University of Maribor

Faculty of Education

University of Maribor

Faculty of Natural Sciences and Mathematics

The use of artificial intelligence in education in Slovenia

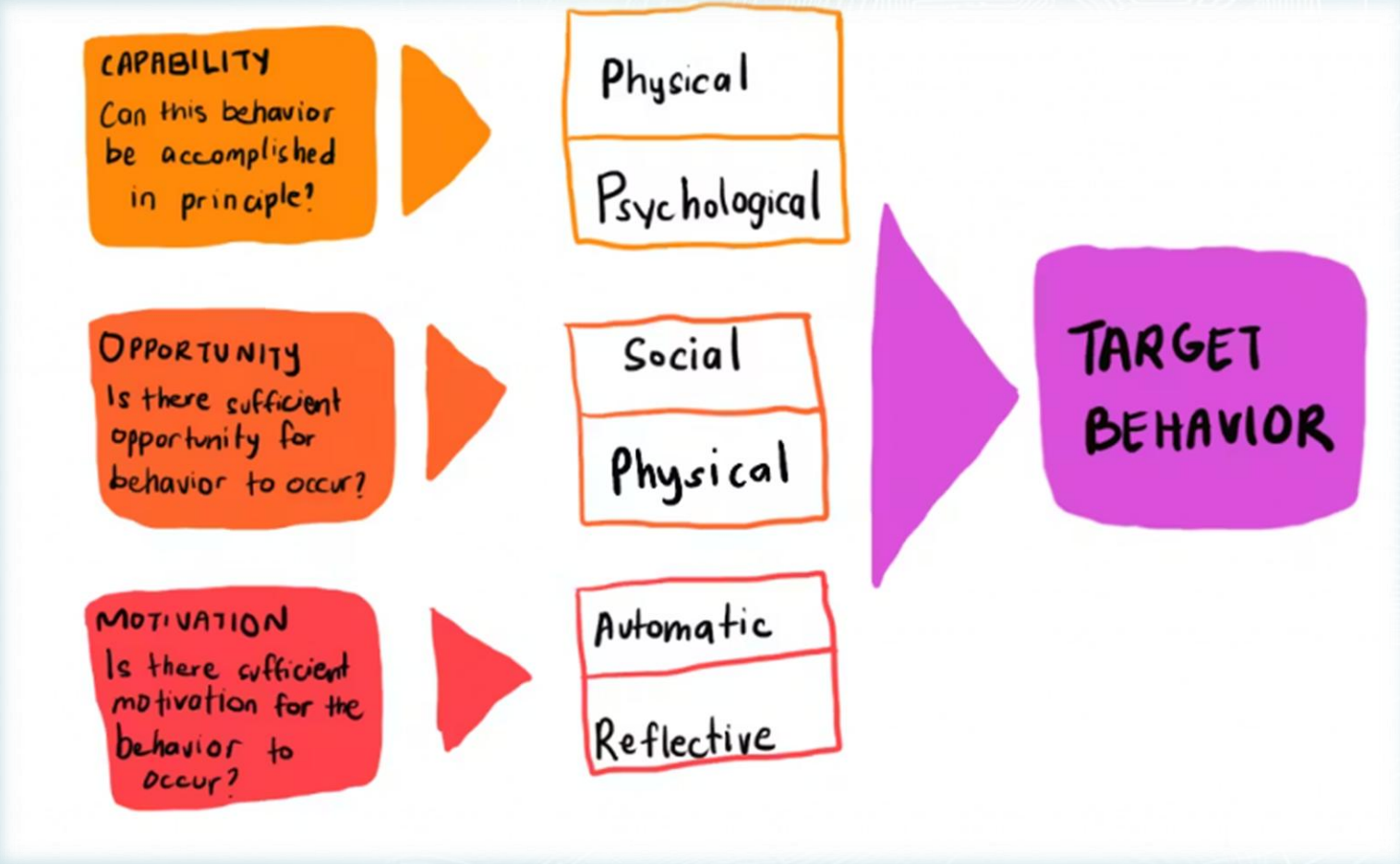
Associate prof. dr. Kosta Dolenc

University of Maribor, Faculty of Education, Faculty of Natural Sciences and Mathematics



AI in STEM education – online 26. 3. 2026

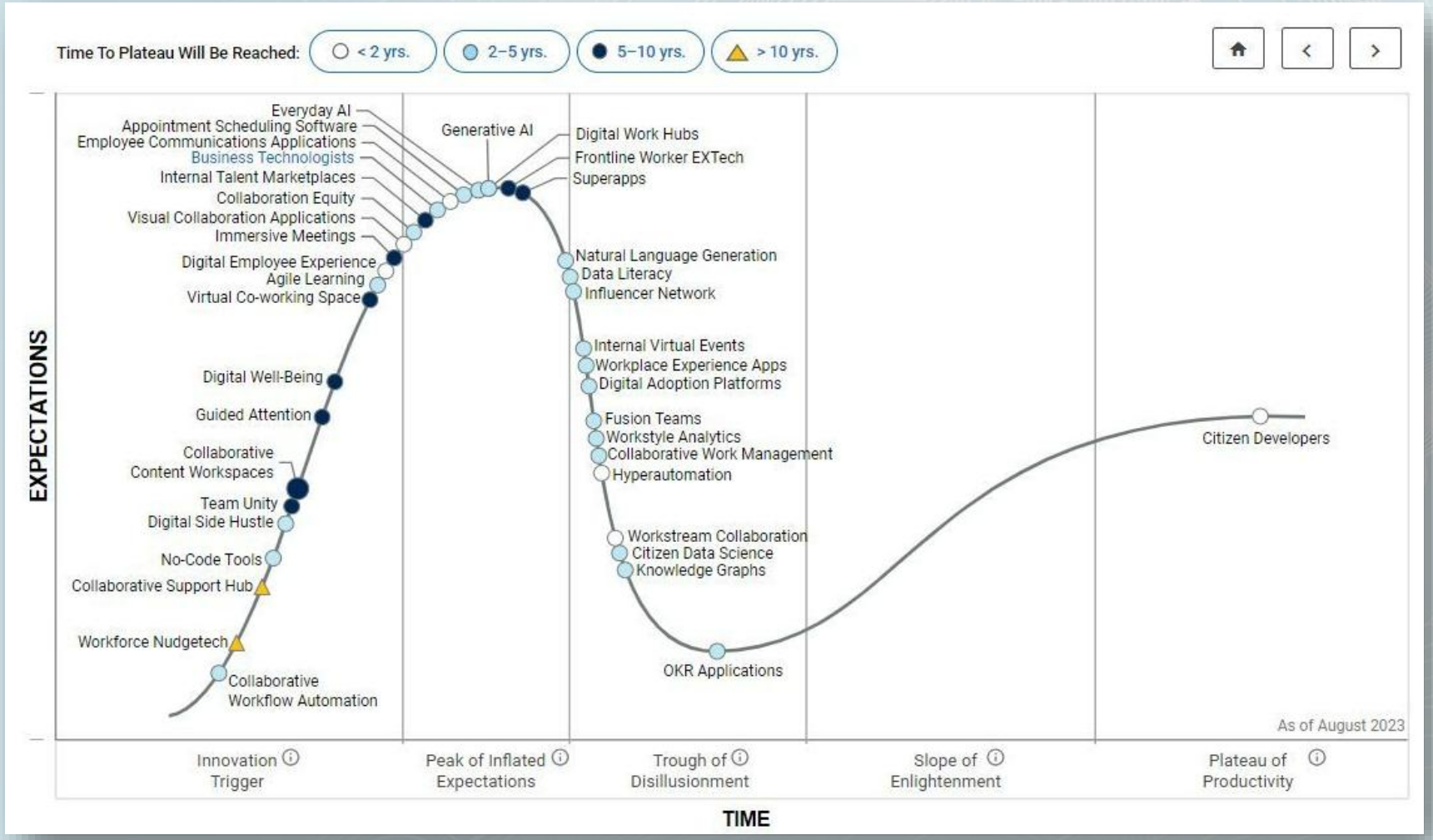
Why implementation matters more than imitation



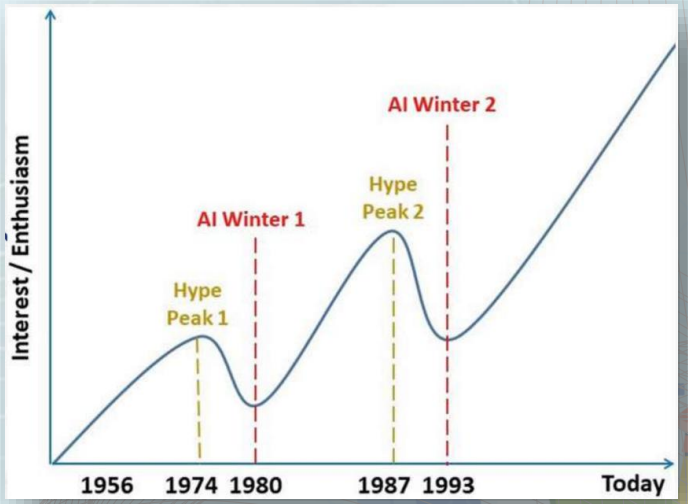
Many people expect a session like this to give them ready-made AI activities they can take straight into the classroom. But education does not work that way. A good example is never just an example — it only works when capability, opportunity, and motivation are in place.

Good examples do not transfer automatically — good principles do.

Enthusiasm and expectations (AI hype)



Gartner's graphical model: assessing the maturity and adoption of new and emerging technologieshttps://shorturl.at/ikowD



What is GenAI – what we know for sure

Based on algorithms and data, not human experience

Often acts as a "black box" as decision-making mechanisms are not fully understood

Learns patterns from massive amounts of data

Produces probable answers, not guaranteed facts

Does not understand or feel like a human being



What users need before using GenAI

- Information and data literacy
- Digital literacy
- Computational thinking
- Ethical literacy
- Domain knowledge
- Basic understanding of AI



AI ethics is really about human ethics

When we talk about “the ethics of AI”, we often assume that machines must be taught what is right.
But first, we need to clarify something:

Values we defend

Which values are we willing to defend, even when many things are technologically possible?

Rights over information

Who should have the right to collect, train on, and use data?

Protection of the vulnerable

How do we protect those with less power — children, vulnerable groups, minorities, and cultural creators?

The cost of responsible technology

Are we willing to pay the price for technology that is more humane and more sustainable?



AI is a mirror: it magnifies, speeds up, and automates what is already in our society.

GenAI initiatives at the University of Maribor

Kompetenčni center SETCOM



Norway Grant - SETCOM
(AI and social-emotional learning)

GEN-UI: GenAI in education
A consortium of educational institutions across Slovenia and more than 100 development schools. Guidelines for the meaningful use of generative AI in teaching and learning.

AIDL DATA LITERACY IN THE AGE OF AI FOR EDUCATION
AI-Enable
AI4T AI FOR TEACHERS

Supporting Erasmus+ projects

- **AI-ENABLE** - Inclusive higher education with
- **AIAI4T** - Artificial Intelligence for and by Teachers
- **AIDL** - Building data-literate, GenAI-aware citizens

AI Edu&Art Lab

AI tutors for employees at the Faculty of Education

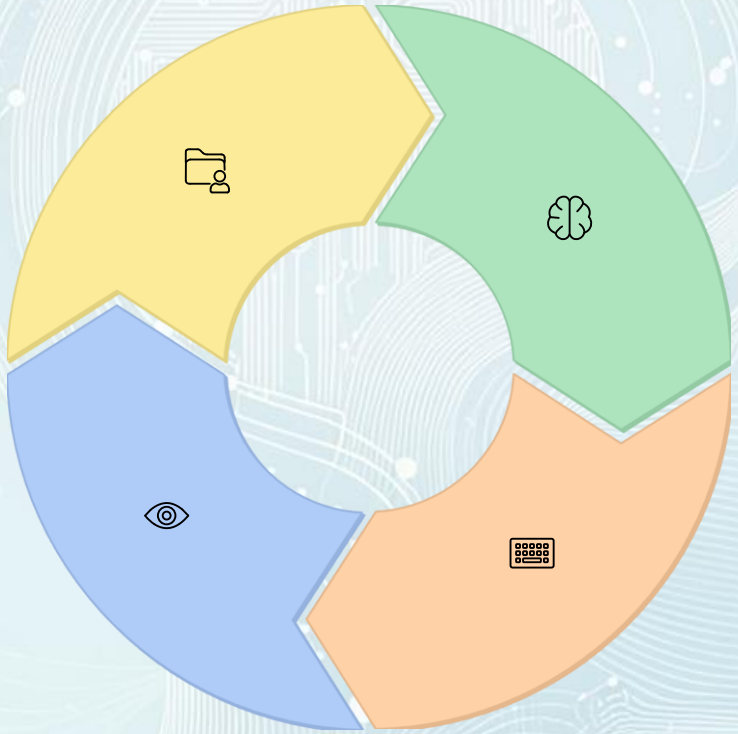
- Scientific research
- Teaching
- Artistic work
- Administrative work

1. Individual consultations
2. Regular AI updates
3. Training in staff meetings
4. Access to tailored AI applications
5. Faculty guidelines

Why errors occur when using GenAI

Data / Training

Biases, errors, cultural frames



AI Model

Hallucinations, statistical prediction, ambiguity

User - Output

Uncritical trust, ignorance, misuse

User - Input

Vague questions, implicit expectations

Mistakes do not come only from AI or human error. They result from a combination of human and machine limitations, together with the context in which AI is used.

A typical GenAI failure: fluent, structured, and completely off-target.

How to improve a paper chopper for the first grades of elementary school

Here are some suggestions on how to improve a paper helicopter for the first grades of elementary school:

- Use stronger paper. Regular stationery paper may be too thin for a helicopter to float in the air. Instead, use stronger paper, such as cardboard or scrapbook paper.
- Add more support. To make the helicopter hover longer, you can add more support. This can be done by gluing small pieces of paper or cardboard to the bottom of the chopper.
- Design the helicopter more aerodynamically. If the chopper is too heavy on one side, it will quickly turn around. Try to design the chopper more aerodynamically by giving it smoother lines and reducing weight.



Mini checklist to avoid errors (human or AI)

Before you click „Copy"

1. **Do I understand what I'm copying?**
   If I can't explain it in my own words, I don't really understand it.
2. **Do I have at least two independent sources for the key claims?**
   One source is not enough for fact-checking.
3. **Have I clearly stated the context and limitations?**
   Who is this for? What should AI not do here?
4. **Is the cost of error error low or high?**
   When the stakes are high, AI should not be the final authority.
5. **Could I do this without AI?**
   If yes, would I learn something valuable by doing it myself?

If your answer to even one of these questions is “I don’t know” or “no,” that is a red flag. You may be one step away from AI-generated nonsense.

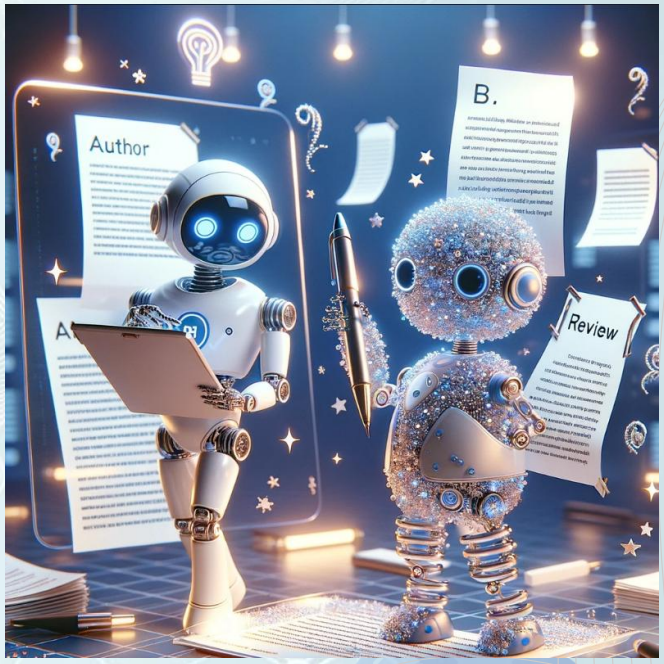
Before we start using AI (applied to ICT too)



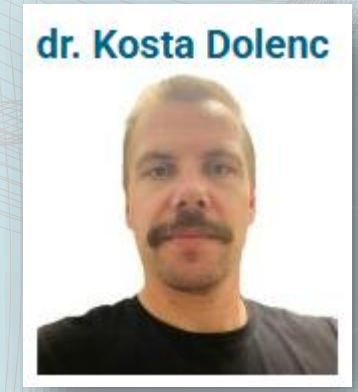
Use a separate email address.
Create a new email address that is not linked to your personal information.



Protect your data.
Do not share personal data or any data you do not want to be processed.



Keep human authorship.
AI should review, suggest ideas, and propose corrections — not replace the author.



Advice:

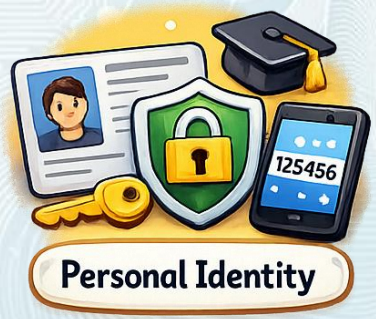
To survive in the digital world, you need at least four email addresses.

Because "one email for everything" is a speed run to spam and chaos.



Use for: work, school, internal tools, official communication.
Rule: *No newsletters. No shops. No "10% off" sign-ups.*

name.surname@school.com



Use for: government services, banking, healthcare, education, critical accounts.
Rule: This is basically **part of your identity** → strong password+2FA.

name.surname@gmail.com



Use for: online stores, loyalty cards, utilities, insurance.
Rule: Keep it separate from your identity inbox.
Benefit: marketing stays contained.

surname123@gmail.com



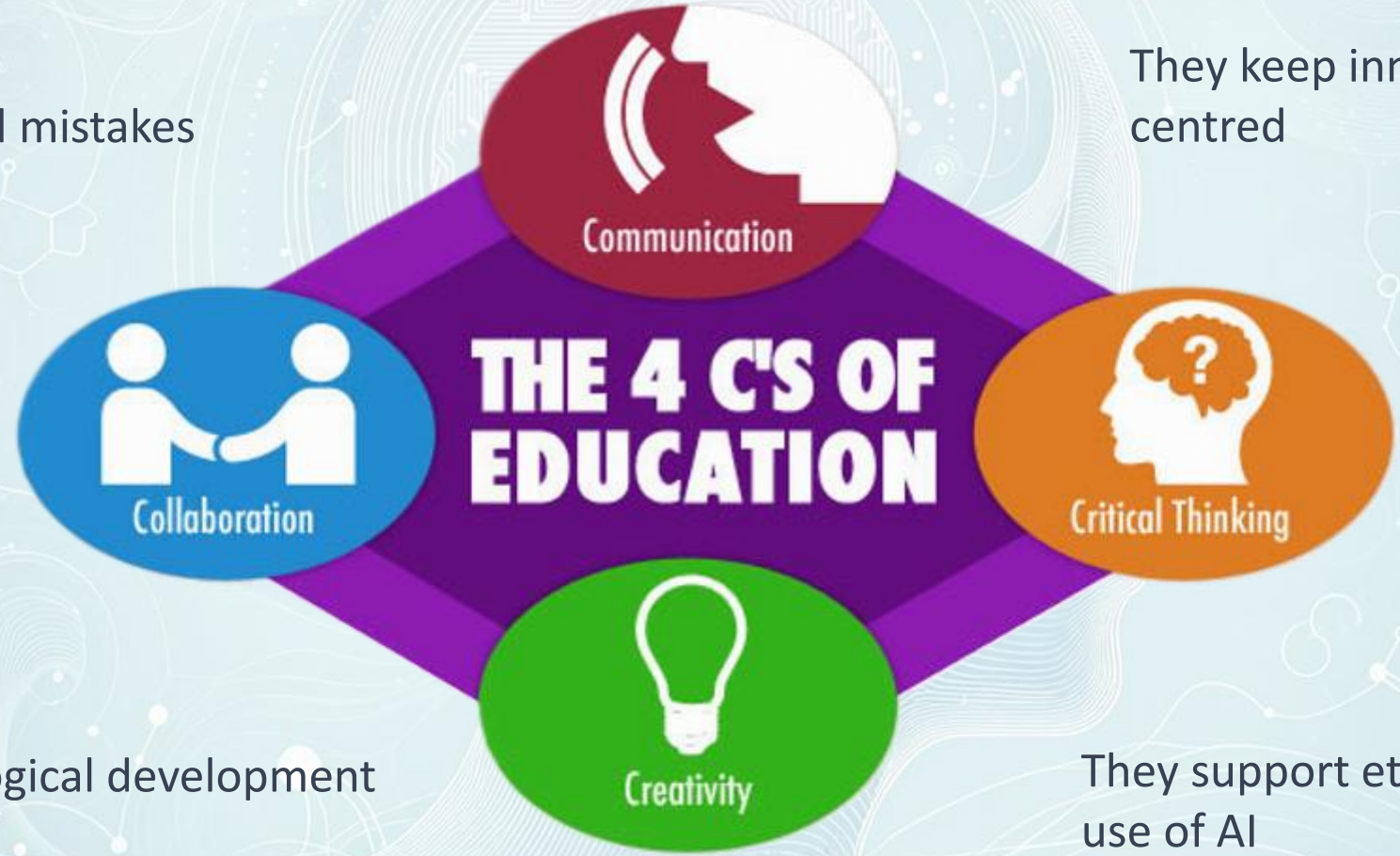
Use for: trials, downloads, "give us your email to continue", experiments.
Rule: *Nothing personal. Nothing important.*

Buterfly756@gmail.com

What matters more than GenAI

They reduce AI-related mistakes

They keep innovating human-centred



They balance technological development

They support ethical and sustainable use of AI

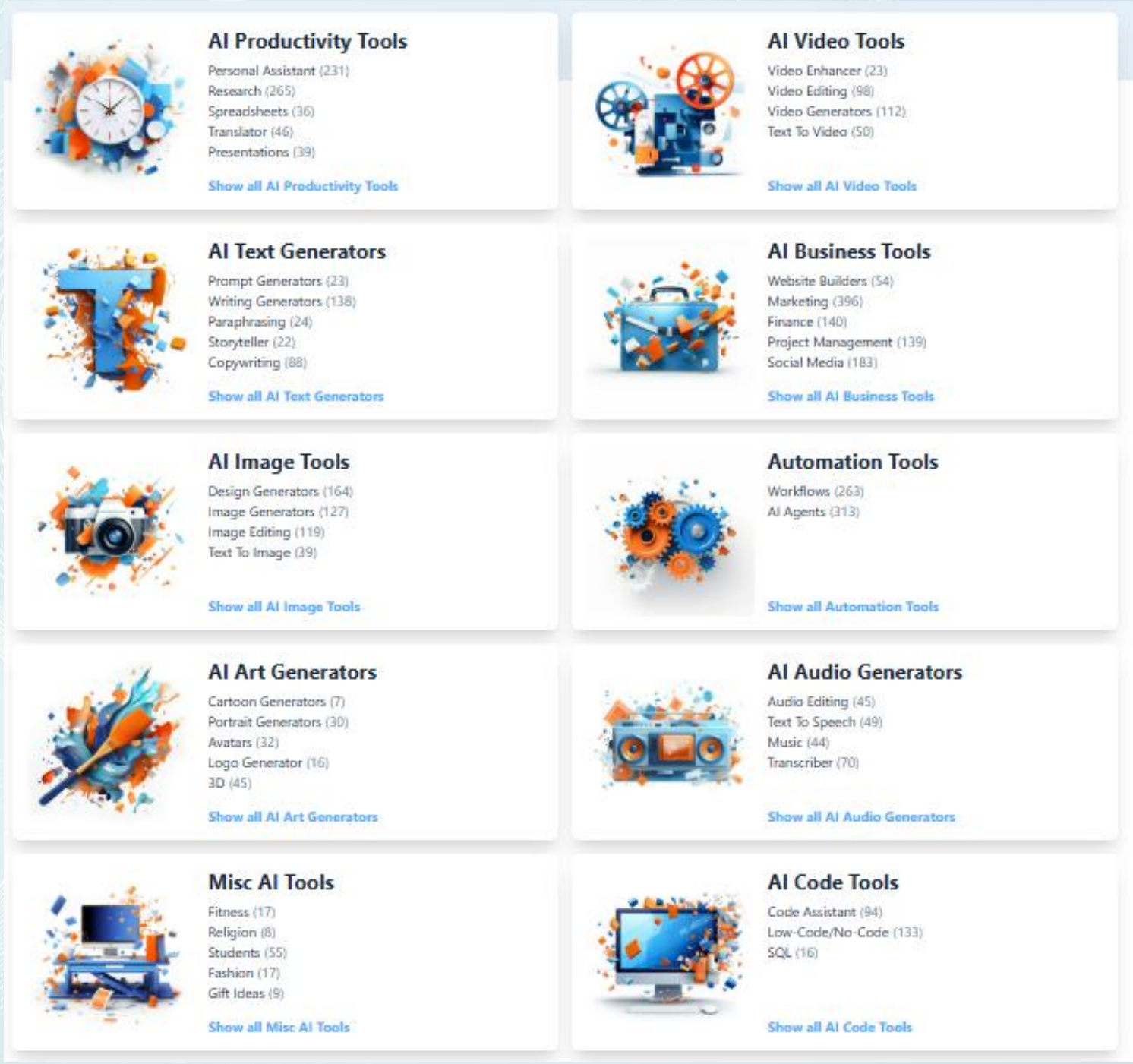
Where to search

Futurepedia

One of the best websites for UI applications in which we can search by different categories

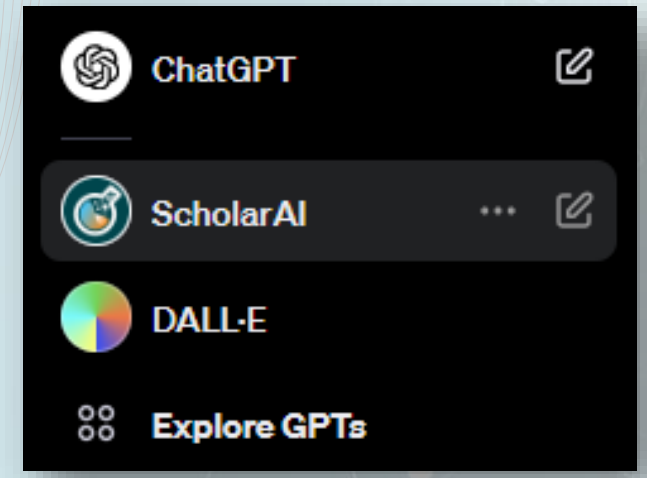
TopAI.tools

One of the largest websites for UI applications



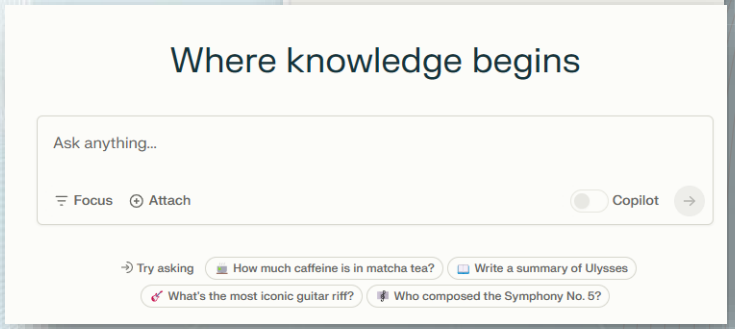
Always check with source outside of AI !!!

Chatbots

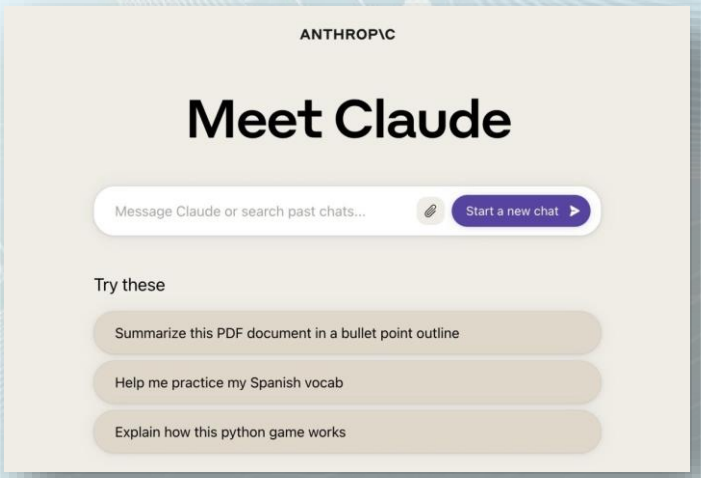














What about deepseek

Imagine a AI chatboot (gpt, bard, …) a teacher who has read billions of texts and developed a deep understanding of the content.

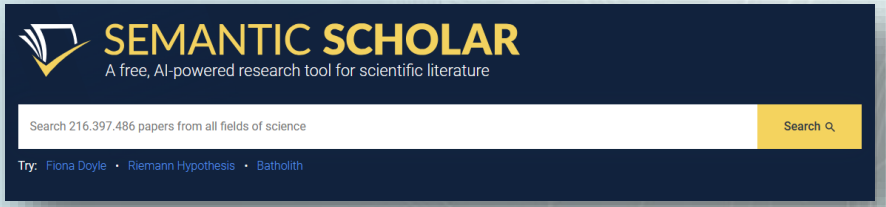
Deepsek is a student who learns directly from this teacher - he does not read the entire library, but receives already structured and processed knowledge (*cost efficient, but with flaws in knowledge and without personal innovativnes and critical thinking*)

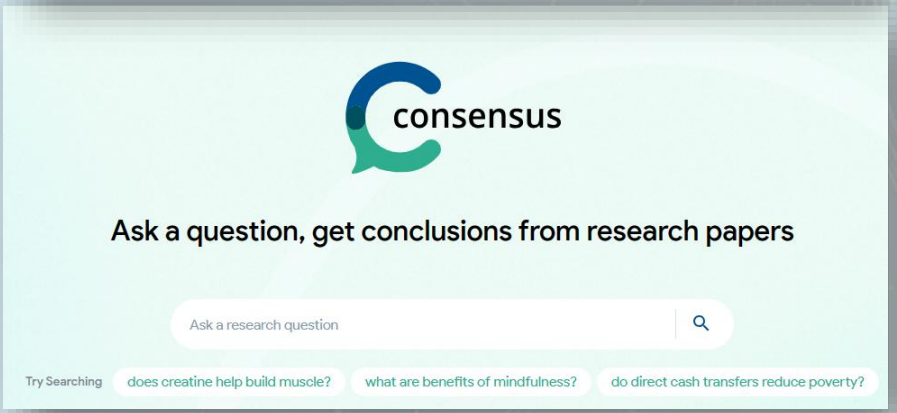


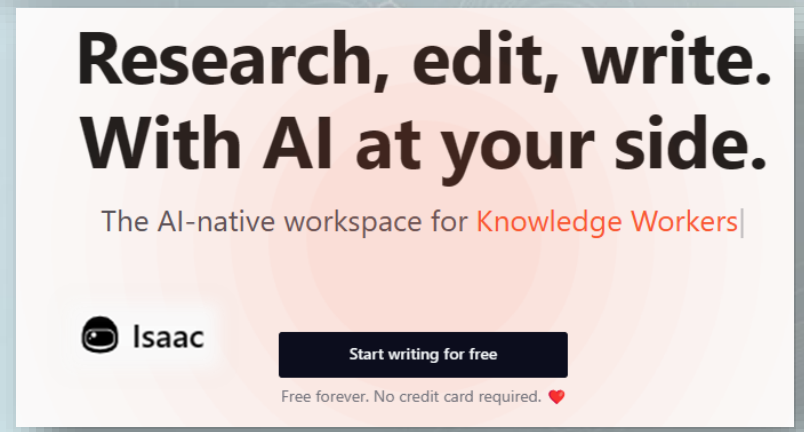
If you can‘t afford to buy a lunch, a snack is a good idea otherwise it‘s not worth it.

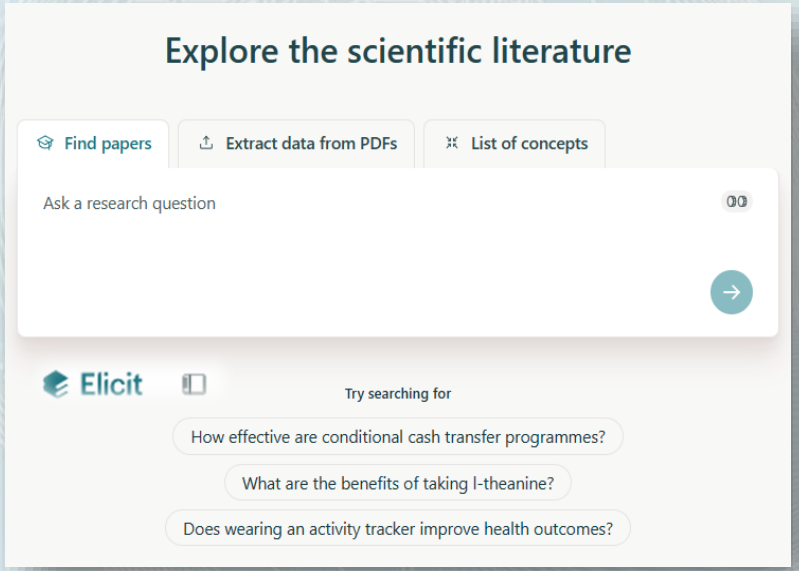
Always double check the references !!!

Research work

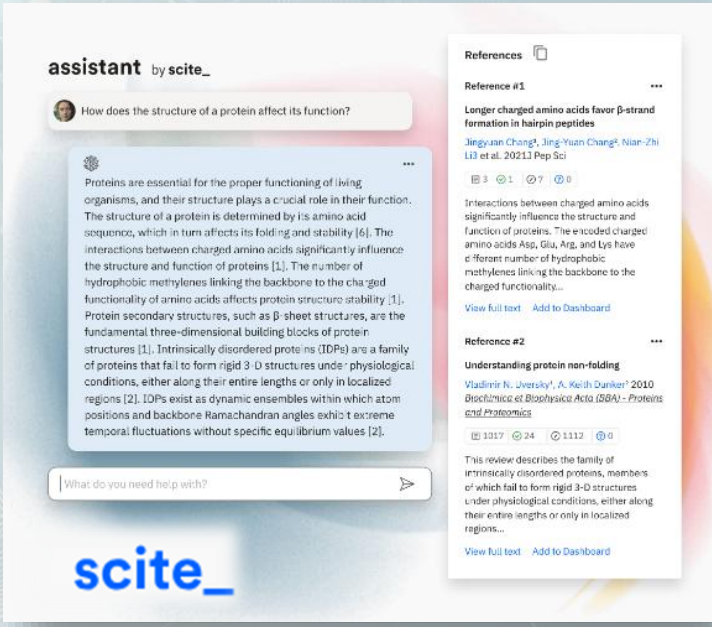




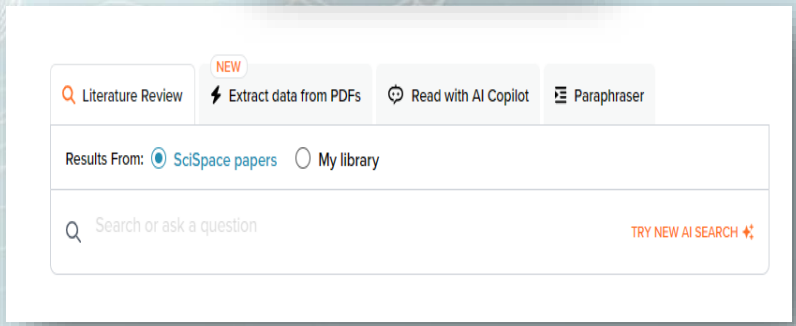












Consensus

Is computational thinking effective in learning through gamification in elementary school?

Pro · 2 steps · 20 sources >

Yes, **gamified approaches to computational thinking can effectively support learning** in elementary school, especially for CT skills and motivation.

Is gamification effective for developing computational thinking in elementary school students? N = 9



Yes	89%	
Possibly	0%	
Mixed	0%	
No	11%	

All details

FIGURE 1 Research consensus on gamification and CT effectiveness

Effects on Computational Thinking and Academic Skills

- A systematic review of 61 studies on educational programming games in primary education found that **most reported positive effects on CT skills and basic programming concepts**, with no negative impacts and only a few null results 14.
- Game-based environments like **Zoombinis** improved CT practices in grades 3–8; more gameplay and stronger in-game CT behaviors predicted higher external CT assessment scores 4.
- An adaptive CT game (AutoThinking) with elementary students significantly improved **both CT conceptual knowledge and skills**, outperforming a traditional tech-enhanced condition 6.

Of course, before asking the question, it is necessary to know what computational thinking is, what gamification is, and many other things.

Summary Table

Outcome	Typical effect of gamified CT	Citations
CT skills / concepts	Often significantly improved	2 4 6 12 14 16 18
Motivation & engagement	Consistently higher	2 10 12 14 18
Self-efficacy in CT	Frequently increased	2 8 16 18



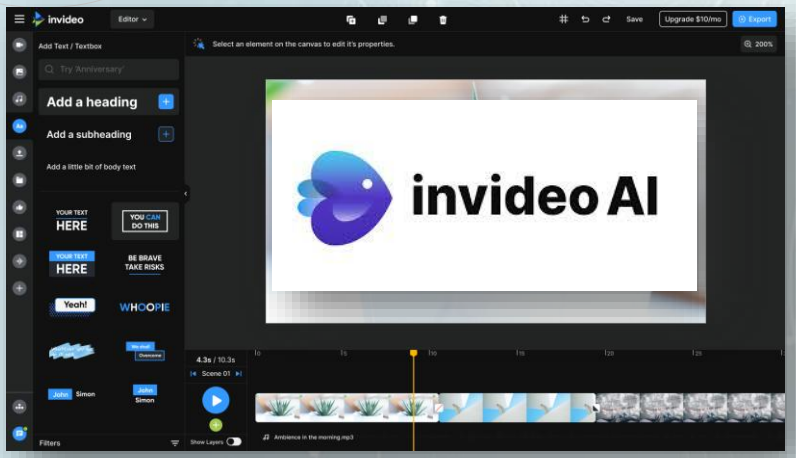
Writing papers with AI is …

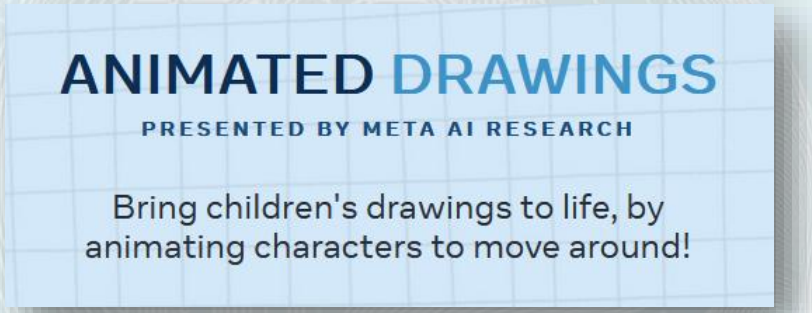
Referenca (kot si jo navedel)	Status	Kaj je narobe / opomba
Aaltonen, K., Kujala, J., Havela, L. and Savage, G. (2022) Stakeholder dynamics and value creation in project management, *International Journal of Project Management*, 40(5), 395–409.	❌ Neujemanje	Kombinacija avtorjev/leto/članek v IJPM 40(5) ni potrjena; "Stakeholder dynamics …" pri Aaltonen et al. se pojavlja kot **Project Management Journal (2015)**, ne IJPM. eprints.whiteros…
Adamantiadou, K. (2025) Artificial intelligence in project management… *Technological Forecasting and Social Change*, 198, **123456**.	❌ Ne obstaja v tej obliki	Številka **123456** deluje kot "placeholder"; avtorica obstaja, ampak članek je v drugi reviji. MDPI
Adewusi, O., Komolafe, A., & Adebayo, T. (2024) … *Journal of Business Research*, 162, 113824.	⚠️ Nisem našel potrditve	V iskanju po naslovu + številki članka (113824) nisem našel sledi v JBR (možno napačen naslov/avtorji/letnik).
Ahern, T., Leavy, B., & Byrne, P. J. (2023) Sustainability-oriented project management… *IJPM*, 41(3), 302–316.	❌ Neujemanje	Avtorji Ahern/Leavy/Byrne imajo IJPM članek, ampak je **2014** in z drugim naslovom (ne ESG-integracija, ne 2023). Academia +1
Ahmed Hashimzai, S., & Mohammadi, M. (2025) AI adoption in project management… *IJPM*, 43(2), 215–231.	⚠️ Nisem našel potrditve	V iskanju po naslovu/avtorjih + IJPM ni zadetkov; pojavljajo se druge objave s podobnimi temami, ne pa ta IJPM navedba. Undiknas Journal +1
Ainslie, A., Thompson, J., Maynard, T., & Ahmad, R. (2023) Digital ecosystems and enterprise integration. *Journal of Enterprise Information Management*, 36(6), 1294–1312.	❌ Neujemanje	Kombinacija avtorjev + naslov + JEIM ni potrjena; isti avtorji se jasno pojavljajo pri članku o **cyber-threat intelligence** v **Computers & Security**, ne JEIM. SCIRP
Aldoseri, A., Al-Maliki, A., & Khalifa, S. (2023) Ethical AI governance… *AI & Society*, 38(2), 547–561.	❌ Neujemanje	Ne najdem tega članka v AI & Society z navedenimi stranmi; Aldoseri ima 2023 članek drugje (npr. MDPI *Applied Sciences*), ne pa točno to v AI & Society. MDPI

Always keep in mind that, as the user (author), you are ultimately responsible for any AI-generated content you produce.

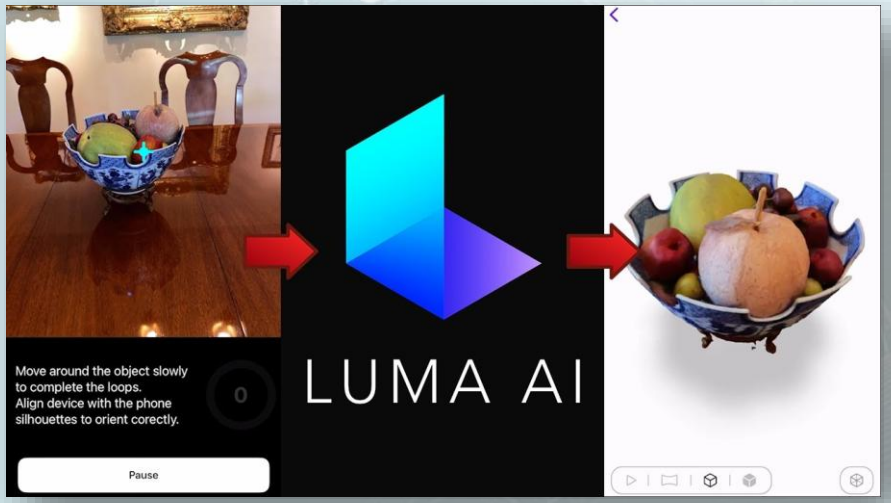


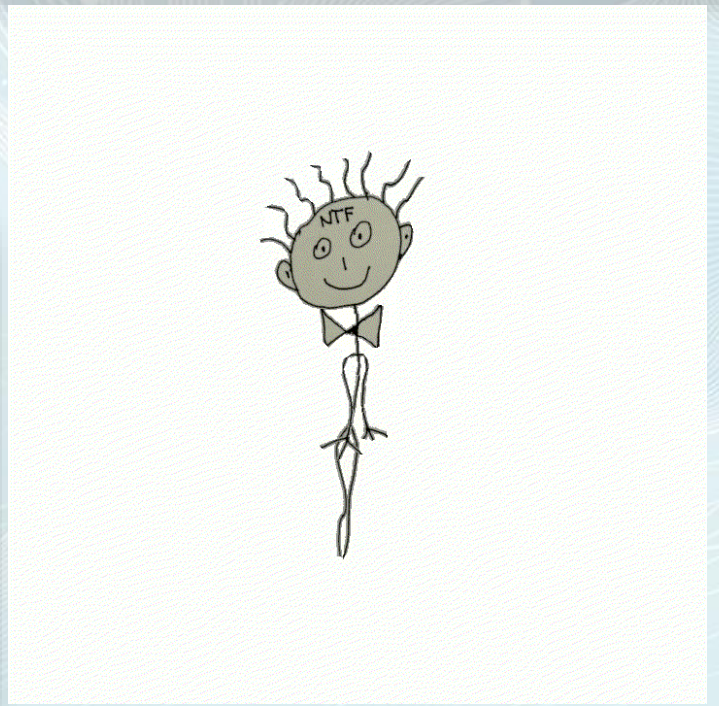
Pictures and video

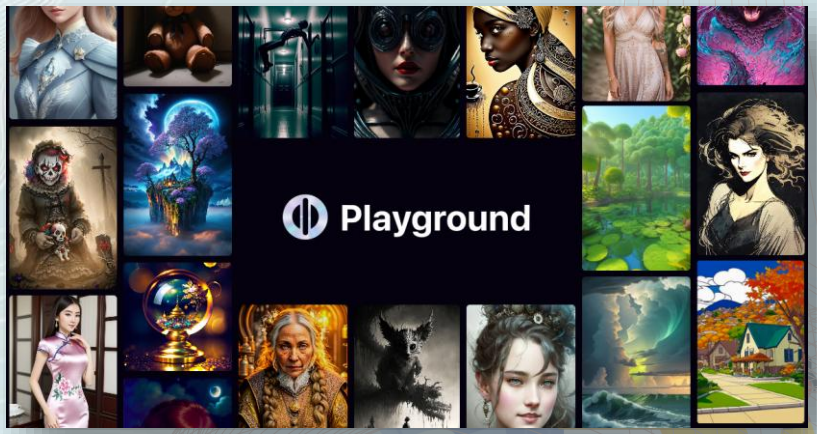




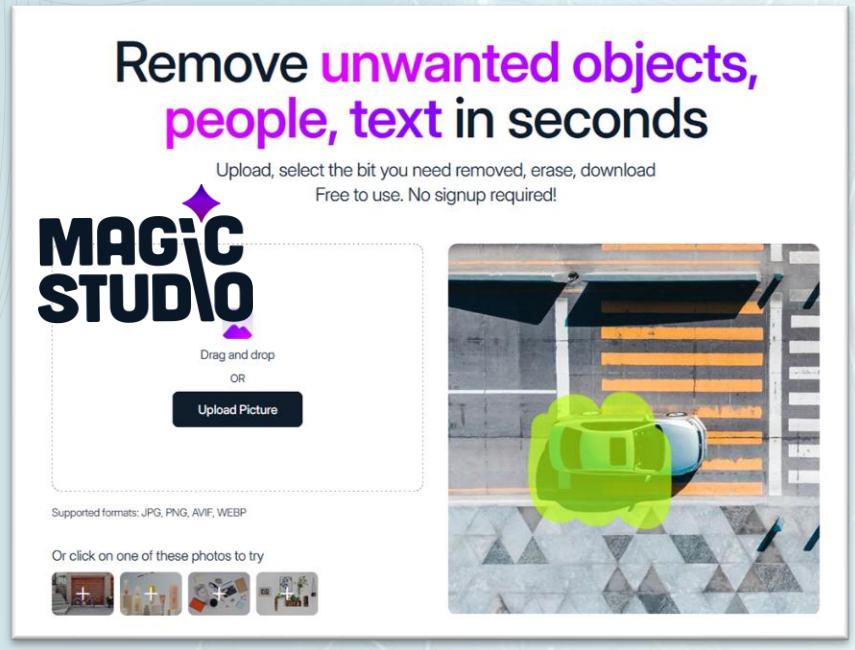


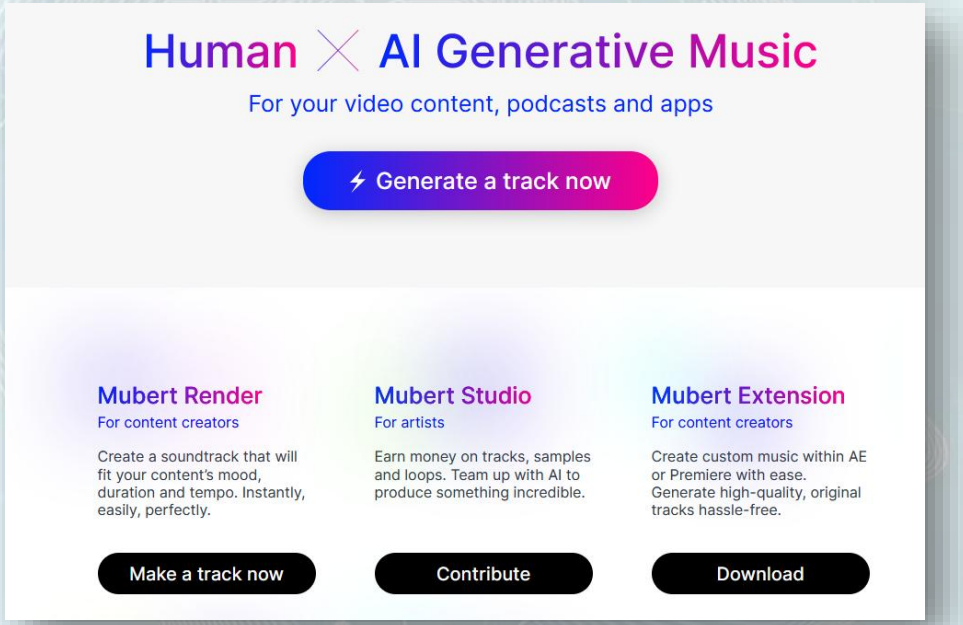


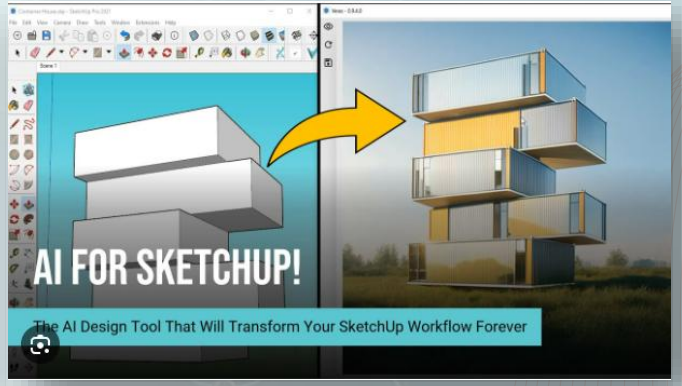


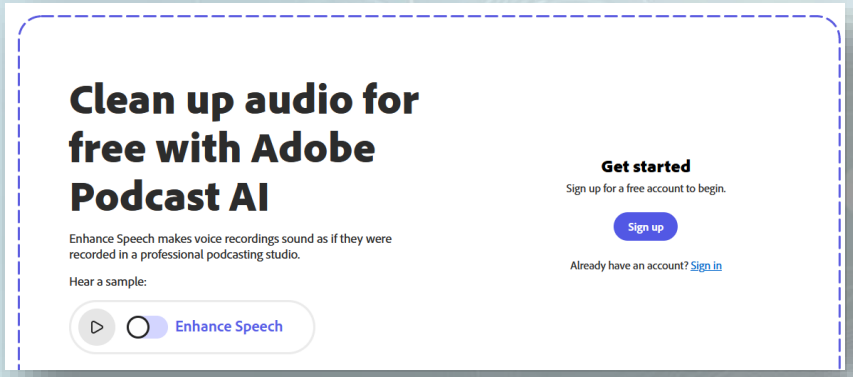


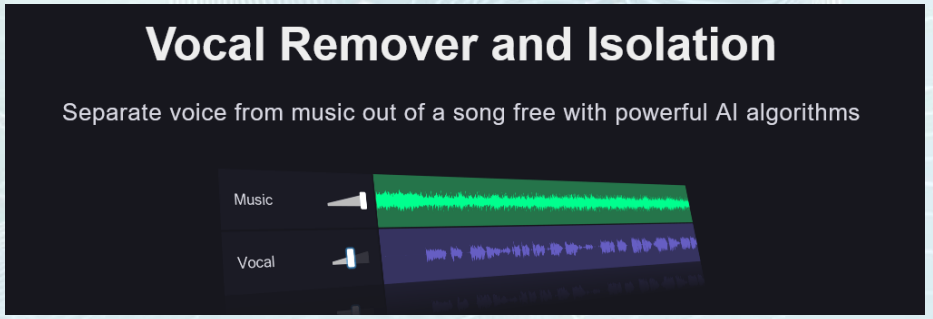
Noteworthy

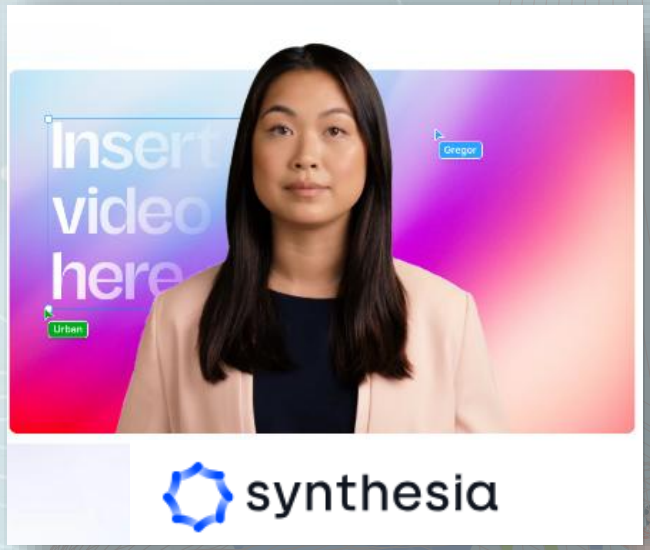

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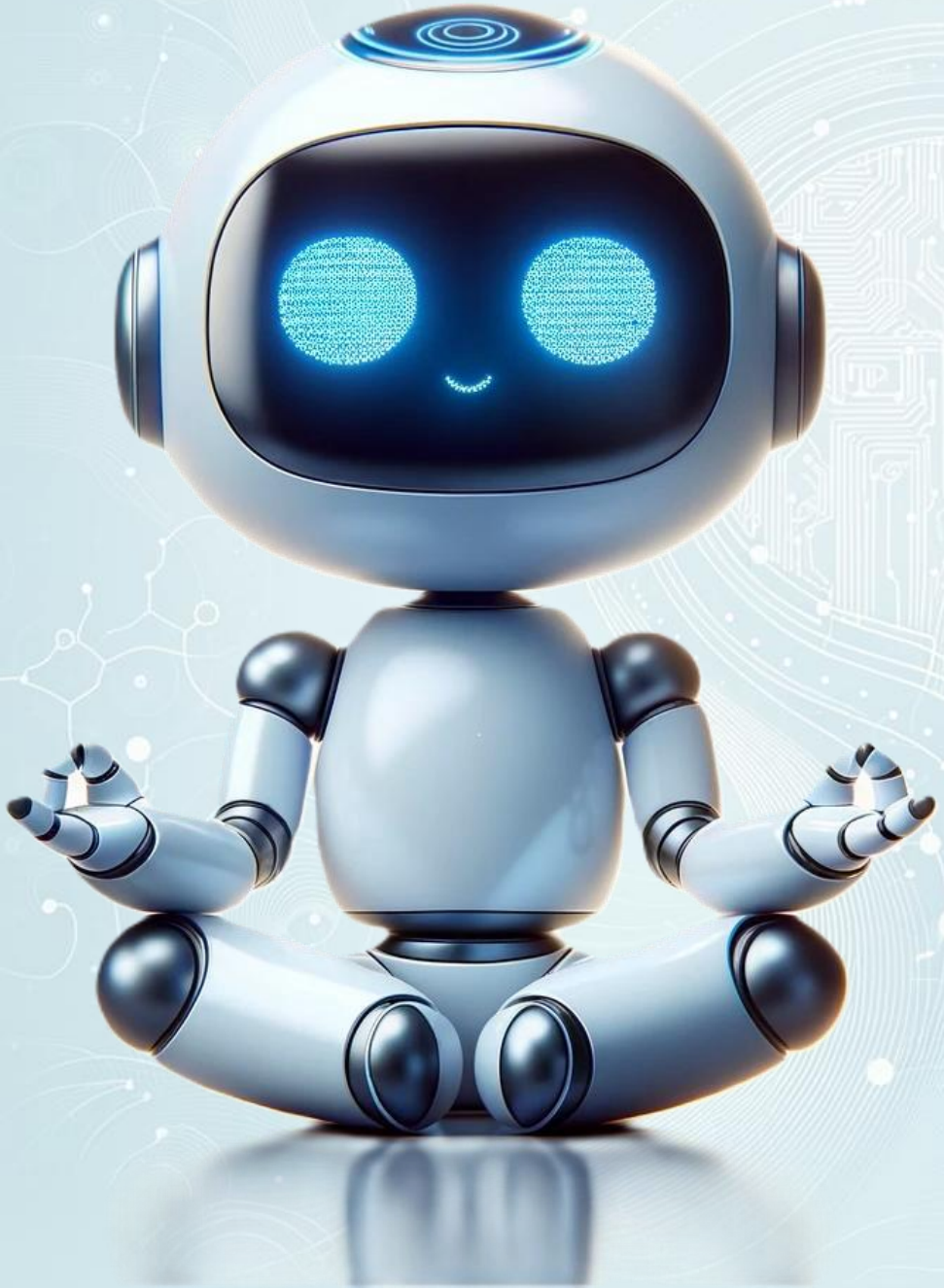

Human AI Generative Music
For your video content, podcasts and apps
Generate a track now
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Create a soundtrack that will fit your content's mood, duration and tempo. Instantly, easily, perfectly.
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