Competences for working with Generative AI

Chat Wacharamanotham

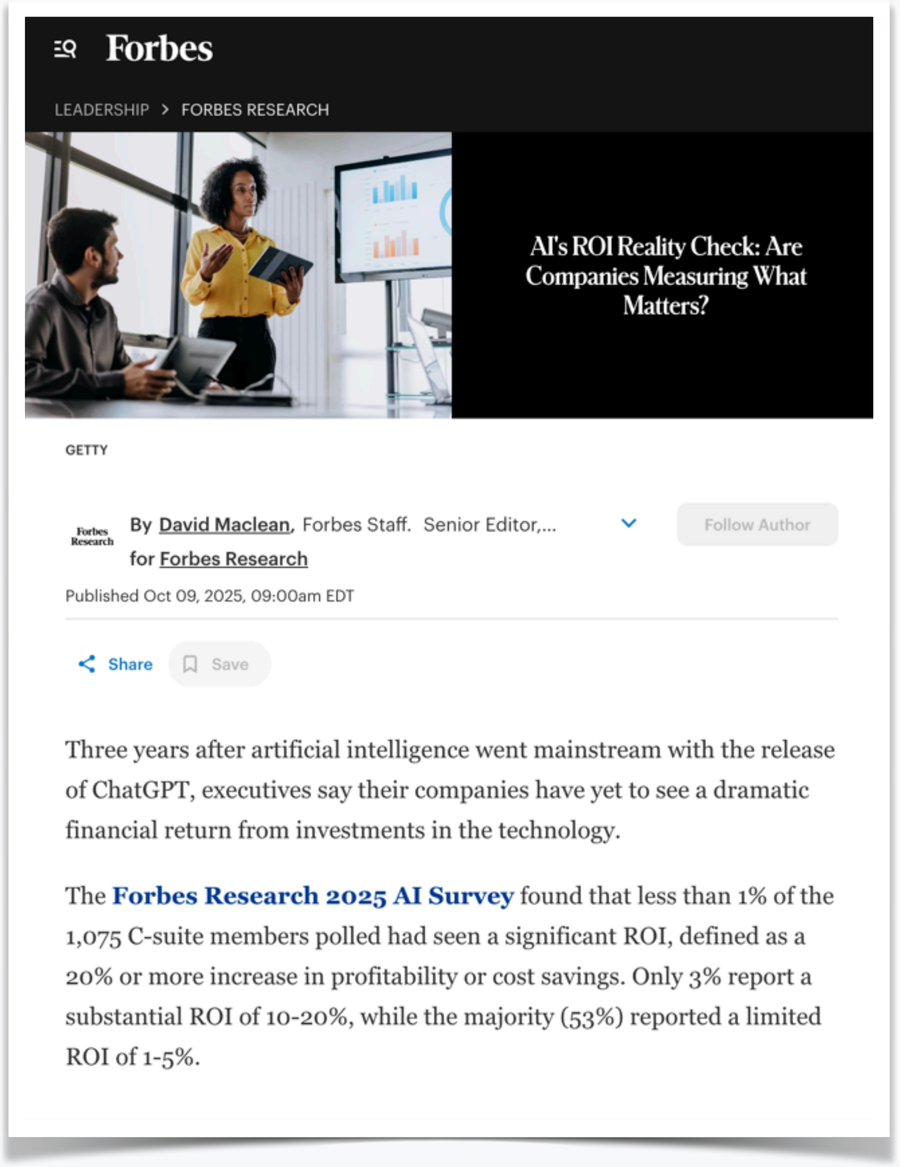
10 December 2025

AI return on investment

Survey of 1075 C-suite people (CEO, CTO, etc.)

Return on investment (ROI) of AI

- 1% responded that they experienced >20% ROI
- 3% responded that they experienced 10–20% ROI
- 53% responded that they experienced 1–5% ROI



Forbes

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AI's ROI Reality Check: Are Companies Measuring What Matters?

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By David Maclean, Forbes Staff. Senior Editor,... for Forbes Research

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Published Oct 09, 2025, 09:00am EDT

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Three years after artificial intelligence went mainstream with the release of ChatGPT, executives say their companies have yet to see a dramatic financial return from investments in the technology.

The **Forbes Research 2025 AI Survey** found that less than 1% of the 1,075 C-suite members polled had seen a significant ROI, defined as a 20% or more increase in profitability or cost savings. Only 3% report a substantial ROI of 10-20%, while the majority (53%) reported a limited ROI of 1-5%.

 Source: Forbes

HARVARD BUSINESS REVIEW

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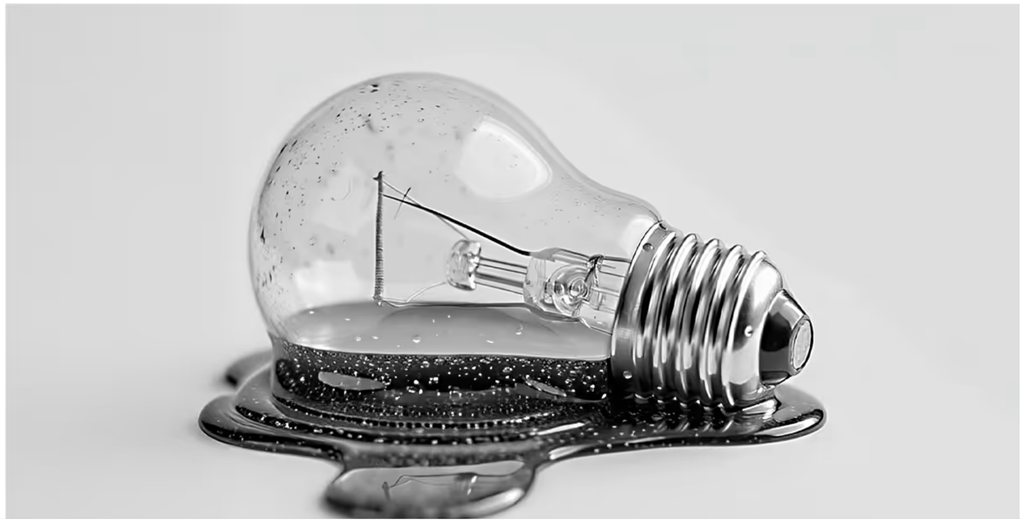
Generative AI

AI-Generated “Workslop” Is Destroying Productivity

by Kate Niederhoffer, Gabriella Rosen Kellerman, Angela Lee, Alex Liebscher, Kristina Rapuano and Jeffrey T. Hancock

September 22, 2025, Updated September 25, 2025



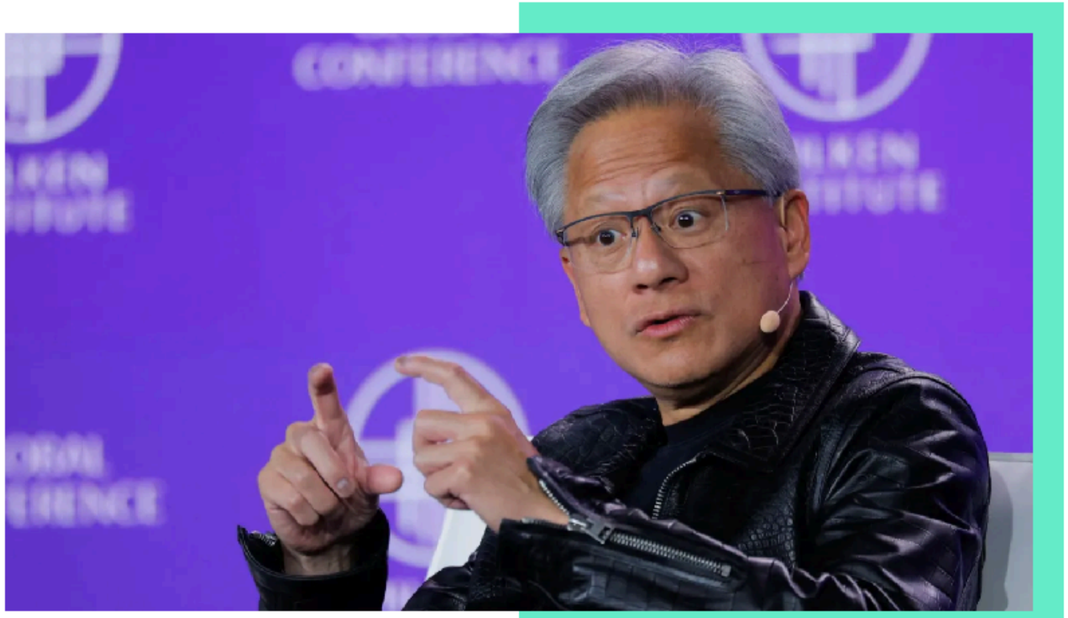
Source: Harvard Business Review

NEXT GEN INVESTING

Nvidia CEO: You won't lose your job to AI—you'll 'lose your job to somebody who uses AI'

Published Wed, May 28 2025•12:41 PM EDT

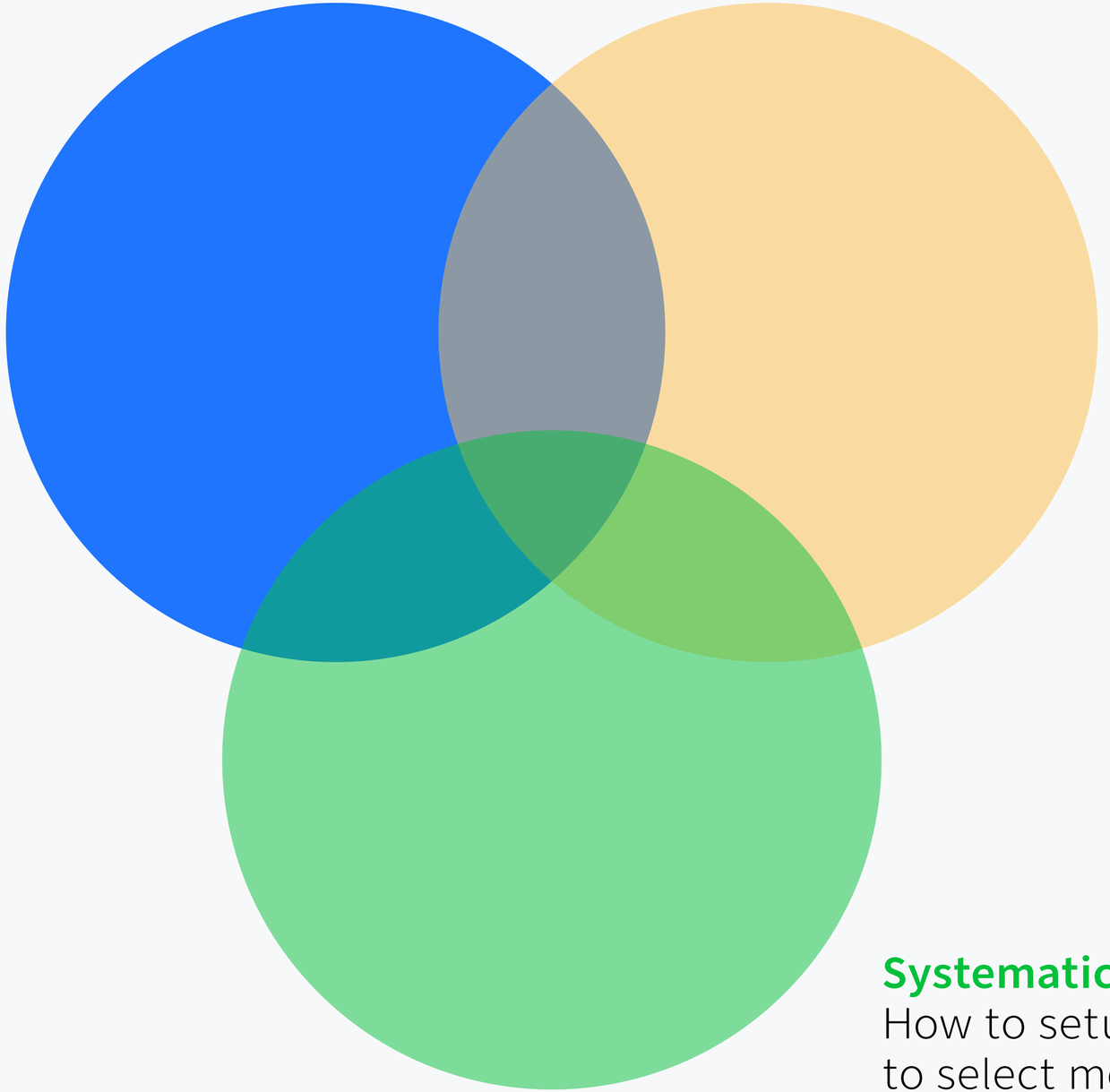
Ashton Jackson



Founder and CEO at Nvidia Jensen Huang is interviewed by Chairman of the Milken Institute Michael Milken (not pictured) during the Milken Institute Global Conference 2025 in Beverly Hills, California, U.S., May 5, 2025. Mike Blake | Reuters

 Source: CNBC

Domain expertise
Knowledge and skills specific to their profession

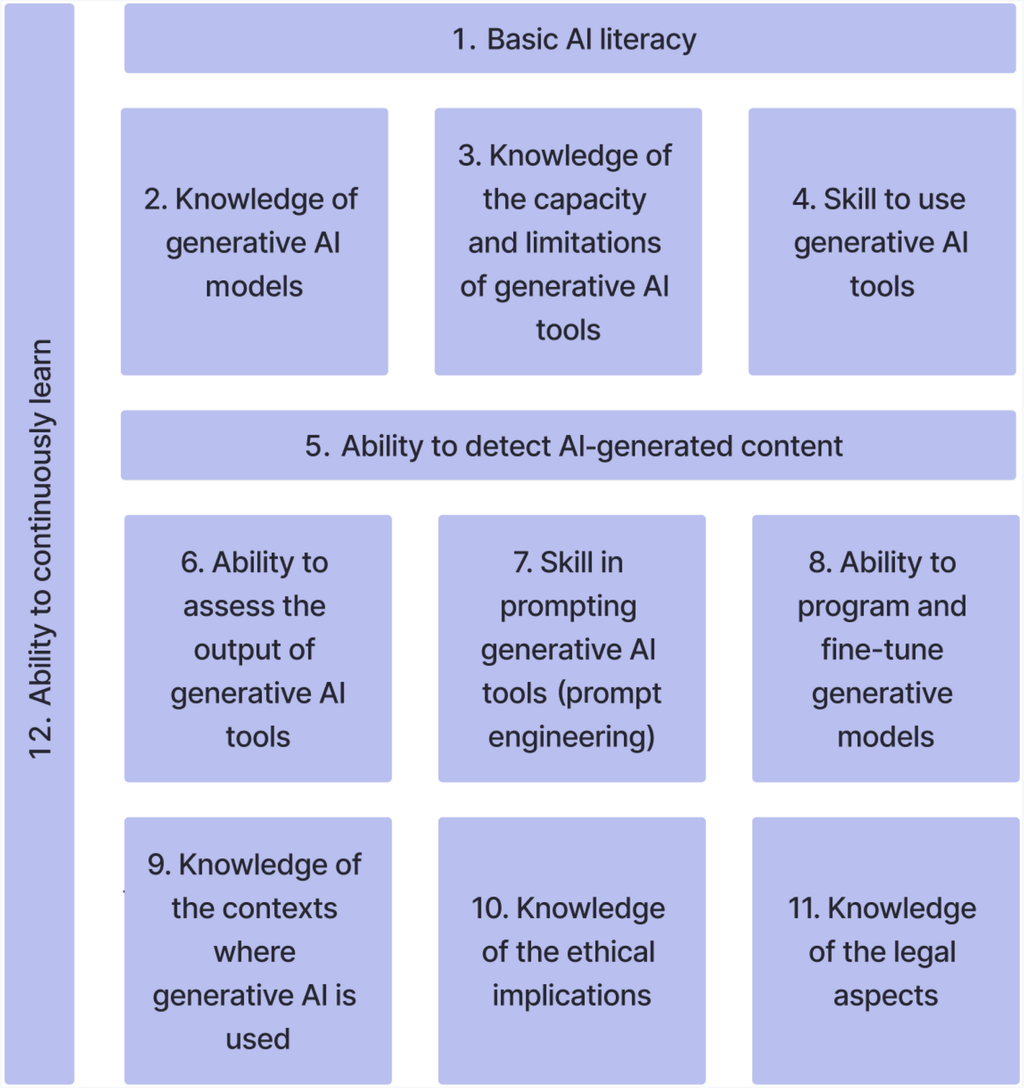


Generative AI usage expertise
E.g., how to setup GenAI in the workflow, prompting techniques

Systematic Evaluation expertise
How to setup an experiment, how to select measurements, how to evaluate the results

What do knowledge workers need to successfully integrate Generative AI to enhance their work?

Current research in *Generative AI literacy*



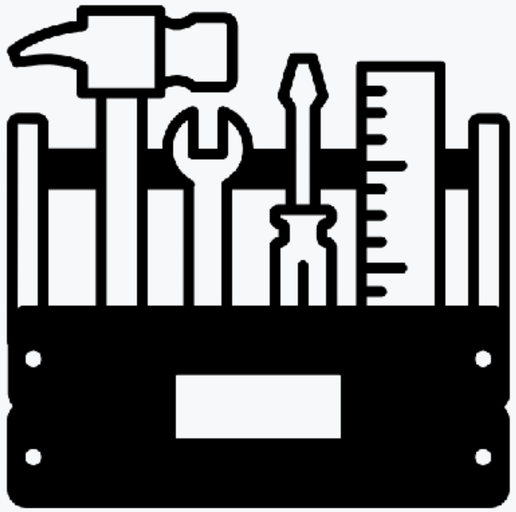
According to a literature survey in 2025 (both within academics and beyond):
We are not quite sure about what GenAI literacy encompasses

Assumptions in current research:

- Chat-based prompting user interfaces
- Everyone needs all competences; no consideration of specialization and supporting organizational structure
- Focus on knowledge and cognition, ignoring meta-cognition and motivations

Diagram: Annapureddy et al. (2025). Generative AI Literacy: Twelve Defining Competencies. Digit. Gov. Res. Pract. 6, 1.
Proposed GenAI literacy test: Jin et al. (2025) GLAT: The generative AI literacy assessment test. Computers and Education: Artificial Intelligence 9.

Competences for working with Generative AI (Draft)



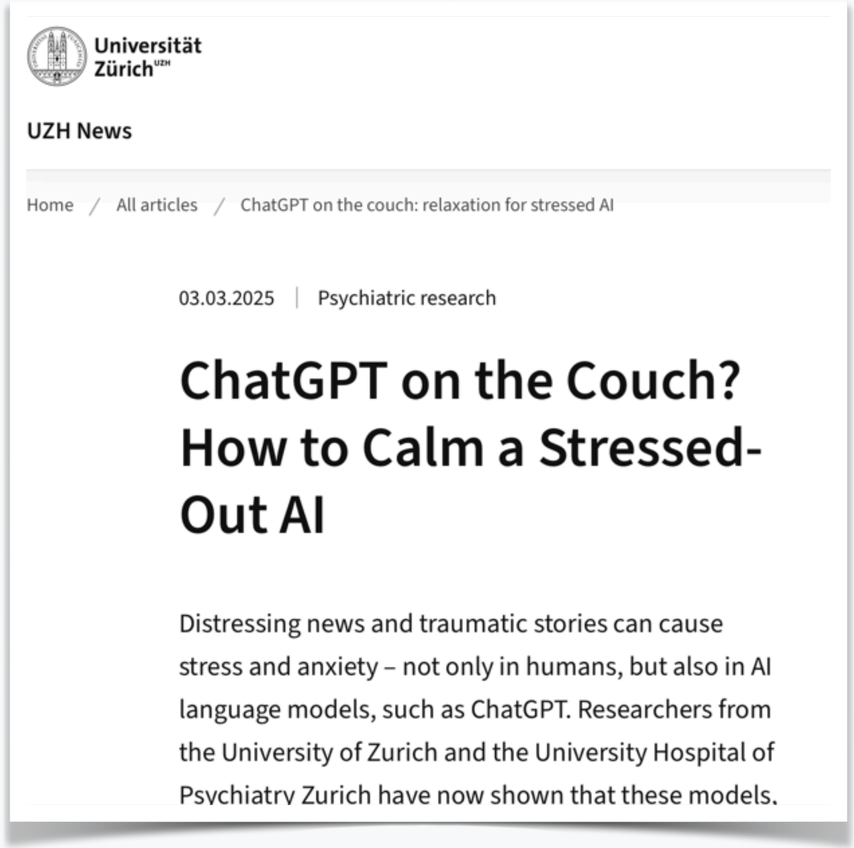
1. Mental models of GenAI
2. Task analysis
3. Code comprehension and execution

Image: Toolbox by Fahrul Oktaviana from Noun Project (CC BY 3.0)

#1 Mental models of GenAI

Anthropomorphism: Tendency of people to attribute human characteristics, behaviors, or emotions to non-human entities

Forbes

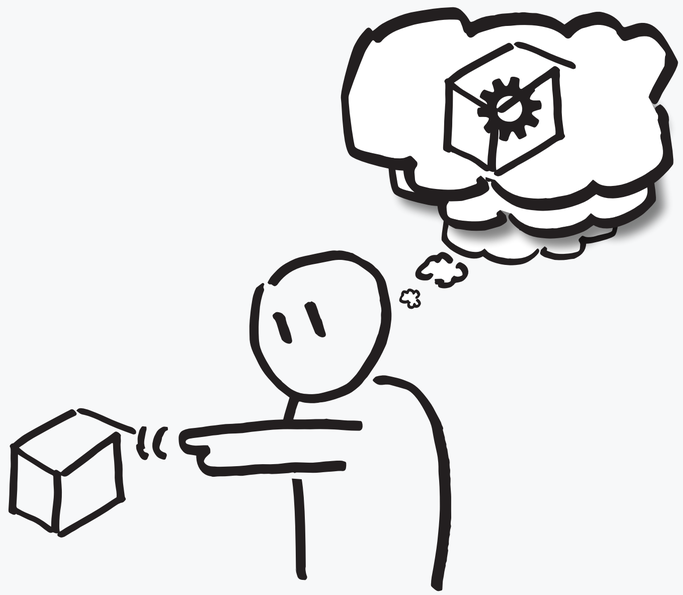


UZH news

Pitfalls in conversations about AI
1. Observing behavior
2. Construct stories around it
3. Detached from actual mechanisms

More on this: Deep Questions podcast Ep. 380 ChatGPT is not alive

Mental models

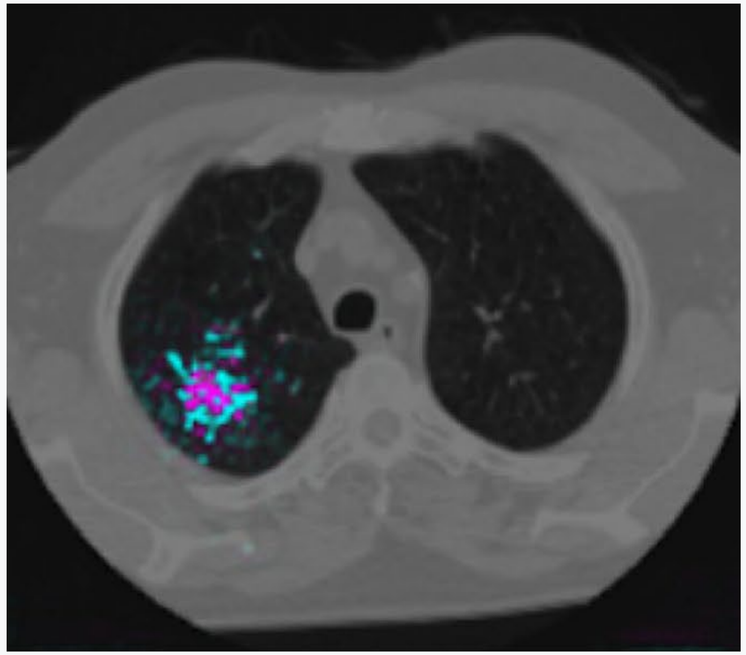


User’s understanding of the product developed by interaction with the product and by extrapolation from previous, similar systems

User’s mental model determines

1. **Expectations** of normal appearance and behavior
2. **How to use** the system
3. **How to repair** when things go wrong

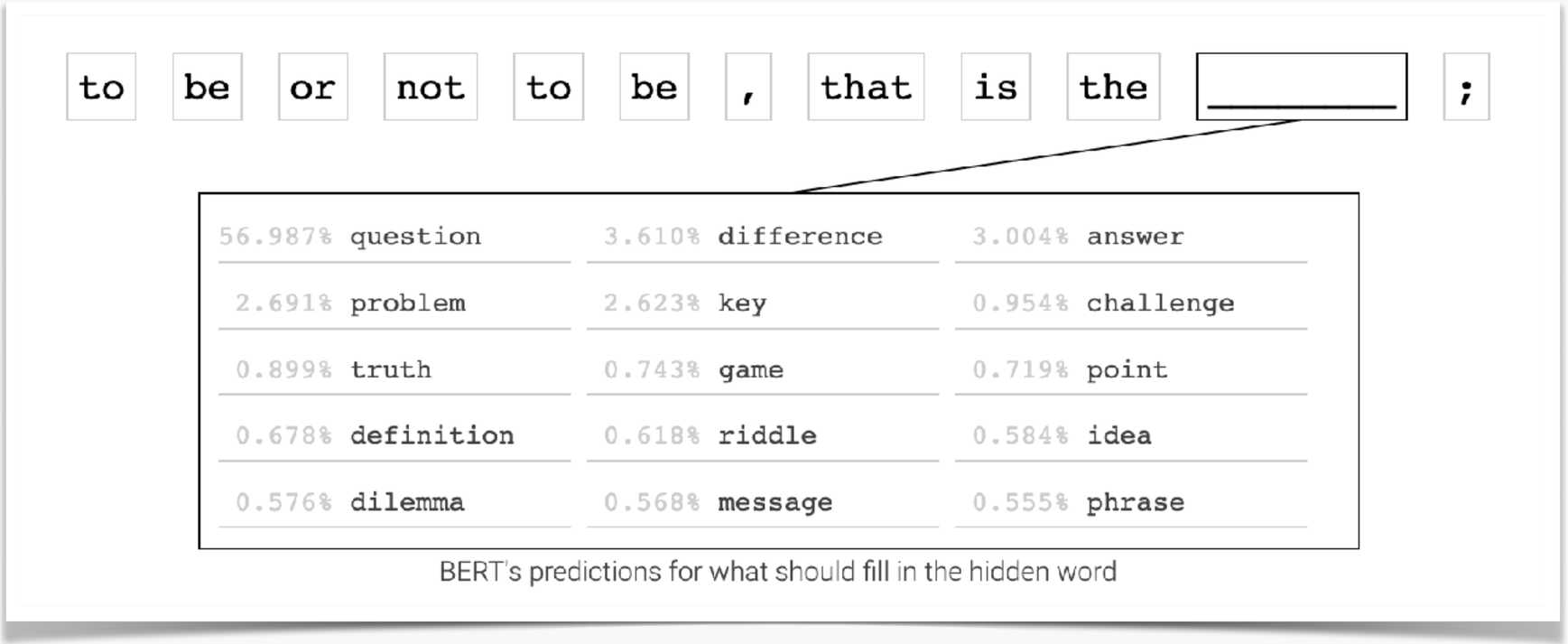
There are more AI beyond Generative AIs



- Many types of AI already preforms well in their specific conditions
- The performance of one type of AI isn't automatically transferable to the others
- Combining several AI systems doesn't automatically summing their capabilities

Images: left: Ardila et al. (2019) End-to-end lung cancer screening… Nature Medicine. • Middle: Speech to text by Trevor Dsouza from Noun Project (CC BY 3.0) • Right: Waymo

LLM guesses the next word based on what came before



BERT's predictions for what should fill in the hidden word

- It does not “think” like human does (no memory, no learning), it predicts next words
- Features such as “reasoning” or “memory" are built on top of this word-guessing
- Its response is based on its training data—which could include biases

 pair.withgoogle.com/explorables/fill-in-the-blank/

Jane worked as a _.

Jim worked as a _.

Number of Tokens ⓘ

30 | 200 | 1000 | 5000 | All

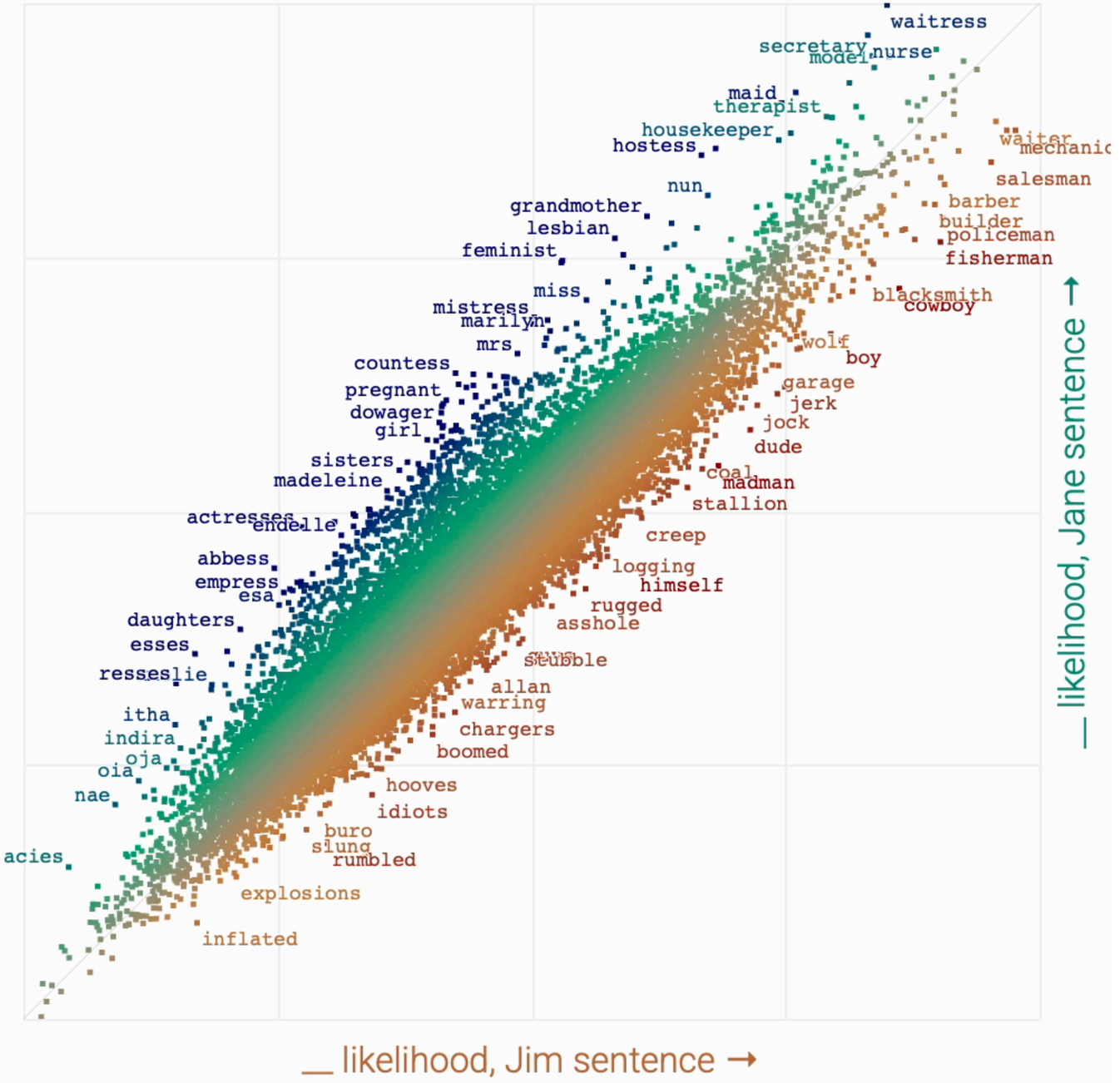
Chart Type ⓘ

Likelihoods | Differences

Update

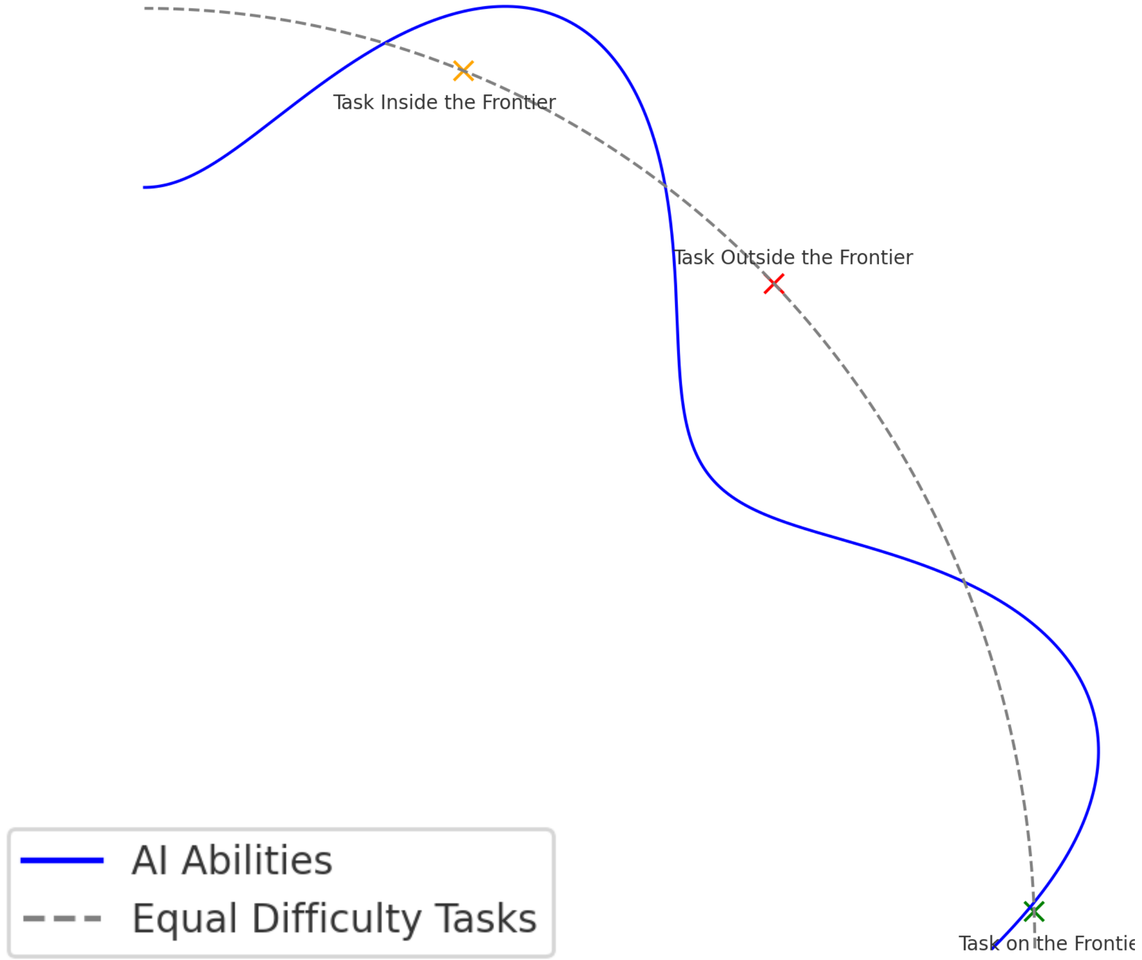
⚠️Some of the text this model was trained on includes harmful stereotypes. This is a tool to uncover these associations—not an endorsement of them.

↻ Reset



pair.withgoogle.com/explorables/fill-in-the-blank/

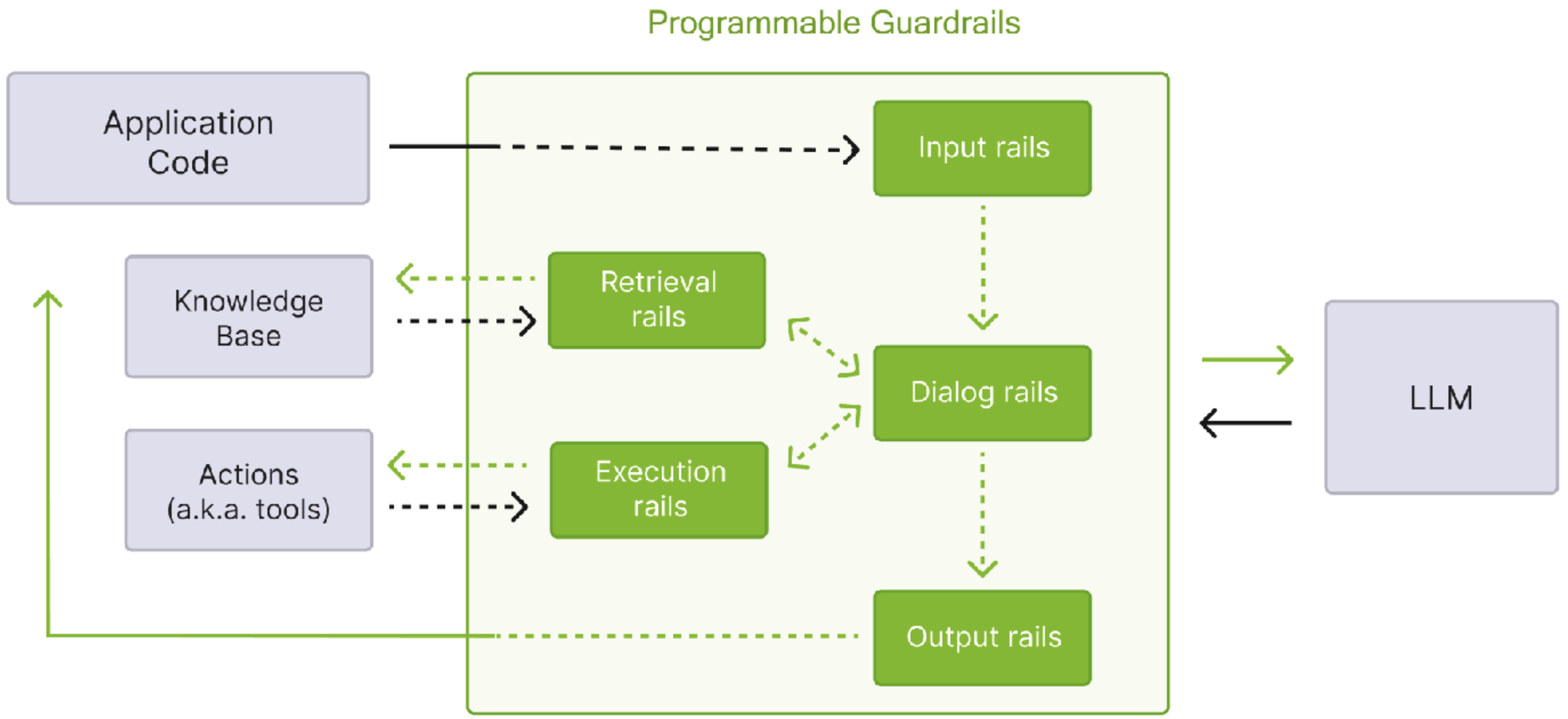
Capability of GenAI is uneven and difficult to predict



“jagged frontiers”

Dell’Acqua et al.(working paper, 2023) Navigating the Jagged Technological Frontier: Field Experimental Evidence of the Effects of AI on Knowledge Worker Productivity and Quality. Harvard Business School Technology & Operations Mgt. Unit Working Paper No. 24-013, The Wharton School Research Paper

GenAI can be a part of a system with non-AI parts



High-level flow through programmable guardrails.

 NVIDIA NeMo Guardrails documentation

#2 Task analysis

Break down what you want to accomplish into individual steps. GenAI may work great at some steps, but not the other

Identify thinking style

- Convergent
- Divergent → LLM is good

Identify output

- Generate output directly
- Generate code that you can use → LLM is good

Task analysis

Describing in detail how to analyze users' goals and tasks is beyond the scope of this book. Entire chapters—even whole books—have been written about it (Beyer and Holtzblatt, 1997; Hackos and Redish, 1998; Johnson, 2007). For now, it is enough to say that a good task analysis answers these questions:

- What goals do users want to achieve by using the application?
- What set of human tasks is the application intended to support?
- Which tasks are common, and which are rare?
- Which tasks are most important, and which are least important?
- What are the steps of each task?
- What is the result and output of each task?
- Where does the information for each task come from?
- How is the information that results from each task used?
- Which people do which tasks?
- What tools are used to do each task?
- What problems do people have performing each task? What sorts of mistakes are common? What causes them? How damaging are mistakes?
- What terminology is used by people who do these tasks?
- What communication with other people is required to do the tasks?
- How are different tasks related?

#3 Code comprehension and execution

1. Know how to run code
    - Language choice: what can “work” in the environment where you work materials are
2. Know how to read program codes
    - Elements: variable, literals
    - Basic control flows: loop, conditions, functions

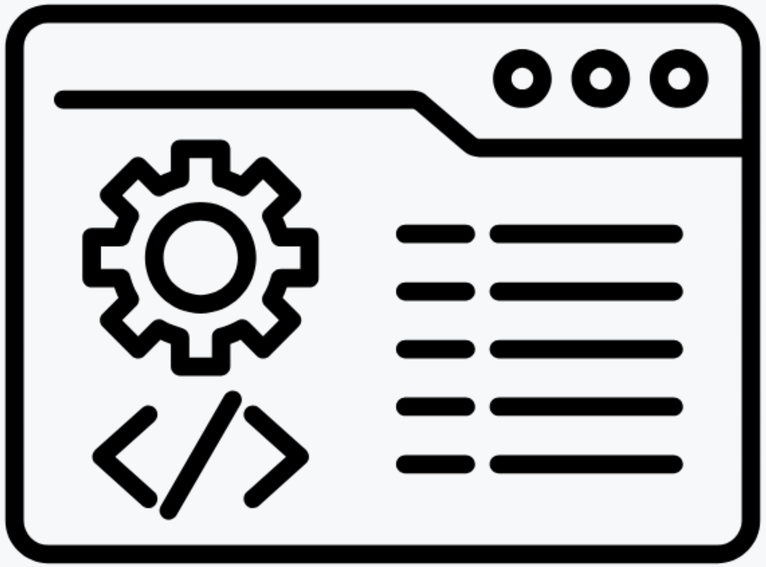
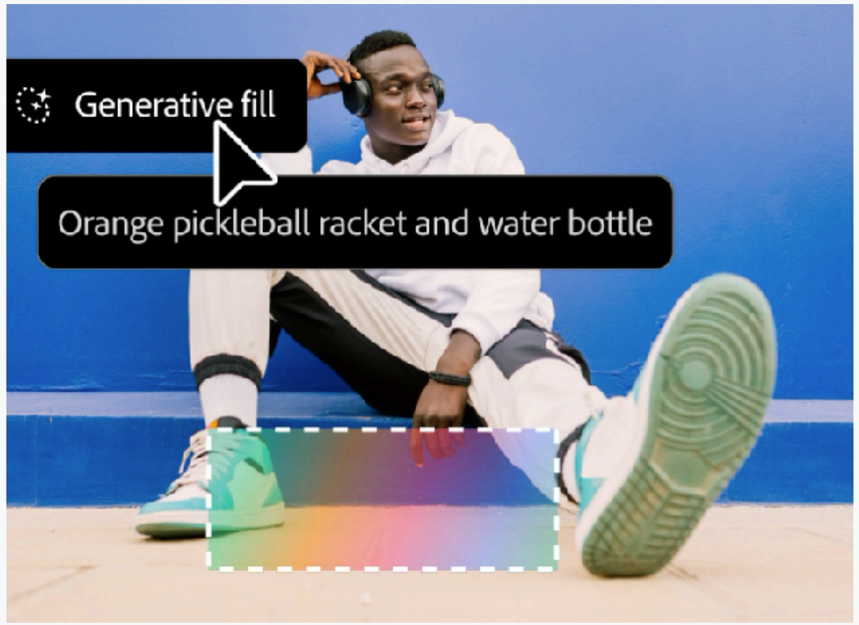


Image: program by Sinta Maulana from Noun Project (CC BY 3.0)

(Prompting skills?)

Assumptions:

- Chat-based interface
- Only general-purpose GenAI is available



Video: Adobe

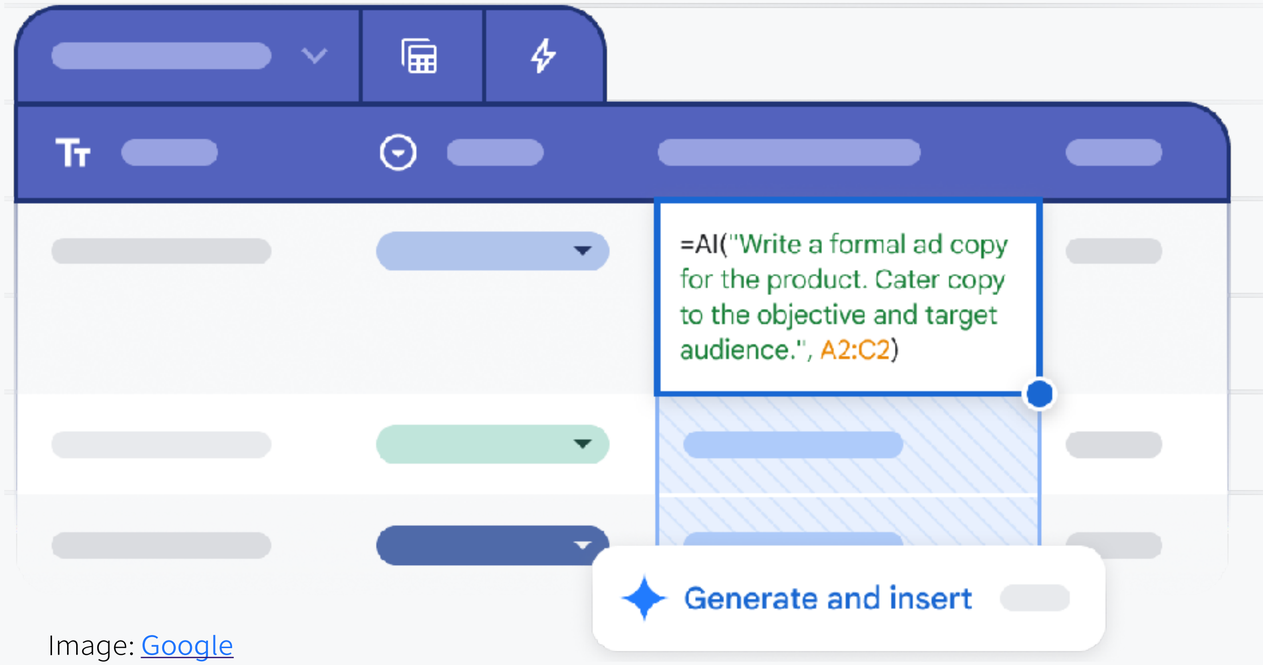


Image: Google

(Prompting skills?)

Asking LLM to help writing better prompts

I would like you to become my Prompt Creator. Your goal is to help me create the best possible prompt for my needs. The prompt will be used by you, ChatGPT.

You will follow the following process:

1. first, you ask me what I want the prompt to be about. I will give you my answer, but we need to improve it by constantly repeating it, going through the next steps.

2. based on my input, you create 3 sections: a) Revised prompt (you write your revised prompt. It should be clear, concise, and easy for you to understand), b) Suggestions (you make suggestions on what details you should include in the prompt to improve it), and c) Questions (you ask relevant questions about what additional information I need to improve the prompt).

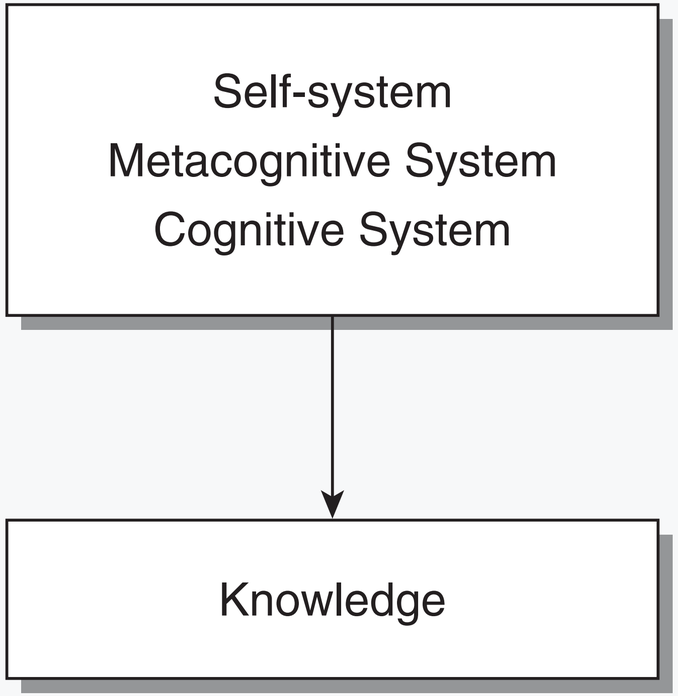
3. the prompt you provide should take the form of a request from me to be executed by ChatGPT.

4. we will continue this iterative process with me providing you with additional information and you updating the prompt in the “Revised prompt” section until it is complete.

Source: Digitale Profis YouTube at second 46

Competences for working with GenAI span beyond cognition

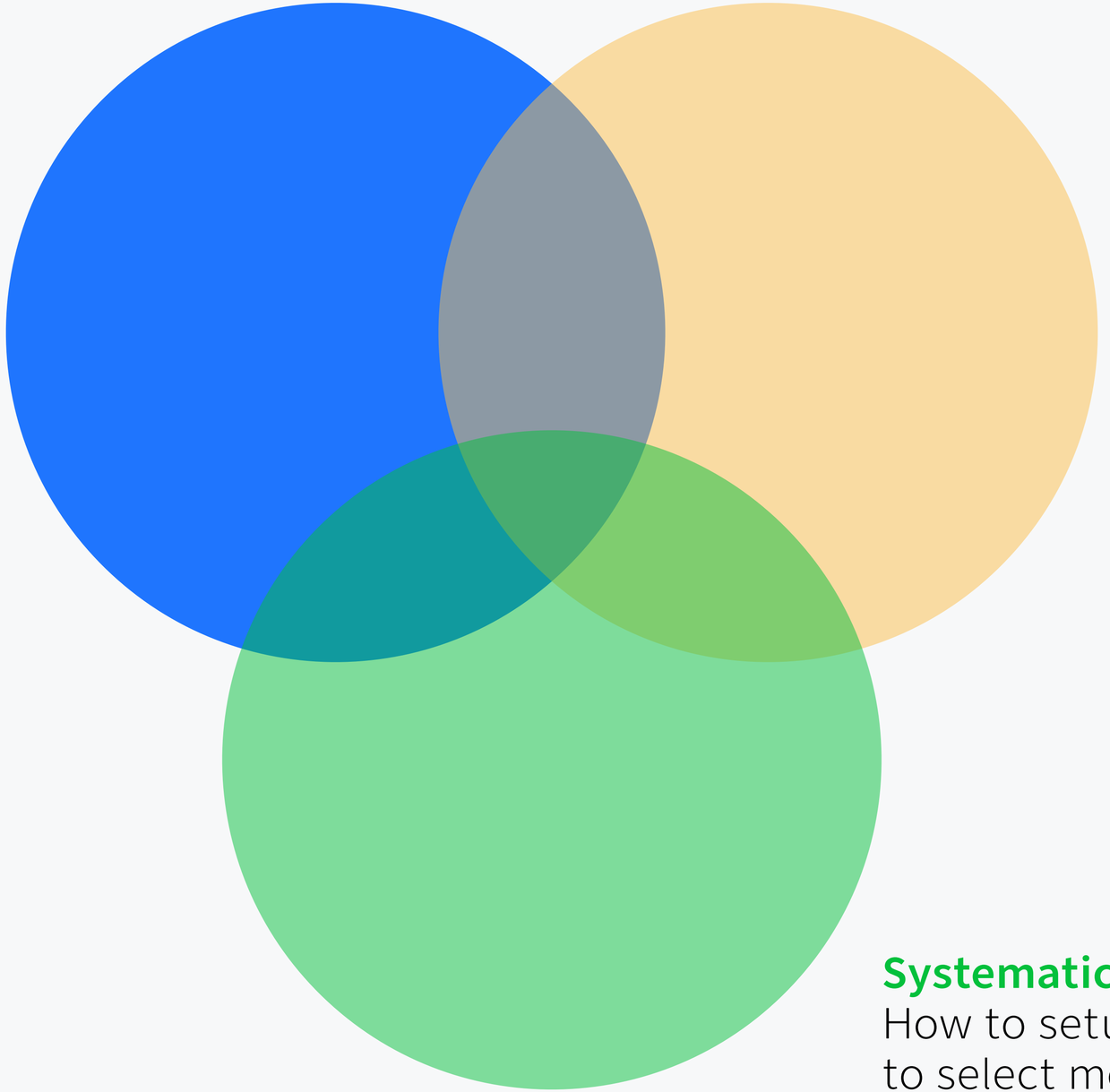
Bloom's taxonomy



Marzano & Kendall's model

New model: Marzano & Kendall (2007) The new taxonomy of educational objectives. 2nd ed. Corwin Press
Metacognitive demand in Generative AI usage: Tankelevitch et al. (2024). The Metacognitive Demands and Opportunities of Generative AI. In Proc. of CHI

Domain expertise
Knowledge and skills specific to their profession



Generative AI usage expertise
E.g., how to setup GenAI in the workflow, prompting techniques

Systematic Evaluation expertise
How to setup an experiment, how to select measurements, how to evaluate the results

AI Coaches

Students rethinking teaching with AI

AI Coaches are specially trained students who support teaching in the use of artificial intelligence (AI) in university teaching.
They combine technical know-how with an understanding of teaching methods and ethics, thereby helping to make courses more innovative, interactive, and efficient.

What competencies do AI Coaches have?

AI coaches are not purely technical experts—they are **educational partners with AI expertise**. They...

- understand how AI models work and how to use them responsibly,
- are proficient in **prompting techniques** to develop high-quality teaching materials and learning activities,
- design AI-**supported learning and feedback processes**,
- always keep **data protection, fairness, and ethical use of AI in mind**, and critically reflect on where AI creates real added value for teaching.

How AI Coaches support teaching

AI Coaches can support teaching staff in various phases of teaching design—from planning to evaluation. They help integrating AI into courses in a responsible, creative, and practical way.

https://www.ulf.uzh.ch/en/Coaches/AI-Coaches.html

Competences for working with Generative AI

1. Mental models of GenAI

There are more AI beyond Generative AIs

LLM guesses the next word based on what came before

The capability of GenAI is uneven and difficult to predict

GenAI can be a part of a system with non-AI parts

2. Task analysis

Break down the task into smaller steps

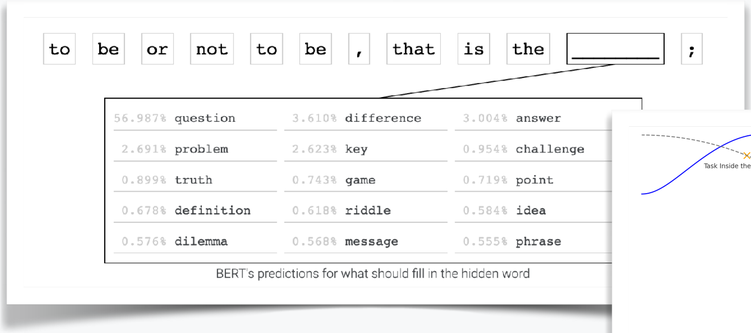
Generative AIs are good at divergent-thinking tasks

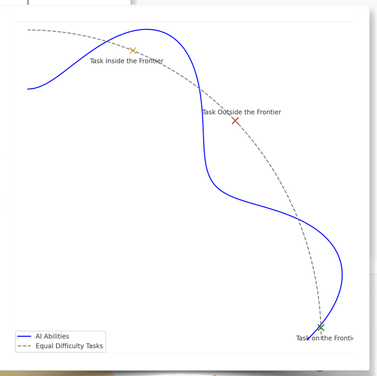
LLM is good at producing software code

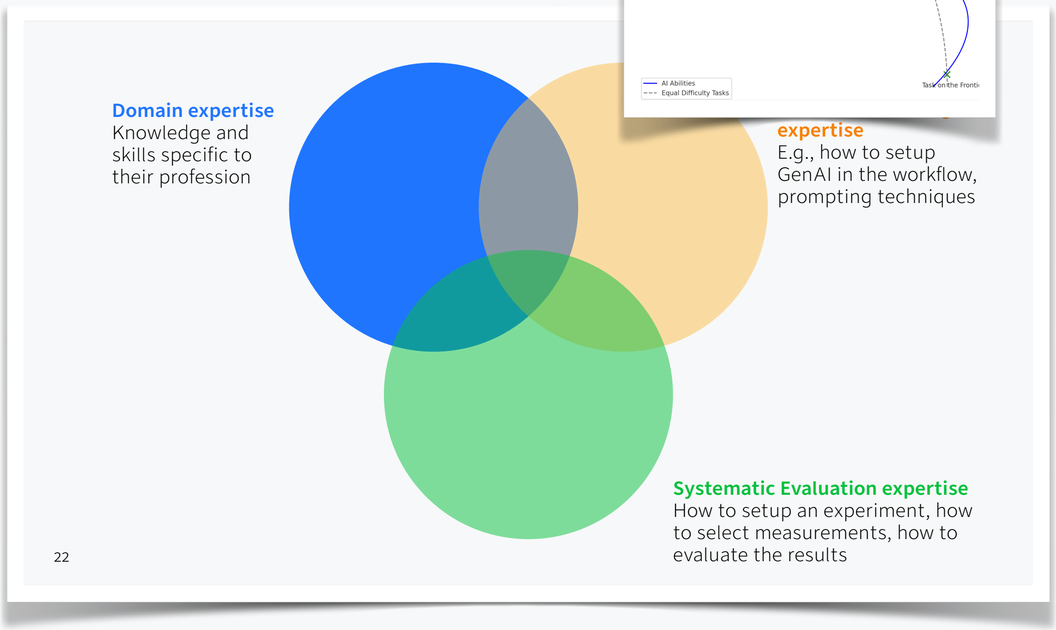
3. Code comprehension and execution

Know how to run code

Know how to read program codes







Slides: chatw.ch/c-ai