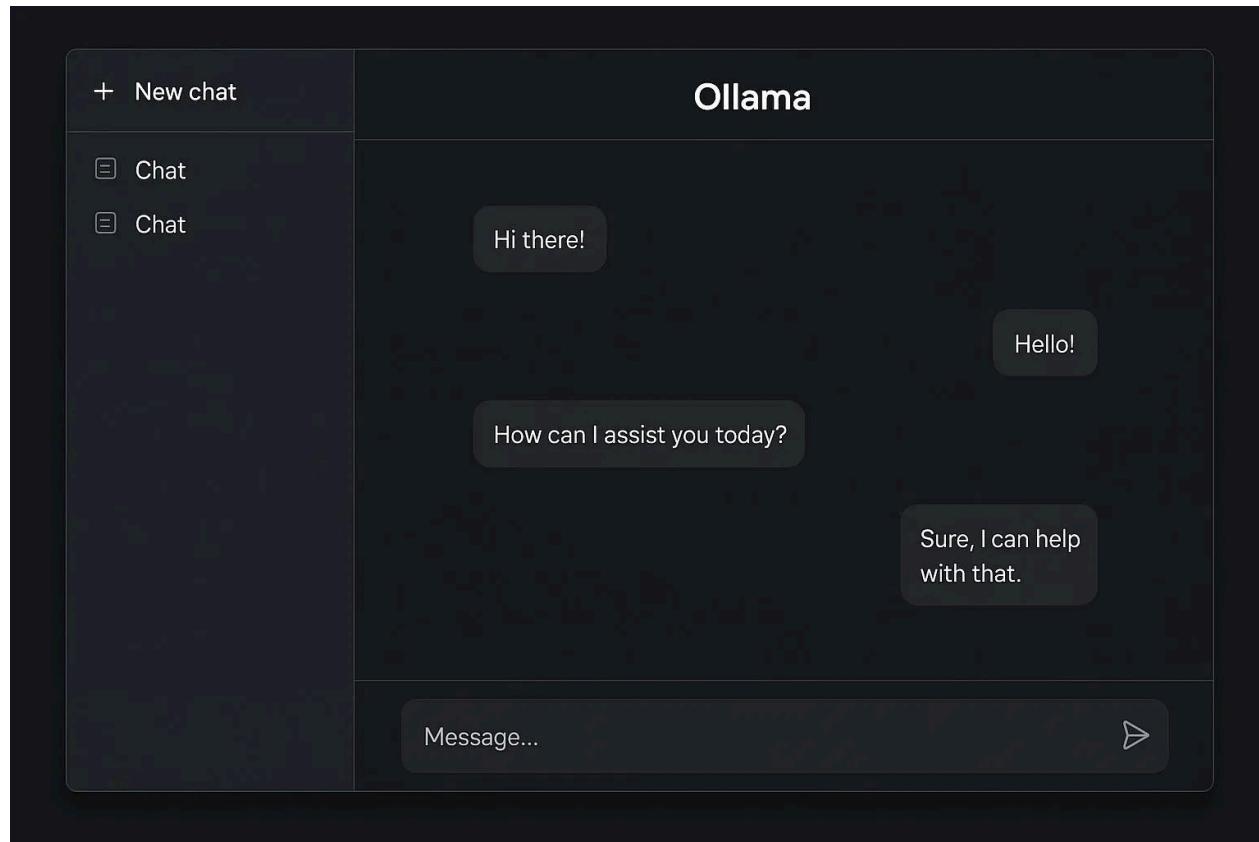
Usage: code.exe [options][paths...]

To read output from another program, append '-' (e.g. 'echo Hello World | code.exe -')

Options
-d --diff <file> <file>           Compare two files with each other.
-a --add <folder>                  Add folder(s) to the last active window.
-g --goto <file:line[:character]>    Open a file at the path on the specified
                                         line and character position.
-n --new-window                      Force to open a new window.
-r --reuse-window                     Force to open a file or folder in an
                                         already opened window.
-w --wait                            Wait for the files to be closed before
                                         returning.
--locale <locale>                   The locale to use (e.g. en-US or zh-TW).
--user-data-dir <dir>              Specifies the directory that user data is
                                         kept in. Can be used to open multiple
```

Example terminal session: The model responds to queries instantly and works completely offline after the initial download.

Optional Enhancement—Installing Open WebUI for a ChatGPT-Like Interface



Open WebUI provides a familiar, user-friendly chat interface for your local AI models—just like ChatGPT, but completely private and offline.

What Is Open WebUI?

Open WebUI is a free, open-source web interface that runs locally on your computer and provides a ChatGPT-like experience for Ollama models.

Key Features

- Familiar chat interface with conversation history
- Easy model switching and management
- Markdown rendering and code highlighting
- Document upload and analysis
- Completely private and offline

Detailed step-by-step installation instructions are provided in the handout and on the companion website.

Note: Open WebUI requires Docker to be installed. This is an optional enhancement—Ollama works perfectly fine from the command line.

Five Key Takeaways—What We Must Remember



1

AI Is a Tool, Not Magic

LLMs are statistical pattern matchers trained on massive datasets. They do not understand, reason, or possess intelligence. They predict the next most likely word based on probabilities. Understanding this demystifies AI and prevents us from attributing capabilities it does not have.

2

AI Has Real Costs and Risks

Training and running AI models consume massive amounts of energy and water, accelerating climate change and straining resources. Beyond environmental costs, AI poses cognitive dangers—delegating thinking to AI atrophies our mental abilities and creates dangerous dependencies.

3

Humans Must Remain Critical Thinkers

We cannot delegate thinking, research, and knowledge-building to AI without losing the cognitive skills that make us independent, capable humans. The "use it or lose it" principle applies to our brains. Critical thinking, verification, and expertise must remain human responsibilities.

Two more essential principles complete our framework for understanding and using AI responsibly.

Key Takeaways—Empowerment and Educator Responsibilities

4

Local AI Provides Empowerment

Running AI models locally on your own computer gives you complete privacy, full control, and independence from corporate surveillance and subscription fees. Tools like Ollama make local AI accessible to everyone, demystifying the technology and putting power back in users' hands.

5

Educators Have Critical Duties

We must teach students AI literacy, emphasize verification, promote critical evaluation, address ethical implications, and model appropriate use. If we do not prepare students to use AI critically and responsibly, we are failing them. They will inherit a world shaped by AI—we must equip them to navigate it wisely, understanding both its benefits and its dangers.

Recommended Resources for Further Learning

ESSENTIAL BOOKS

The Shallows: What the Internet Is Doing to Our Brains

Nicholas Carr (2010) — Explores how technology reshapes cognition and memory

Algorithms of Oppression: How Search Engines Reinforce Racism

Safiya Noble (2018) — Examines bias and discrimination in AI systems

Life 3.0: Being Human in the Age of Artificial Intelligence

Max Tegmark (2017) — Discusses AI's future impact on society and humanity

Superintelligence: Paths, Dangers, Strategies

Nick Bostrom (2014) — Analyzes existential risks and safety challenges of AI

KEY RESEARCH PAPERS

On the Dangers of Stochastic Parrots

Bender et al. (2021) — Critical analysis of large language models' limitations and risks

The Growing Energy Footprint of Artificial Intelligence

de Vries (2023) — Quantifies AI's environmental impact and energy consumption

Energy and Policy Considerations for Deep Learning in NLP

Strubell et al. (2019) — Documents carbon emissions from training AI models

Google Effects on Memory: Cognitive Consequences

Sparrow et al. (2011) — Foundational research on digital amnesia and cognitive offloading

Next: Practical tools and online resources for running AI locally and staying informed

Recommended Resources—Tools and Online Resources

TOOLS & PLATFORMS

Ollama

ollama.ai — Free, open-source tool for running AI models locally on your computer

Open WebUI

github.com/open-webui — ChatGPT-like interface for local Ollama models

Hugging Face

huggingface.co — Repository of open-source AI models and datasets

LM Studio

lmstudio.ai — Alternative GUI tool for running local language models

ONLINE RESOURCES

AI Now Institute

ainowinstitute.org — Research on social implications of artificial intelligence

Partnership on AI

partnershiponai.org — Multi-stakeholder organization addressing AI's impact on society

Electronic Frontier Foundation (EFF)

eff.org — Digital rights advocacy including AI privacy and ethics

Companion Website

pyaim.github.io/AI-Illuminator-Imitator — All slides, handouts, and resources from this talk

Works Cited

- Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the dangers of stochastic parrots: Can language models be too big? In *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency* (pp. 610-623). Association for Computing Machinery.
- 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>
- EESI (Environmental and Energy Study Institute). (2025). Data centers and water consumption: The hidden environmental cost of AI infrastructure. Retrieved from <https://www.eesi.org>
- EdWeek Research Center. (2025). Teachers' perspectives on AI tools and student critical thinking skills. *Education Week*.
- Fügener, A., Grahl, J., Gupta, A., & Ketter, W. (2022). Cognitive challenges in human–artificial intelligence collaboration: Investigating the path toward productive delegation. *Information Systems Research*, 33(2), 678-696.
- Gerlich, M. (2025). AI tools in society: Impacts on cognitive offloading and the future of critical thinking. *Societies*, 15(6), 73.
- Hasan, M. K., Rahman, M. A., & Ahmed, S. (2025). How AI quietly undermines the joy and effort of learning: A neuroscience perspective. *PMC* (PubMed Central).
- Li, P., Yang, J., Islam, M. A., & Ren, S. (2025). Making AI less thirsty: Uncovering and addressing the secret water footprint of AI models. *Cornell University*. arXiv preprint.
- Mytton, D. (2021). Data centre water consumption. *npj Clean Water*, 4(1), 11. <https://doi.org/10.1038/s41545-021-00101-w>
- Polytechnique Insights. (2025). Cognitive atrophy in the age of AI: The neuroscience of digital dependence. Retrieved from <https://www.polytechnique-insights.com>
- Sparrow, B., Liu, J., & Wegner, D. M. (2011). Google effects on memory: Cognitive consequences of having information at our fingertips. *Science*, 333(6043), 776-778. <https://doi.org/10.1126/science.1207745>
- Strubell, E., Ganesh, A., & McCallum, A. (2019). Energy and policy considerations for deep learning in NLP. In *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics* (pp. 3645-3650). Association for Computational Linguistics.

Thank You

COMPANION WEBSITE

pyaim.github.io/AI-Illuminator-Imitator

All slides, handouts, setup instructions, research sources, and recommended resources from this presentation are available on the companion website.

Use AI wisely. Question its output. Maintain your critical thinking. Teach others to do the same.

The future of AI depends not on the technology itself, but on how we choose to use it—and how we prepare the next generation to navigate a world where AI is ubiquitous.