Robust minds for robust futures

Boris Ney

Busynet 2026





Slides 10–11

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  https://www.sciencedirect.com/science/article/pii/S2451958826001764

Slide 25

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Slide 33

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Slide 43

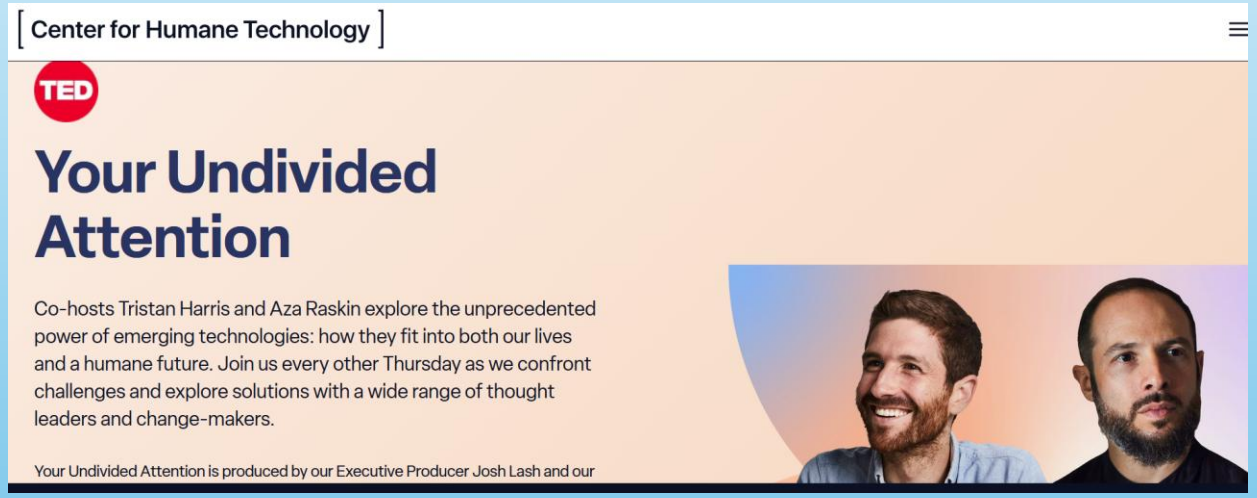
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https://www.humanetech.com/podcast

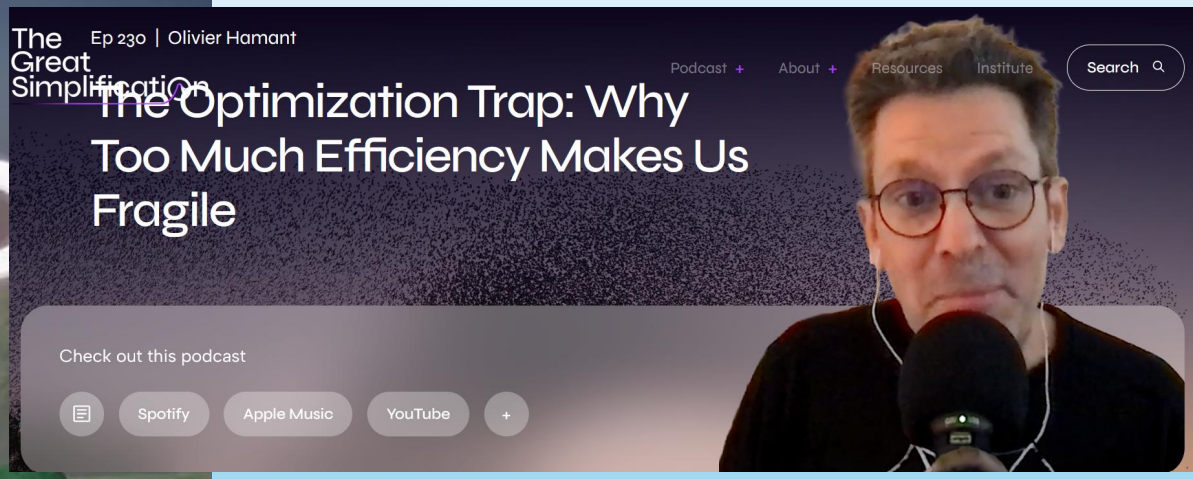


Centre for Humane Technology

https://www.humanetech.com/areas-of-work

MAKERS OF THE SOCIAL DILEMMA, THE AI DILEMMA AND THE AI DOC...AND FORMER BIG TECH EMPLOYEES





THE PODCAST

- **30 MINUTES MOVIE OF THE GREAT SIMPLIFICATION**

https://bsahely.com/2023/07/23/the-great-simplification-film-on-energy-environment-and-our-future-full-movie-nate-hagens-2022/

https://www.thegreatsimplification.com/episode/230-olivier-hamant

Close your eyes and listen to the music.
Please write down some characteristics of it and/or feelings you have AFTERWARDS.....now feel it

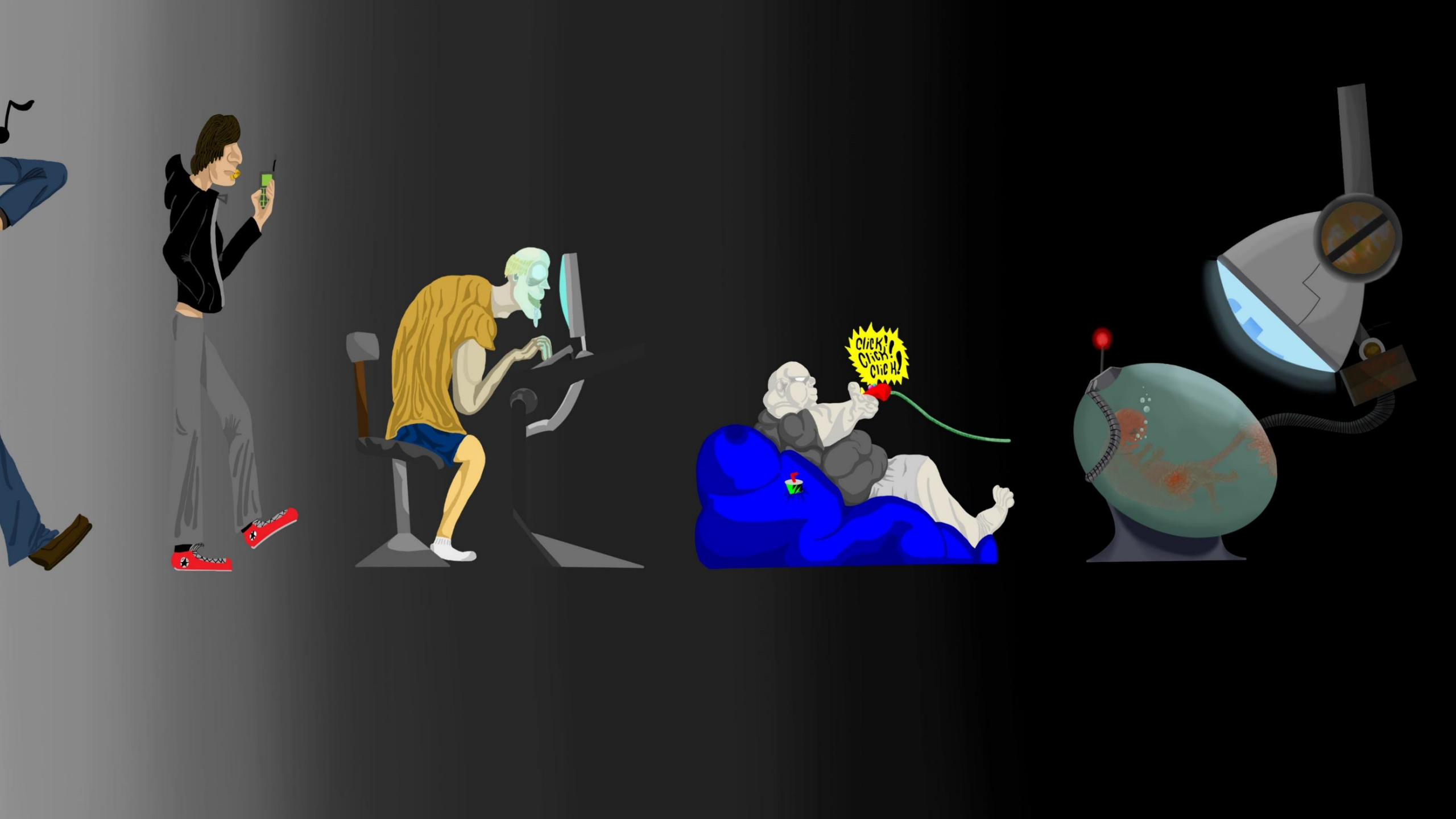
We will come back to it at the end of the workshop☺

Overview

- Recap last workshop Istanbul→ Behavior modification
- Two sides of innovations
- Current use of LLMs
- Cognitive effects of using LLMs
- Robust minds
- Questions & Applause






Click!
Click!
Click!

THERE ARE ALWAYS TWO SIDES TO INNOVATIONS...

LET US HAVE A QUICK LOOK IN HISTORY



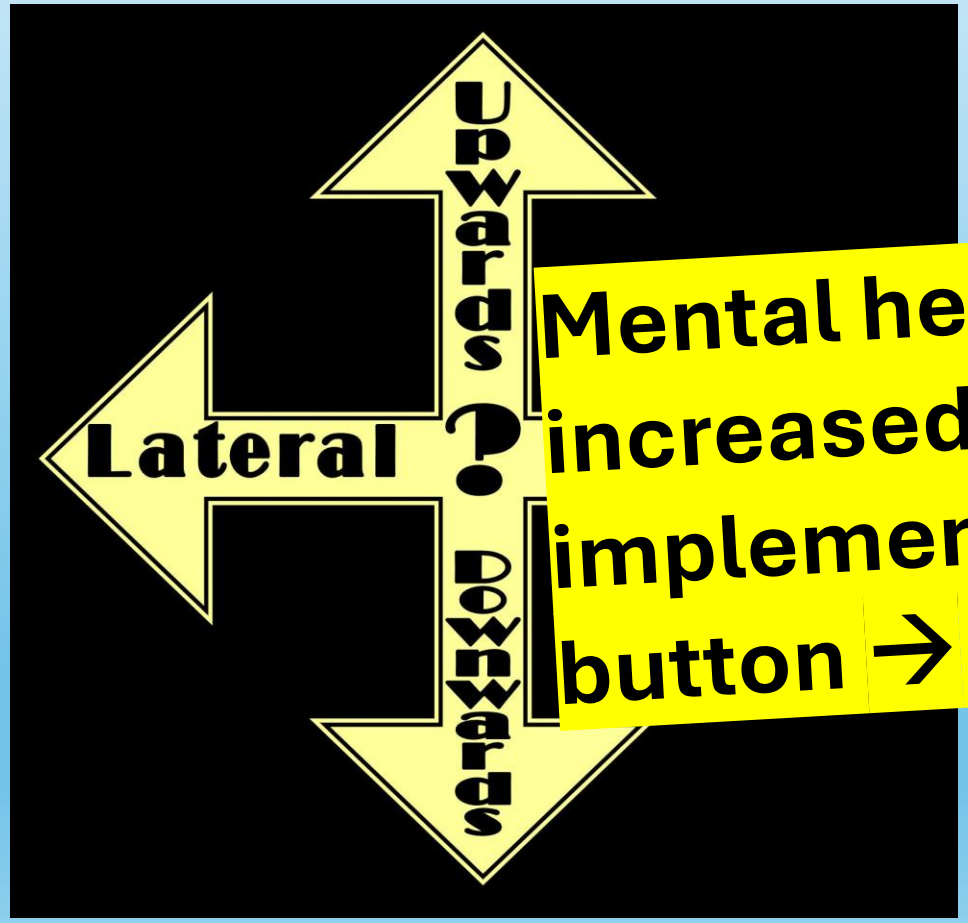
GAINS AND COSTS OF INNOVATIONS

- Assembly line → incredibly efficiënt→ unhealthy
- Plastic→ hygienic packaging→ microplastics
- Food → salt, sugar and fat → tasty and powerful → obesity and addiction
- Uranium → source for energy→ cold war, Fukushima→ future generations
- Teflon → the egg bakes perfect→ forever chemicals

- How about …Social media and…..

- Advanced Intelligence?

Social media → SOCIAL COMPARISON THEORY



Mental heath problems increased since the implementation of the like button → DESIGN FEATURE...???



A cross-culturally robust pattern

Region	Same post-2010 trend?	Magnitude	Key driver
Anglophone (US, UK, Canada)	✅ Yes	Largest	Smartphone adoption + social media saturation
Nordic Europe	✅ Yes, steepest in Europe	Very large, esp. girls	Social media + high gender equality paradox
Continental Europe	✅ Yes, slightly delayed	Moderate to large	Social media + schoolwork pressure
East Asia (Korea, China)	✅ Yes	Large + extreme suicide rates	Smartphone dependence + academic stress interaction
Switzerland	⚠️ Delayed/milder	Smaller	Later social media adoption patterns

?WHAT ABOUT ADVANCED INTELLIGENCE?



Table I. Modes of contemporary AI and their organizational implications

Mode of AI	*Core capabilities*	*Representative systems*	*Diffusion level*	*Distinctive affordances*	*Organizational implications*
Predictive AI	Pattern recognition, forecasting, classification, anomaly detection, large-scale data extraction	Relativity, Kira Systems, radiology classifiers, fraud detection systems	Widely diffused	Scalable pattern recognition; high-volume extraction; efficiency in routine analysis	Redistribution of expertise; expansion of surveillance and monitoring; opacity and interpretability tensions; jurisdictional renegotiation in professional work (Faraj et al., 2018; Lebovitz et al., 2022; Pachidi et al., 2021)
Generative AI	Synthetic production of text, images, code, audio, multimodal artefacts	GPT-5 0.1, Midjourney v6, Stable Diffusion XL, GitHub Copilot	Substantially diffused	Content abundance; computer programming; lowered creative and analytical barriers	Shift from production to curation; heightened verification and evaluative labour; challenges to authorship, originality and professional identity (Doshi and Hauser, 2024; Grimes et al., 2023; Susarla et al., 2023)
Agentic AI	Multi-step reasoning, task decomposition, tool use, autonomous sequencing of tasks	AutoGen, LangChain agents, MM-Agent (research), OctoTools (research)	Emerging adoption	Partial autonomy; orchestration across tools; simulation of cognitive workflows	Challenges to cognitive sovereignty; new accountability and governance architectures; hybrid human–AI reasoning systems; reconfiguration of authority in decision-making (Humberd and Latham, 2026; Leonardi, 2025)
Embodied AI	Physical manipulation, mobility, perception integrated with cognitive controllers (i.e., LLMs)	Tesla Optimus (prototype), Agility Robotics Digit (pilots), Sanctuary AI Phoenix (lab), Apptronik Apollo (pilots), 1X EVE (pilots)	Prototype / lab-stage	Physical task execution; embodied coordination; material presence in work environments	Labour substitution in physical roles; safety, compliance and liability concerns; reorganization of material workflows; transformation of spatial, sensory and affective dimensions of work (Liu et al., 2025; Sawik et al., 2023; Shibata and Wada, 2011)

THE 4 MODES OF AI: FROM DATA TO ACTION

The four distinct forms of modern artificial intelligence.



Predictive AI

Pattern recognition and forecasting.
Uses data for classification and fraud detection; focused on efficiency in routine analysis.

Generative AI

New content and creations.
Creates texts, images, and code, shifting the focus from production to curation.

Agentic AI

Autonomous planning and execution.
Uses tools and reasoning to autonomously organize and complete complex workflows.

Physical AI

Intelligence in a body.
Combines AI with robots for mobility and physical tasks in the real world.

https://doi.org/10.1111/joms.70063

NotebookLM

he four distinct forms of modern artificial intelligence.



Generative AI

New content and creations.
Creates texts, images, and code, shifting the focus from production to curation.



Agentic AI

Autonomous planning and execution.
Uses tools and reasoning to autonomously organize and complete complex workflows.



Physical AI

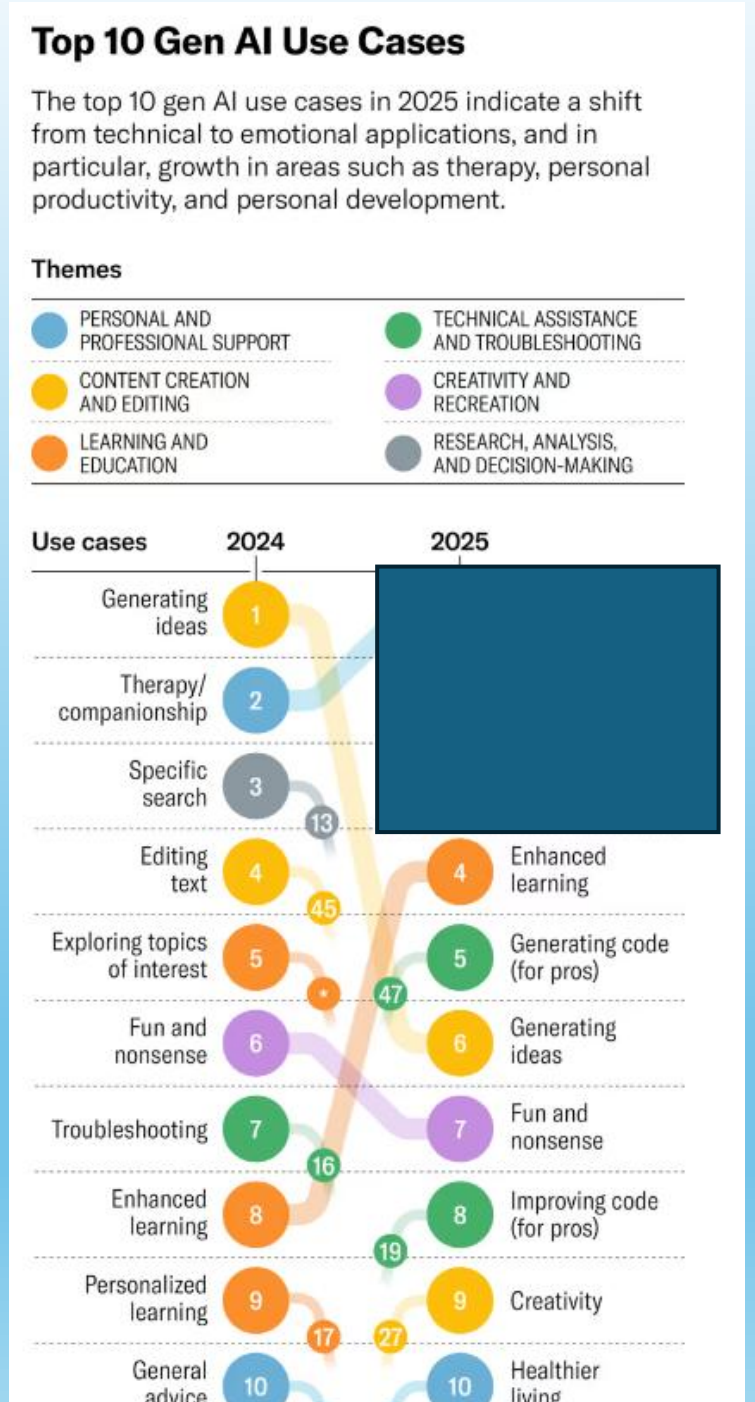
Intelligence in a body.
Combines AI with robots fo
mobility and physical task
in the real world.

Agentic AI

- **Custom GPTs → LLMs are fine tuned to the user**
- **The GPT knows the user → it knows you**
- **It is trained to figure out what you want to do**

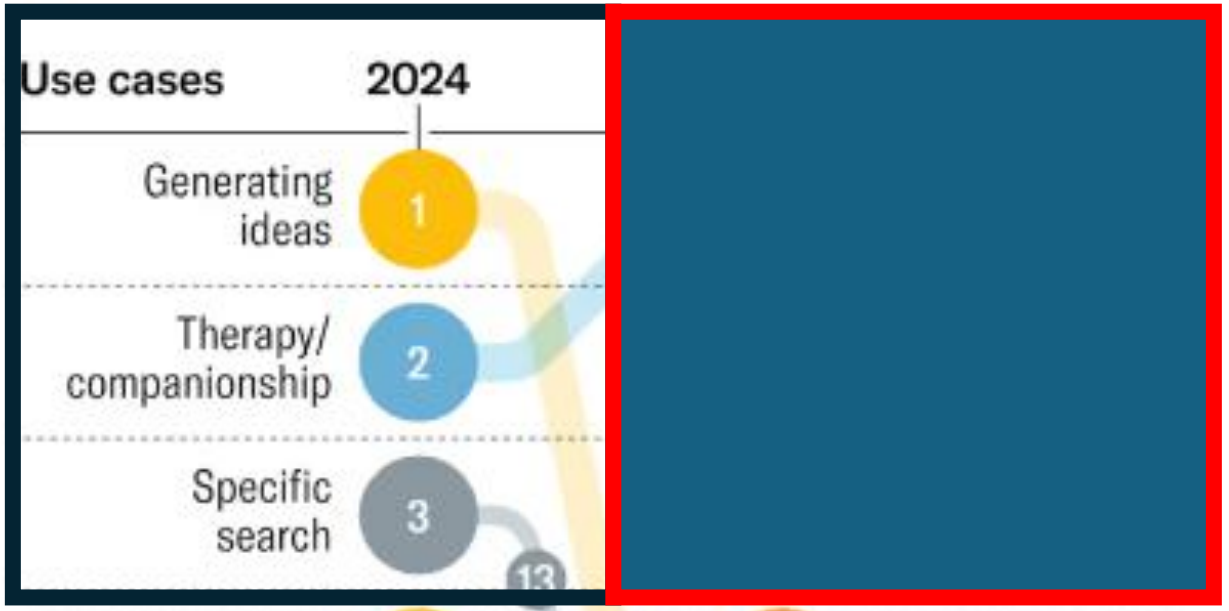
- **NOW YOU PROMPT AI→ WHEN WILL AI PROMPT YOU?**

How are LLMs used?



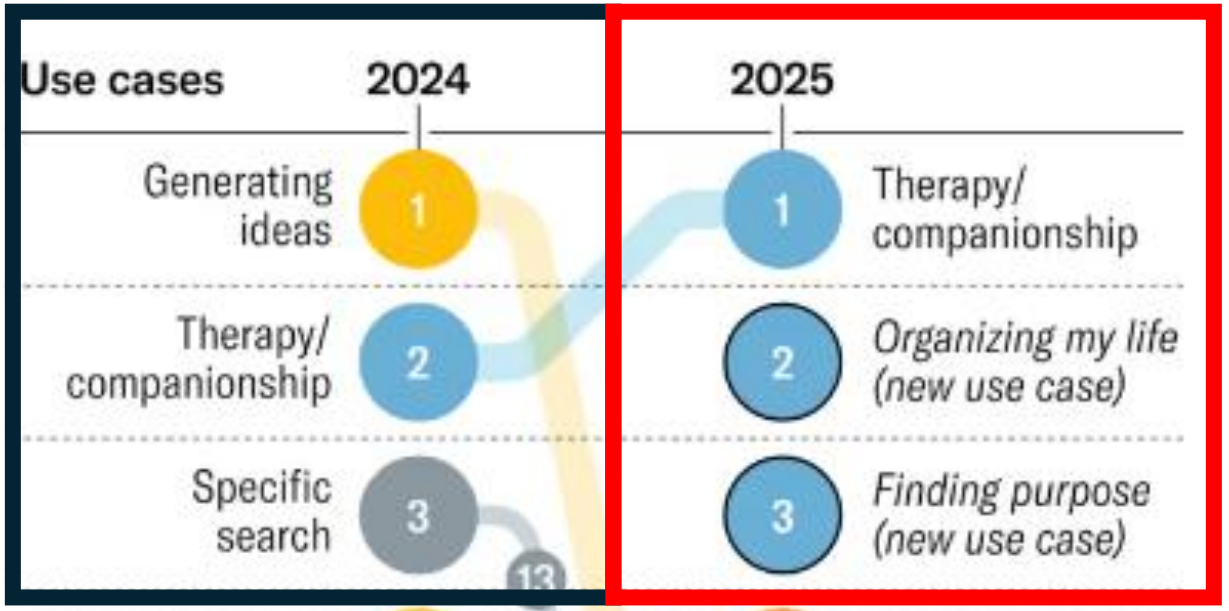
Themes

- PERSONAL AND PROFESSIONAL SUPPORT
- TECHNICAL ASSISTANCE AND TROUBLESHOOTING
- CONTENT CREATION AND EDITING
- CREATIVITY AND RECREATION
- LEARNING AND EDUCATION
- RESEARCH, ANALYSIS, AND DECISION-MAKING



Themes

- PERSONAL AND PROFESSIONAL SUPPORT
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?WHAT ARE POSITIVE COGNITIVE EFFECTS?

Cognitive Benefit	Evidence Type	Source
Reduced cognitive load	Quantitative (meta-analysis)	Nature, HSSC 2026
Improved academic performance	Quantitative (meta-analysis)	Computers & Education, 2024
Enhanced higher-order thinking	Quantitative (meta-analysis)	Computers & Education, 2024
Effective personalized tutoring	Quantitative (RCT)	Scientific Reports, 2025
Frees mental energy for complex problem-solving	Qualitative (review)	Bai et al., Brain-X, 2023
Motivation, self-efficacy, self-regulation	Qualitative (interviews)	STEL, 2025
Individualized feedback & critical thinking	Qualitative (position paper)	Kasneci et al., 2023
Independent learning & engagement	Qualitative (review)	BJGP, 2025

?WHAT ARE NEGATIVE COGNITIVE EFFECTS?

Table 1
Conceptual mapping.

Construct	Analytical nature	Temporal scope	Overlap/relationship	Definition & role
Automation bias	Cognitive predisposition	Pre-task/ persistent	Antecedent to uncritical acceptance	A cognitive tendency to privilege automated suggestions over one's own judgment; increases the probability of uncritical acceptance.
Uncritical acceptance	Proximal behaviour (task-level)	Immediate (single event)	Observable manifestation of automation bias	The observable, unverified endorsement or adoption of a particular AI output during task performance.
Cognitive offloading	Functional mechanism	Immediate (task-specific)	Facilitates short-term performance gains but can lead to habit formation	Delegation of specific mental operations (e.g., fact lookup, drafting) to external tools to reduce current cognitive effort.
Metacognitive laziness	Psychological state	Mid-term (habitual)	Reinforces repeated offloading and uncritical acceptance	A habitual reduction in self-monitoring/verification that normalizes frequent offloading.
AI-overreliance	Behavioural pattern	Mid-term (cumulative)	Formed by repeated uncritical acceptance + offloading	A recurring pattern of routinely outsourcing cognitive tasks without consistent independent verification.
AI-overdependence	Systemic state (harmful)	Mid-to-long term	Problematic when overreliance becomes pervasive across contexts	Sustained reliance that exceeds task-appropriate bounds and produces measurable adverse outcomes (e.g., persistent performance failure, systemic deskilling).
Deskilling/skill erosion	Distal outcome	Long-term (cumulative)	Result of sustained overdependence/ underpractice	Structural decline in the internal capacity to perform tasks independently due to lack of practice and degraded metacognitive processes.
AI misuse	Behavioural outcome	Variable	May co-occur with overreliance or low literacy	Unethical or inappropriate deployment of AI (e.g., cheating, unsafe use).

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Conceptual mapping.

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Automation bias	Cognitive predisposition	Pre-task/ persistent
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AI misuse	Behavioural	Variable

Cognitive Effects of AI use

Conceptual mapping.

Construct	Analytical nature	Temporal scope
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Deskilling/skill erosion	Distal outcome	Long-term (cumulative)
AI misuse	Behavioural	Variable

Cognitive Effects of AI use

Your Brain on ChatGPT: Accumulation of Cognitive Debt when Using an AI Assistant for Essay W

Nataliya Kosmyna [1]
MIT Media Lab
Cambridge, MA

Eugene
Cambri

Xian-Hao Liao
Mass. College of Art and Design (MassArt)
Boston, MA

Ashly Vivian
MI
Cambridg

DANGER FOR OUTSOURCING OUR THINKING...IS THAT WE SIMPLY THINK...less



Figure 1. The dynamic Direct Transfer Function (dDTF) EEG analysis of Alpha Band for groups: LLM, Search Engine, Brain-only, including p-values to show significance from moderately significant (*) to highly significant (***).

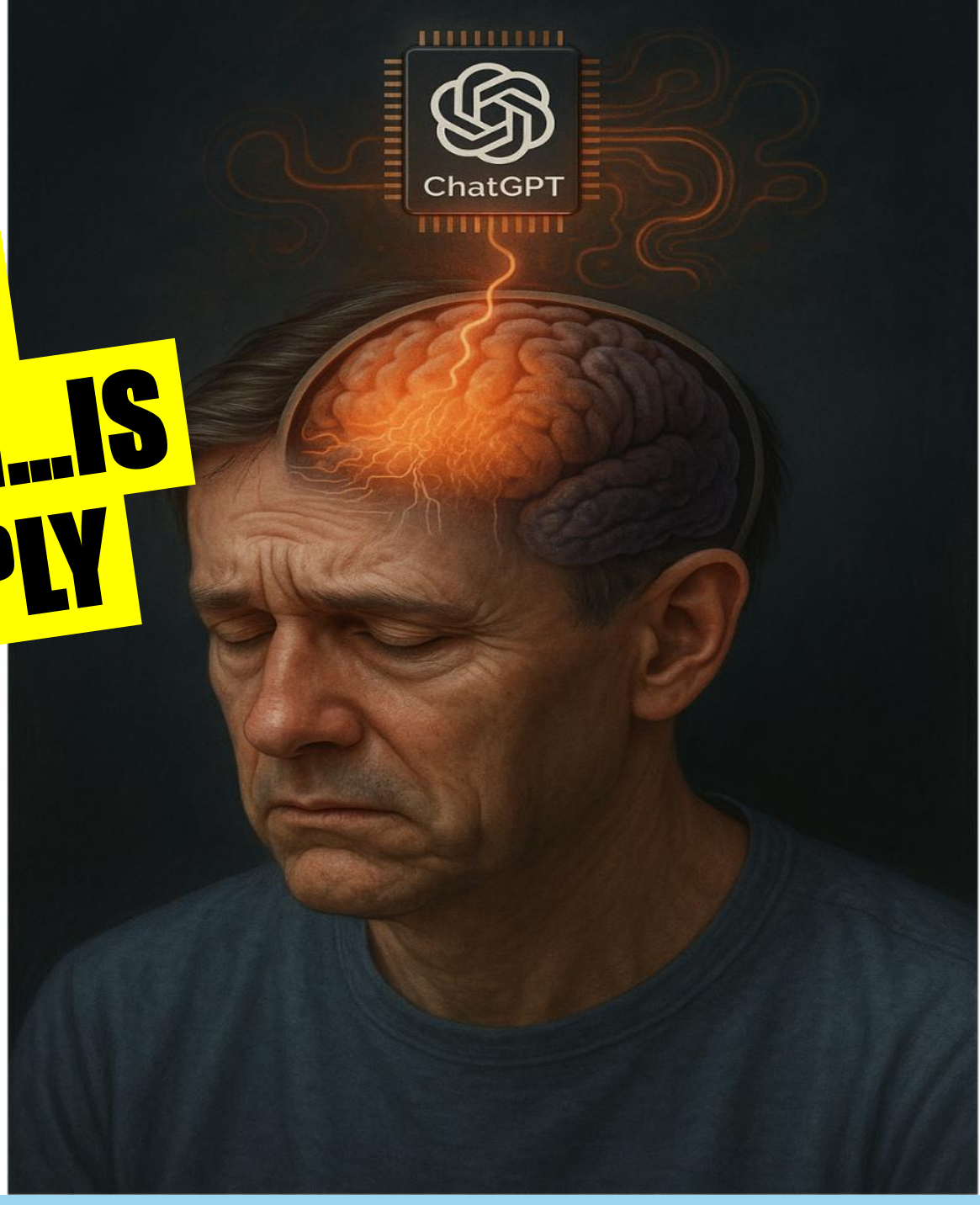


Table 4
Population-specific effects of AI-overdependence.

Category	Demographic Group/Factor Observed	Effects and Risks
Age-Based Demographics	Younger Individuals (e.g., Gen Z)	Higher dependence, lower critical thinking scores, less inclination for deep thinking.
	Older Individuals	Prefer traditional methods, believe they keep cognitive skills sharper; potential for higher

Population specific effects of LLM use

	Group/Factor Observed	
Age-Based Demographics	Younger Individuals (e.g., Gen Z)	Higher dependence, lower critical thinking scores, less inclination for deep thinking.
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	Individuals aged 26–35	Significantly higher risk of AI-induced decision-making

		potential for higher emotional dependence with extended AI interaction.
	Individuals aged 26–35	Significantly higher risk of AI-induced decision-making loss; not observed in older or younger age groups
Socio-Educational and Cultural Dimensions	Lower Educational Attainment	Higher concern about AI-dependence, potentially lacking critical thinking training to scrutinize AI

Evidence for AI-overdependence impact on cognitive decline and skills.

Category	Type of Evidence	Description of Finding	Supporting Literature
Direct Cognitive Decline	Reduced Critical Thinking/ Problem Solving	Negative correlation with AI use mediated by cognitive offloading; perceived reduction by users (though some studies show nuanced/ positive impacts).	(Essel et al., 2024; Gerlich, 2025a; Malik et al., 2024; Wang and Fan, 2025)
	Degradation of Decision-Making	Diminished abilities observed with overreliance on AI dialogue systems.	(Ahmad et al., 2023; Zhai et al., 2024)
	Impact on Memory	Damage to memory retention and cognitive functioning with excessive AI use; potential decline with overuse of tools such as ChatGPT.	(Bai et al., 2023; Hoskins, 2024)
Evidence Related to Skills	Deskilling	Inability to perform processes without AI tools; using AI as a substitute for human labor, decreasing self-efficacy, autonomy and expertise.	(Choudhury and Chaudhry, 2024; Macnamara et al., 2024; Puntoni et al., 2021)
	Leveling Effect	AI helps novices perform at expert levels, reducing the skill gap.	(Brynjolfsson et al., 2025; Crowston et al., 2025; Dell'Acqua et al., 2023)
	Illusions of Understanding	Learners develop false beliefs of greater understanding when using AI to assist skill development.	Macnamara et al. (2024)

Effects on cognition and skills

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DISCUSSION- talk to your neighbour



IN WHAT WAY ARE PEOPLE USING AI IN THE RIGHT VS WRONG WAY?

COGNITIVE SUSTAINABILITY

Sustaining mental resources for long-term well-being and performance in a complex world.

SO IF YOU USE AI THE RIGHT WAY YOU HARNESS THE POSITIVE WHILE MITIGATING THE NEATIVE…BUT THEREFORE WE NEED ROBUST MINDS

How do we develop robust individuals that can take autonomous decisions?

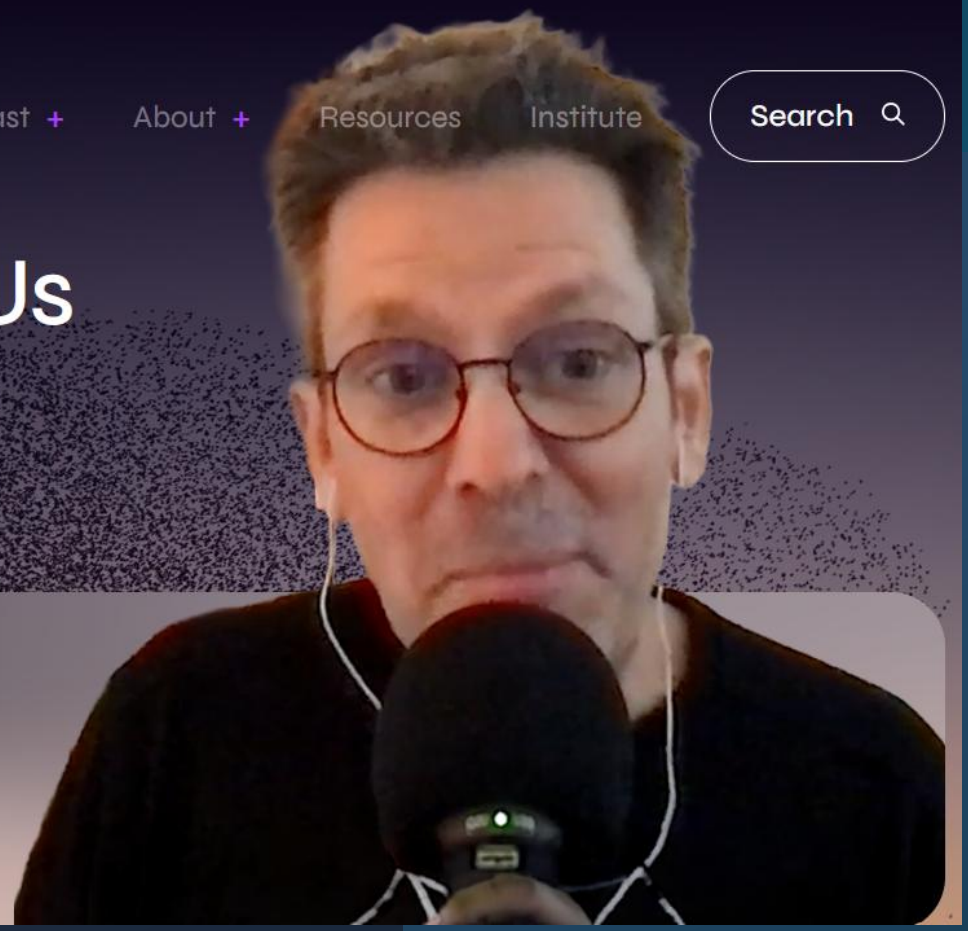
HOW DO YOU STAY SERENE IN CRISIS SITUATIONS?

The Great Simplification

Ep 230 | Olivier Hamant

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The Optimization Trap: Why Too Much Efficiency Makes Us Fragile



Check out this podcast

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WHAT IS ROBUST?

- **Not the same as resilience**
- **Resilience is when you fall you bounce back**
- **Robustness ensures…you do not fall☺**

- **We often create conditions for efficiency which is great!**
- **But when something unpredictable happens→ you can't improvise**
- **If we lean too much on efficiency we may be able to bounce back, but we may fall often**

ROBUSTNESS IS....

CIRCULARITY

COOPERATION

ROBUSTNESS IS...

- having the knowledge, skills and confidence to respond effectively when things don't go as planned.

- being able to critically and creatively use your existing knowlegde to come up with new solutionS beyond standard procedures and routines.

?How to develop robust minds in class?

- **Close the laptop at the beginning of the lesson and focus on existing knowledge**
- **Free writing**
- **Physical movement in the class room**
- **Post its and other creative old school tools**

- **Use AI as a braintorm companion**
- **Tell when NOT to use ai**
- **Use AI tools consciously & conscientiously**
- **Teach students about hidden costs AI**

?How is that related to jazz?



- **Improvisation vs choreographed music**
- **If you do not have any skills or abilities to play (perform ☺) you are not able to improvise**
- **If rules are very clear and defined, you do not need to be robust, you do not need to improvise**
- **BUT our world is not well defined, nor the problems we need to solve!**





If we cannot engage in autonomous decision making we are not cognitively sustainable and we won't find solutions to small and big challenges ahead→ whom to love vs climate change

angoan.nl/download



?QUESTIONS?