GenAI in the Classroom

Koen van Elsen & Jacqui Edwards

Lunchtalk: AI in the classroom

- how to effectively integrate AI into classroom learning activities. We explore practical, research-informed examples of AI use in higher education including what supports learning and what does not.

- **You will:**

- Discuss practical strategies for using AI in your own courses

- Learn what current research says about AI in the classroom

- See concrete examples of AI-supported learning activities

Bio Jacqui Edwards

j.edwards@uva.nl

- Trainer/Educational advisor at TLC Central and AI Living Lab (contact: ai-tlc@uva.nl)
- BKO Instructor at FEB and FMG
- Developer of the BKO+ Track "Responsible AI in Education"

Teaching & Learning Centre

Bio Koen

k.m.j.vanelsen@uva.nl

- AI Living Lab Innovatie TLC Centraal (contact: ai-tlc@uva.nl)
- Adoptieregisseur onderwijstools
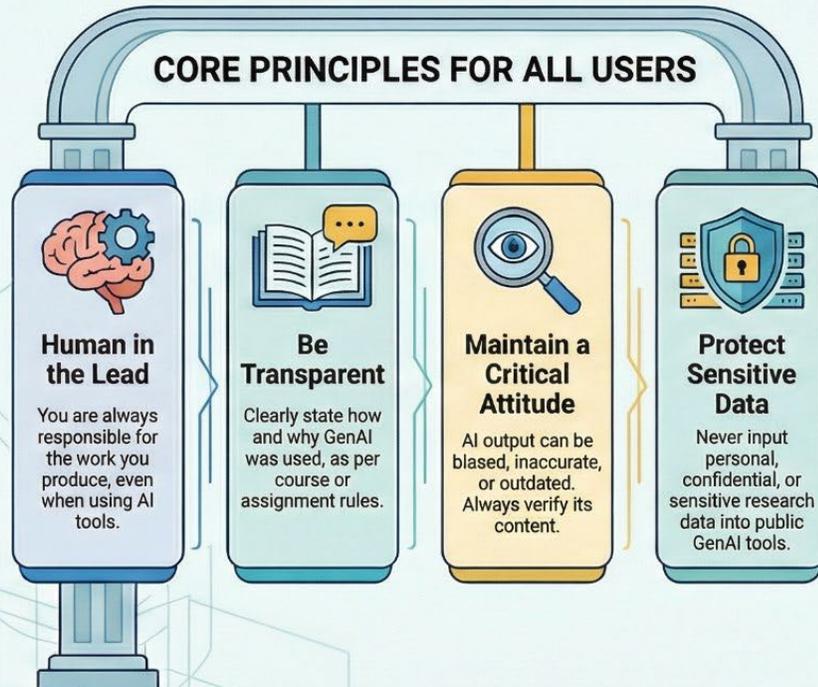- Betrokken bij genAI pilots van de UvA sinds 2023

Teaching & Learning Centre

UvA & AI

Why UvA AI Chat?

- Equal access for everyone
- Controlling our own data
- Private and secure

AI in the Classroom
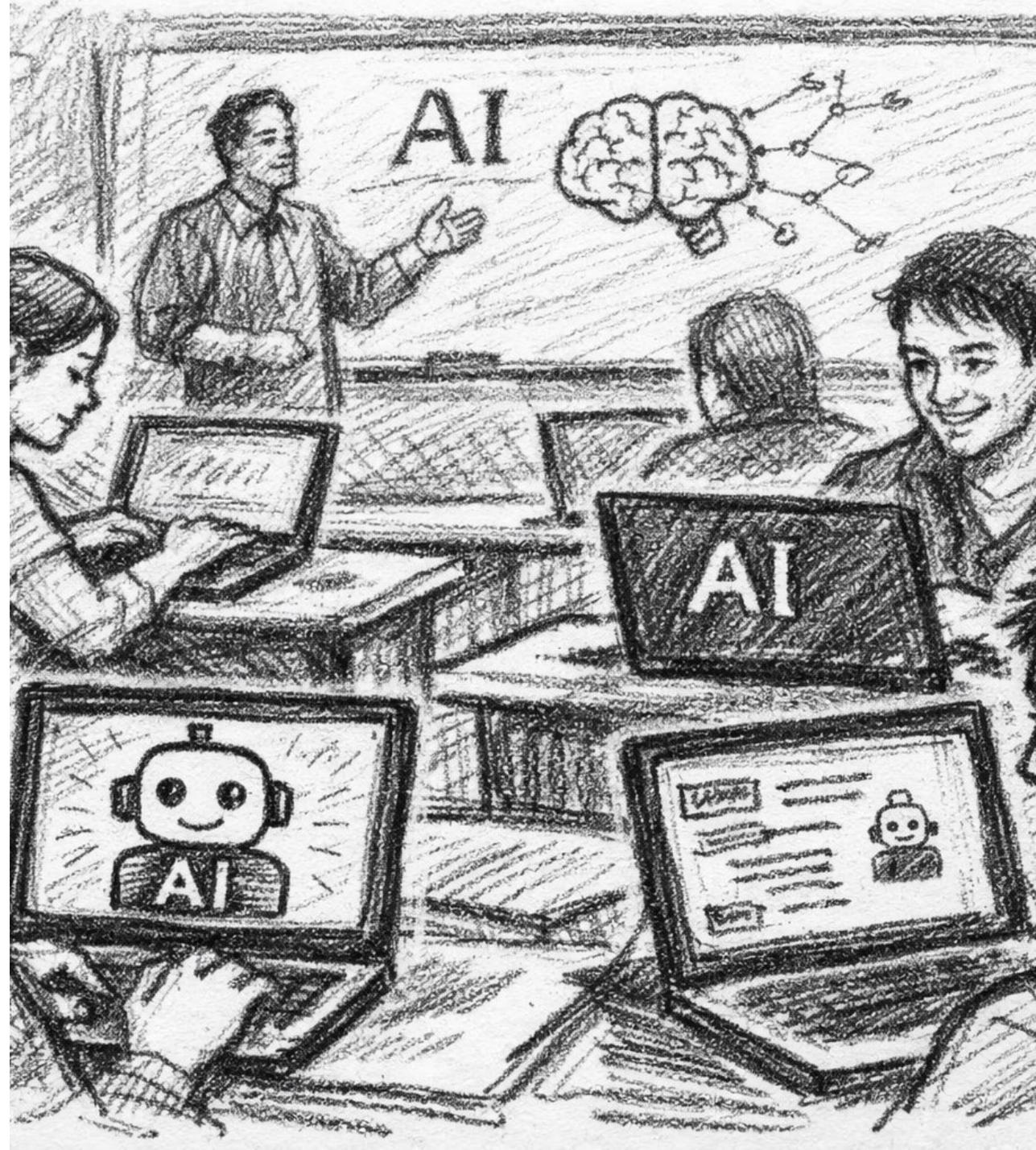
What does the literature say?

- It's a puzzle, but a quarter of the puzzle is done and we have an idea of the landscape we're looking at
    - If we step back and look across 50+ experimental studies
    - we're no longer guessing whether the puzzle is "a forest or a city."
- The image that emerges *is* a beach:
    - Many students **want to be there**
    - Learning *can* be productive
    - But it's not automatically safe or beneficial

Building AI Literacy: Frameworks to consider

NPULS AI-GO

UNESCO Competency Framework

For teachers

For students
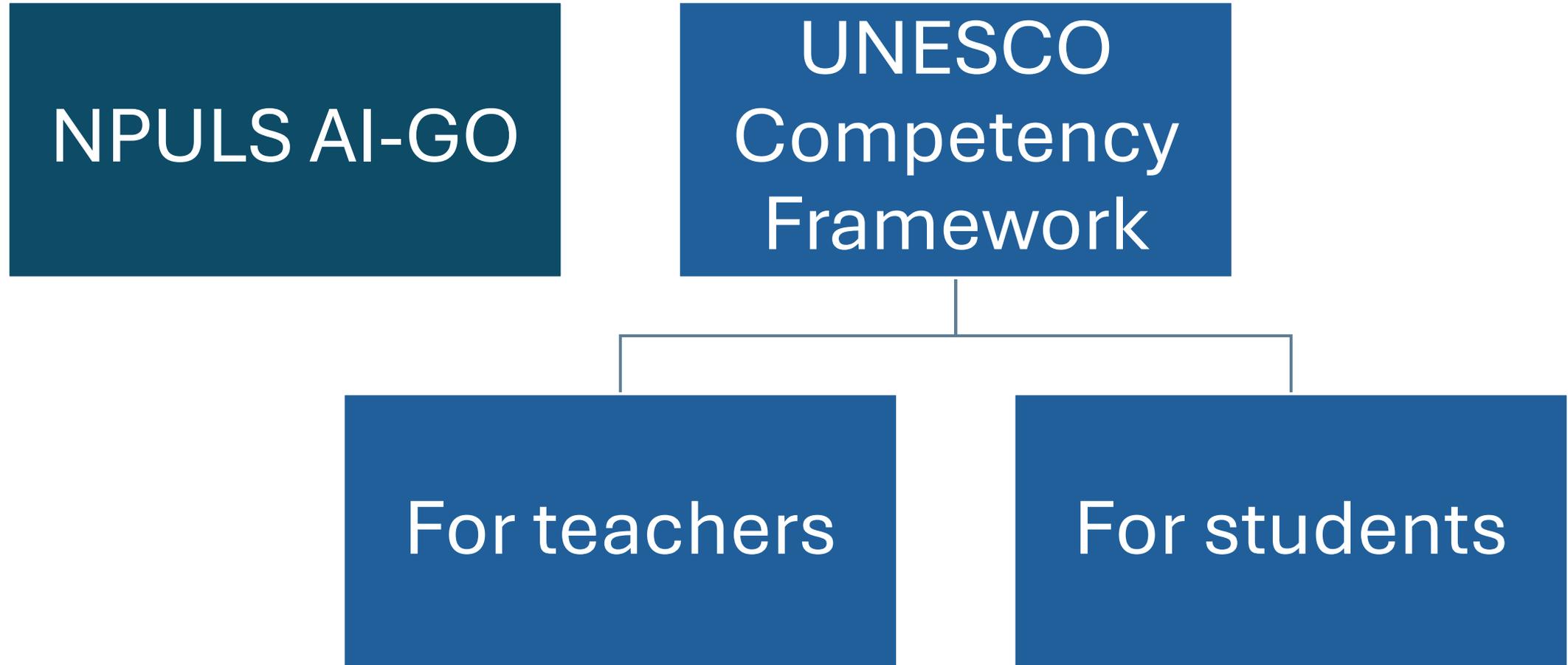
Npuls AI-GO

- "AI literacy refers to the interplay of knowledge, skills and attitudes, with ethical awareness as the foundation for engaging with AI systems critically, responsibly and effectively."

- Suggests that AI literacy is mostly context dependent and what determines high or low literacy depends on the environment/discipline and what is expected/needed. It is not a "fixed" standard.
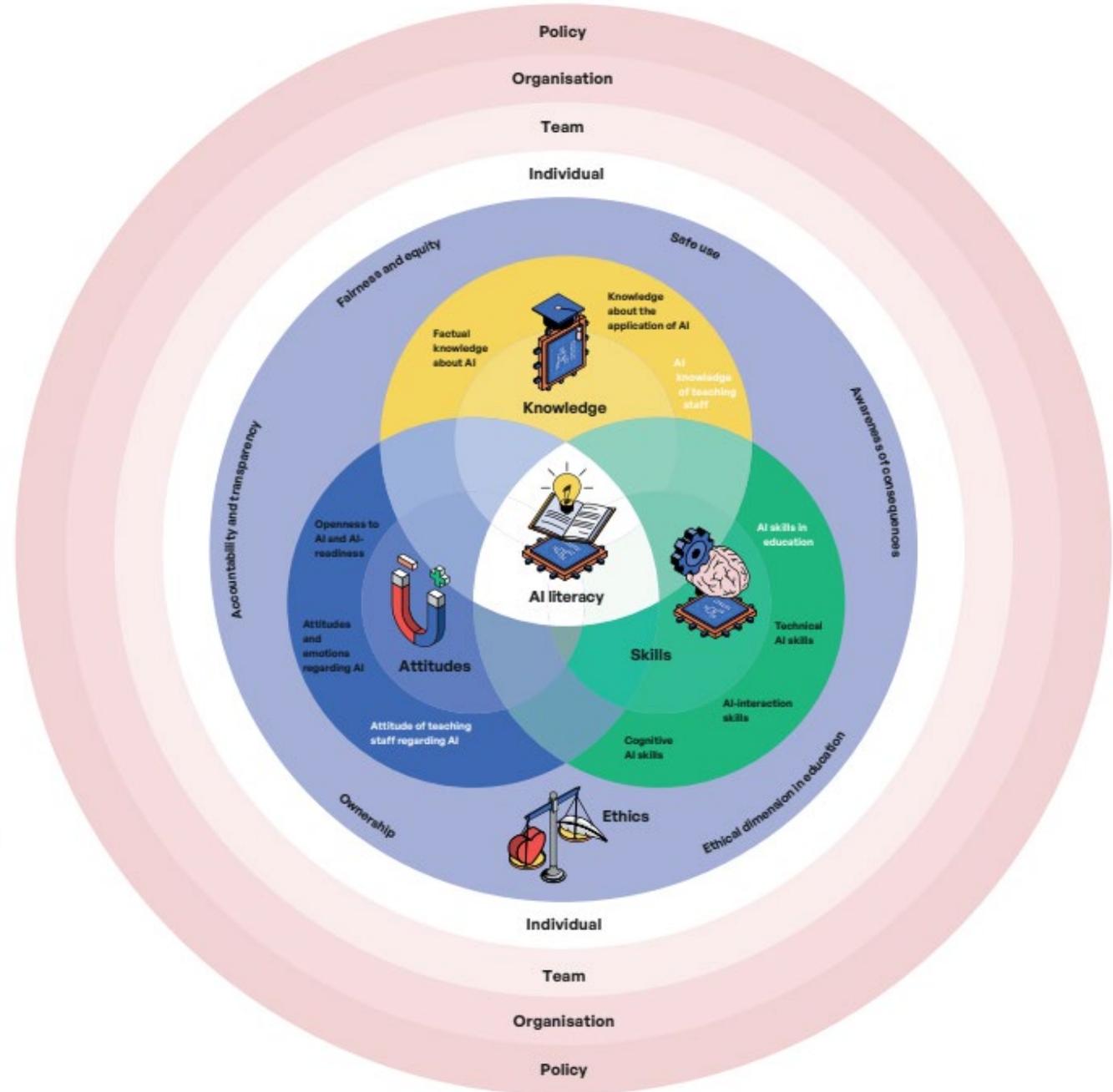
UNESCO Competency Framework

Teachers

Aspects	Progression		
	Acquire	**Deepen**	**Create**
1. Human-centred mindset	Human agency	Human accountability	Social responsibility
2. Ethics of AI	Ethical principles	Safe and responsible use	Co-creating ethical rules
3. AI foundations and applications	Basic AI techniques and applications	Application skills	Creating with AI
4. AI pedagogy	AI-assisted teaching	AI–pedagogy integration	AI-enhanced pedagogical transformation
5. AI for professional development	AI enabling lifelong professional learning	AI to enhance organizational learning	AI to support professional transformation

Students

Competency aspects	Progression levels		
	Understand	**Apply**	**Create**
• Human-centred mindset	• Human agency	• Human accountability	• Citizenship in the era of AI
• Ethics of AI	• Embodied ethics	• Safe and responsible use	• Ethics by design
• AI techniques and applications	• AI foundations	• Application skills	• Creating AI tools
• AI system design	• Problem scoping	• Architecture design	• Iteration and feedback loops

Key differences?

For teachers, AI is framed as something they must *govern, mediate, and integrate* into education systems.

For students AI is framed as something they must *engage with, question, and eventually redesign*.

Do teachers need to use both? Yes.

Use the teachers' framework to make design decisions — and the student framework to clarify what students should become capable of.

What does using both look like?

Design FROM (Teachers)	Design TOWARD (Students)
Professional judgement about AI use	Students' AI literacy and agency
Pedagogical and assessment decisions	Critical, ethical, responsible AI use
Safeguarding learning and integrity	Ability to judge, question, and explain AI use
Deciding *when, how, and why* AI is used	Developing informed AI practices over time

AI Frameworks for Educators: UNESCO's Ladder vs. AI-GO's Compass

UNESCO: The Ladder

A structured, step-by-step progression for development.

Global & Policy-Oriented
Designed as a global reference to inform national policies and human rights.

3 Levels of Progression
Moves users through three distinct stages: Acquire, Deepen, and Create.

Acquire
Deepen
Create
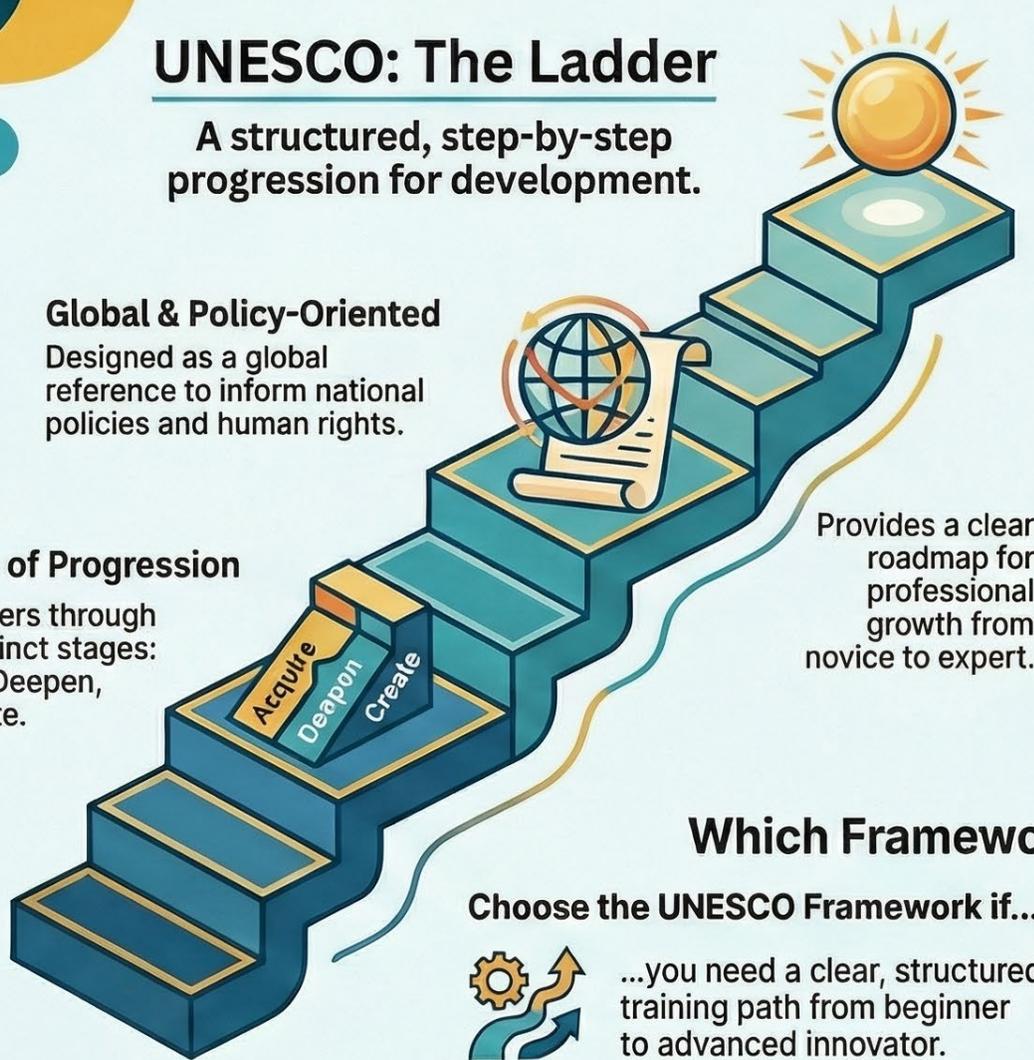
Provides a clear roadmap for professional growth from novice to expert.

AI-GO: The Compass

A holistic model to orient teachers in their context.

Attitude
Views AI literacy as a dynamic interplay of skills, knowledge, and attitude.

Teacher & Attitude-Focused
Places strong emphasis on teacher confidence, self-efficacy, and openness to AI.

Skills
Knowledge
Skills
Attitude

No Fixed Levels
Focuses on the interaction between components, not a linear hierarchy.

Which Framework Is Right For You?

Choose the UNESCO Framework if...

...you need a clear, structured training path from beginner to advanced innovator.

...you are drafting policy or need to align with student competency goals.

Choose the AI-GO Framework if...

...your main challenge is addressing staff anxiety and building confidence in using AI.

...you need a flexible, non-linear model for a higher or vocational education context.

AI and Assessment frameworks

Feature	Two-Lane Approach	AI in Assessment Scale
Conceptual focus	Distinguishes assessment purpose (assurance vs learning with AI).	Places assessment tasks along a continuum of AI involvement.
Outcome assurance	Explicitly ensures some outcomes are verified independently (Lane 1).	Does not inherently assure mastery — levels must be tied back to outcomes by designers.
AI expectation	Assumes AI will be used in many tasks and designs around that.	Frames how much AI is allowed/expected.
Student guidance	Communicates when AI is allowed, but not how much.	Explicitly shows degree of permissible AI use.
Policy vs practice	Is a **broad framework** guiding strategy across a curriculum.	Is a **rubric/tool** for designing or classifying specific tasks.

1	NO AI
2	AI PLANNING
3	AI COLLABORATION
4	FULL AI
5	AI EXPLORATION

Balancing Rigour and Readiness:
A Dual-Framework for AI in Higher Education

The AI Assessment Scale (AIAS): Instructional Scaffolding

Focus on Critical Evaluation
Encourages assessments where students must verify and critique AI output to build mastery.

A Five-Point Framework
Provides a standardised language to clarify AI expectations and reduce student anxiety.

Scaffolding Digital Literacy
Progressively introduces AI, from simple brainstorming to complex, high-level task completion.

The Two-Lane Approach: Strategic Program Security

Lane 1: Assuring Learning
Protects degree value through supervised assessments that guarantee independant student knowledge.

Lane 2: Professional Simulation
Mirrors the workplace by allowing AI usage in complex, unsupervised, and collaborative tasks.

Grading the Process
Shifts focus from the final product to how students prompted and iterated results.

AI Assessment Scale (Instructional Design)
Objective: Defining the specific level of human-AI collaboration for tasks.
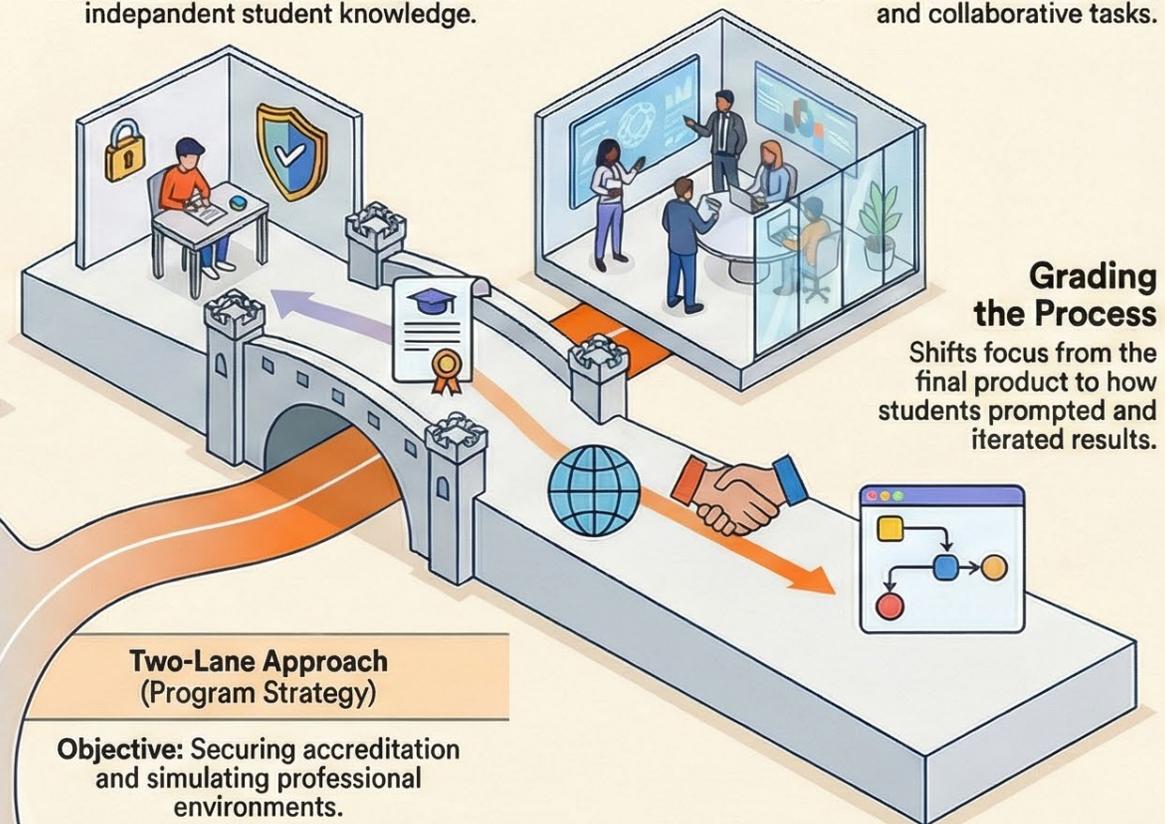
Two-Lane Approach (Program Strategy)
Objective: Securing accreditation and simulating professional environments.

NotebookLM

Didactic use of GenAI in the classroom

1. Start with your learning goals (ILOs)

2. Define the role of AI in the learning process

3. Check students' starting point

4. Design tasks for learning, not just output

5. Create a climate of trust

- NOTE: These steps are more suited to formative, developmental, or lower-stakes classroom contexts. Summative and formal assessment design is another topic with different considerations.
- Evidence on GenAI in higher education is still developing; these steps reflect *current* best practice rather than fixed rules.

Didactic use of GenAI in the classroom

1. Start with your learning goals (ILOs)

- **What do students need to learn?**
  - GenAI is a **tool** to help achieve your ILOs, or
  - Learning to use GenAI is **part of the ILOs** themselves.
- GenAI is currently more likely to be effective in:
  - Problem-based learning
  - Skills and competency-focused courses
  - Learning activities that span multiple sessions

Design principle: Don't add AI first and retrofit learning later

Two styles of AI in the Classroom

AI Literacy

- To teach students how to use AI effectively
  - Understanding what AI is (and isn't)
  - Using AI tools effectively and ethically
  - Critical evaluation of AI outputs
  - Fairness, bias, and inclusion
  - Creativity and human–AI collaboration

Didactical use of AI

- Incorporate AI in tasks
  - Formative assessment and feedback
  - Personalized learning and differentiation
  - Learning support and tutoring
  - Brainstorm assistant

Didactic use of GenAI in the classroom

2. Define the role of AI in the learning process

- **Is AI the right choice here? Why?**
  - GenAI can meaningfully support learning when used for:
    - Explaining concepts
    - Supporting practice
    - Providing formative feedback
    - Generating ideas or alternatives
- Be explicit about what AI *should* do, and what it *should not* do.

Design principle: Use AI where it adds learning value, not convenience alone.

Didactic use of GenAI in the classroom

3. What do students already know *about AI?*

Have students received AI literacy training or clear guidance?

Students with limited AI literacy cannot use tools effectively to get what they need, which can cause frustration and decrease motivation.

GenAI may help these students create quality work that is actually beyond their zone of proximal development aka *it looks like they can do it independently, but they can't.*

You will need to guide AI use in any case, but this is especially important when students lack prior informed exposure.

Design principle: Don't assume shared understanding of how to use AI well.

Didactic use of GenAI in the classroom

What do students already know about *the topic*?

Prior domain knowledge

- Students need foundational knowledge to benefit from AI assistance.

- Research suggested that students without domain knowledge struggled to evaluate AI-generated answers or detect errors (programming context)

Without this critical evaluation capacity, students risk over-reliance and may actually perform worse on subsequent assessments.

Didactic use of GenAI in the classroom

4. Design tasks for learning, not just output

- **What must be built into the task to support learning?**
  - Make AI a *coach*, not a calculator
  - Keep humans in the loop
  - Build in self-reflection

Design principle: Learning happens in the interaction, not in the output.

What does designing tasks for learning look like?

Coach not a calculator	Human in the loop	Self-reflection
Structure prompts, personas, or instructions to focus on process, not just answers. Avoid letting AI make all decisions, this helps **prevent over-reliance and disengagement**.	Use AI feedback as a starting point, not the final judgement. Build in peer discussion, comparison with criteria, and follow-up questioning to **develop students' own evaluative judgement**.	Reflection should be guided by prompts that focus on strategy, decision-making, and future improvement, not just experience. This supports **self-regulated and metacognitively aware learners**.

Role of AI in the classroom?

Don't drop AI into the classroom with no clear role or purpose

Make *all* roles within the classroom explicit.

AI
provisional feedback

Peer
interpret and challenge

Teacher
set standards and boundaries

Didactic use of GenAI in the classroom

5. Create a climate of trust

Students who feel overly monitored or distrusted may be more likely to game the system or disengage.	Clear expectations, transparency, and purposeful task design can encourage more authentic learning behaviours.

Design principle: Trust supports better learning with AI than surveillance.

Examples

AI-Assisted Writing Feedback Loop

Students write an essay draft independently, then use GenAI to get feedback on grammar, structure, and argumentation.

They must document the AI's suggestions, critically evaluate each one, and decide which to implement with justification.

🎯 **Learning Goals**

Category	Learning Goal
Domain skill (AI as tool)	Improve academic writing through iterative revision based on feedback
Domain skill (AI as tool)	Develop self-editing skills by critically evaluating external feedback
AI literacy (AI as goal)	Learn to prompt AI for useful feedback rather than content generation
AI literacy (AI as goal)	Recognize limitations and errors in AI-generated feedback

Examples

Scaffolded Problem-Solving with AI Hints
The Activity
Students work on complex problems in any structured domain (e.g., mathematics, logic, case analysis, research design). When stuck, they can request AI hints from a teacher-configured chatbot that provides *heuristic hints* (guiding questions, relevant concepts to consider) rather than solutions. The teacher sets up the AI with a system prompt or custom persona that refuses to give direct answers. Hints are tiered: students must try each hint before requesting another.

🎯 **Learning Goals**

| Category	Learning Goal
Domain skill (AI as tool)	Develop systematic problem-solving strategies in the discipline
Domain skill (AI as tool)	Learn to work through productive struggle rather than seeking immediate answers
AI literacy (AI as goal)	Understand how AI can scaffold learning without replacing cognitive effort
AI literacy (AI as goal)	Experience the difference between hints that guide thinking and answers that bypass it

Discussion question

- Which of these strategies feels like something you...
  - Can implement fairly quickly on your own?
  - Will need more support to implement? Who do you need support or direction from?
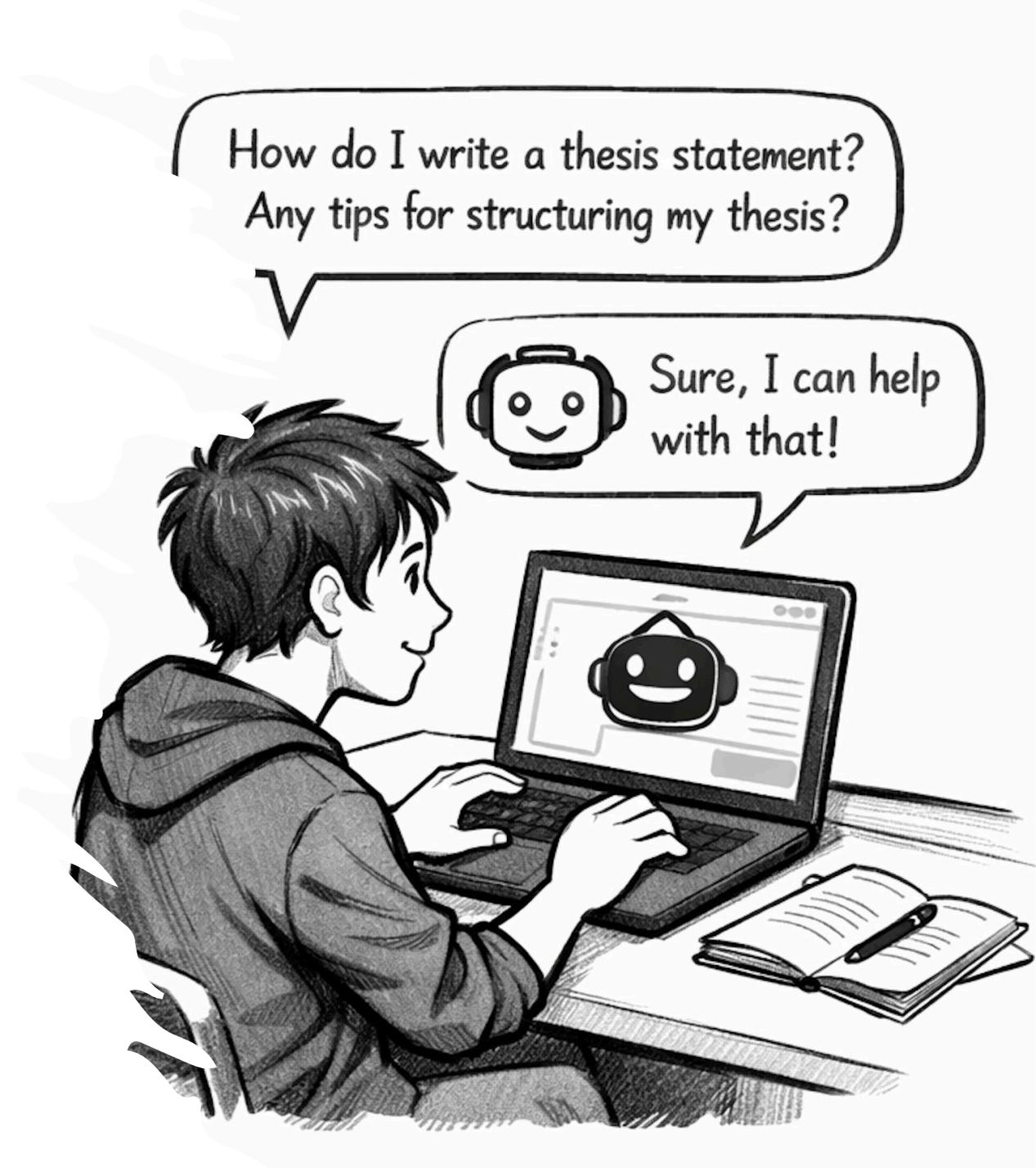
Concrete examples

- Based on pilots at the UvA.
  - Writing
  - Literacy (AI as goal)
  - Feedback
  - Grading
  - Coding
  - Debate

Pilots for Gen-AI
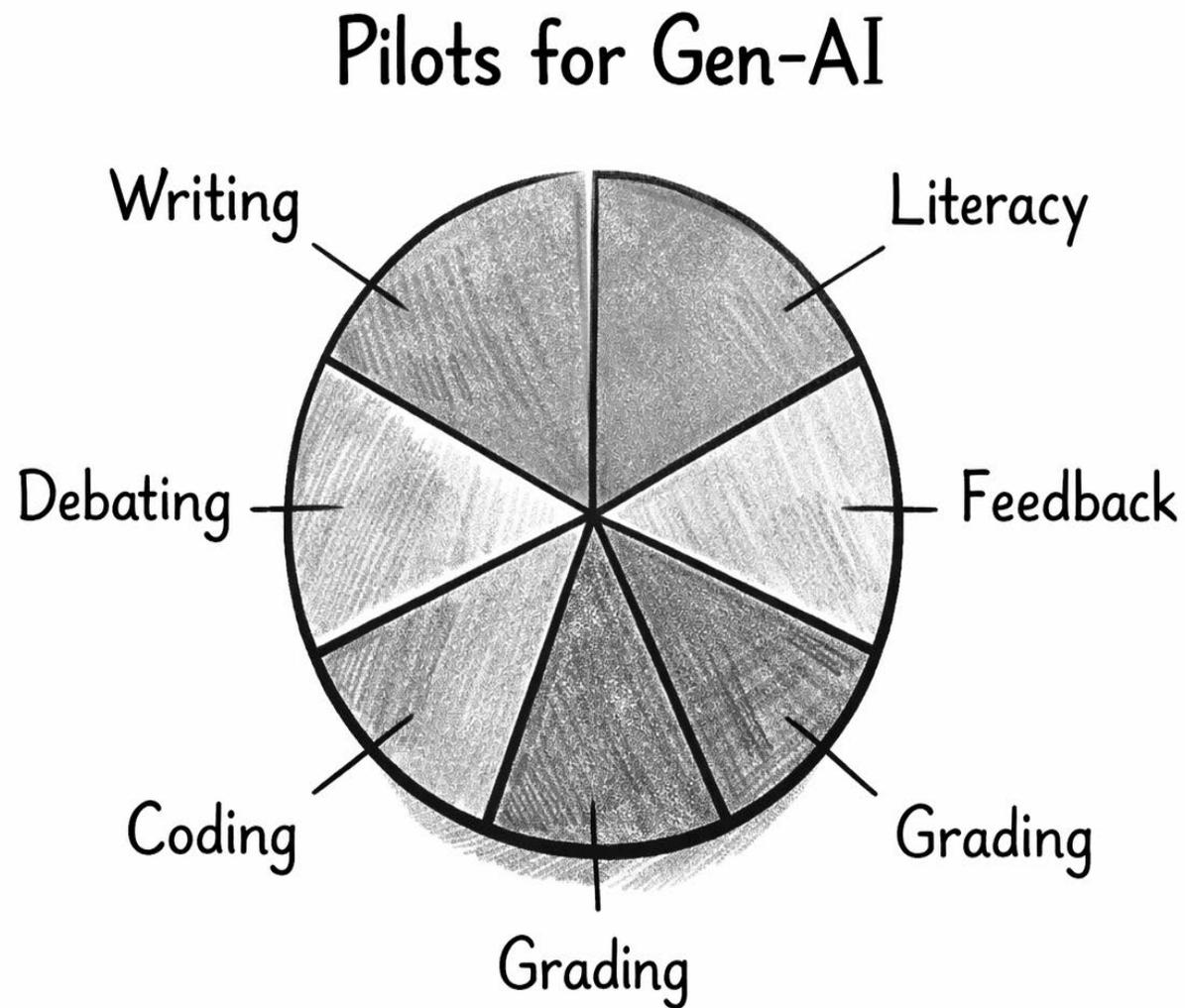
Writing

- Example set of 15 persona's used by the faculty of medicine for giving students assistence during their thesis writing.

- Students get specific feedback immediately from the ai

Writing

- When the student meets with the supervisor, the simple things have been fixed with the AI feedback.

- The students report that their meetings with the supervisor became more focused on and

Take home

- AI is great at writing text, but needs direction
  - Making a persona too large diminishes the outcome
  - Easy for students to use the persona that they need at each exact stage in their writing
  - Students report that they can do 'the smaller / simpler things' with AI. Which means they can get more value out of their meetings with their supervisor.

  - Persona's available on UvA AI Chat
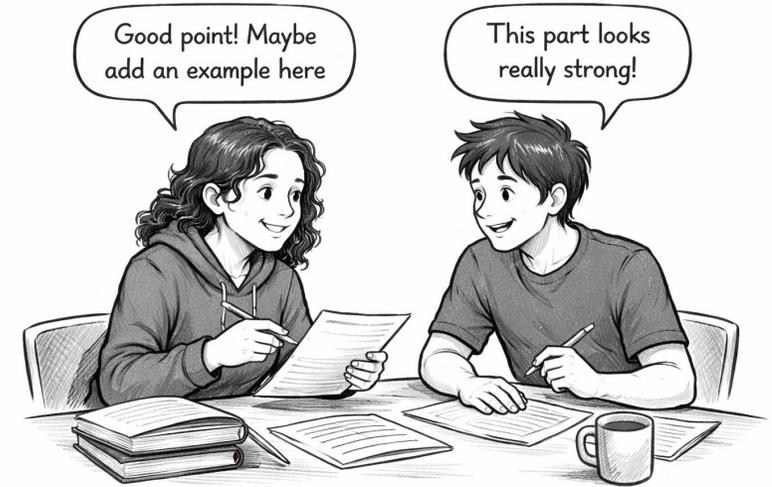
I could do something like that.

Literacy (by using feedback)

- Setup
  - Week 1:
    - Students give each other feedback on their written assignment
    - After two rounds of normal peer-feedback the students also ask UvA AI Chat for feedback on their writing, using their own prompt.
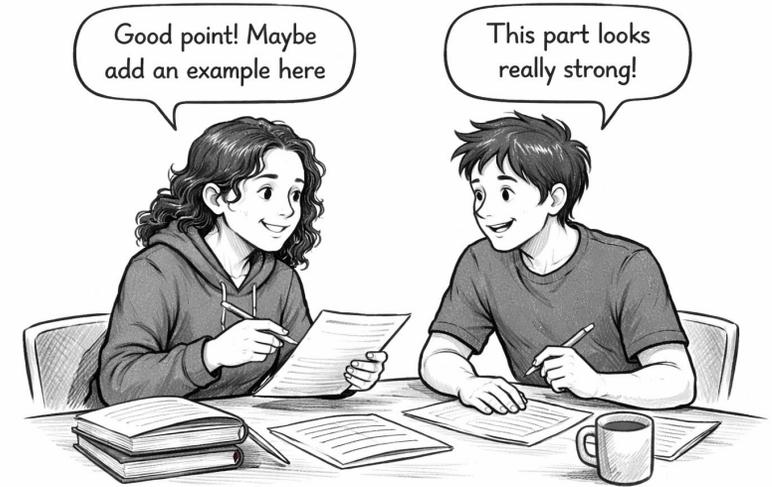
Literacy (by using feedback)

- Setup
  - Week 1:
    - Students give each other feedback on their written assignment
    - After two rounds of normal peer-feedback the students also ask UvA AI Chat for feedback on their writing, using their own prompt.
  - Week 2:
    - Students give each other feedback on the revised writing
    - They also ask for feedback in a specific persona for this assignment: Including rubric and feedback examples the staff gave in previous years

Results

- After week 1 the students weren't very impressed with the AI feedback
  - The students responded that AI gave very vague and general feedback
- After week 2 the value of feedback from AI increased by using the persona
  - The students became aware of the need for good prompting to use AI
  - Many students went from, AI can't be used for feedback to, feedback from AI can be useful if used critically and with a good prompt

Grading & Feedback

- Introduction course to programming (R & Python, master course)

- Automated pipeline for preliminary grades + feedback
  - Grades would go to teacher as extra input
  - Feedback would go directly to students
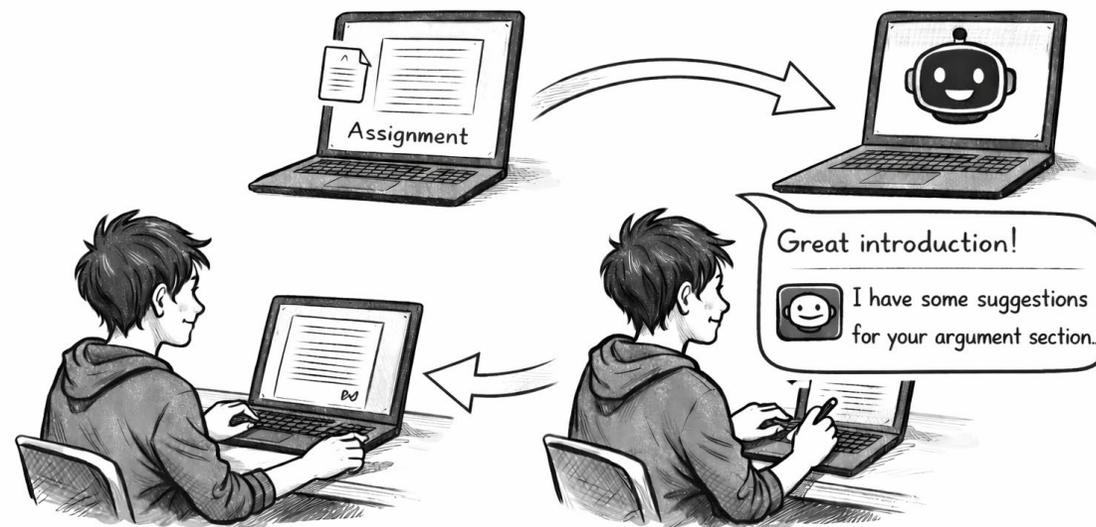
Grading & Feedback

- Outcomes
  - Cheaper and quicker than staff
  - Relatively accurate
    - 80% perfect agreement
    - positive correlation Human & LLM
    - humans overall gave higher grades
- Setup and paper available:
  - https://github.com/lukekorthals/canvas-llm-integration
    - Includes Canvas API setup
  - https://link.springer.com/chapter/10.1007/978-3-031-99264-3_5

Coding

- Improve coding skills by using AI as a tutor
  - Specialized bot/persona that will only explain concepts (Jošt et al., 2024)

Coding

- Improve coding skills by using AI as a tutor
  - Specialized bot/persona that will only explain concepts (Jošt et al., 2024)
- Improve implementation in a new language
  - More experienced programmers used AI to build in a new language
  - Pilot example:
    - Project Software Engineering: Four different AI tools to assist with writing code.

Coding

- Improve coding skills by using AI as a tutor
  - Specialized bot/persona that will only explain concepts (Jošt et al., 2024)
- Improve implementation in a new language
  - More experienced programmers used AI to build in a new language
  - Pilot example:
    - Project Software Engineering: Four different AI tools to assist with writing code.
- Help with coding homework exercises
  - Students that need to learn how to solve something with code, where coding isn't the intended learning outcome.
  - Pilot example: MSc Physics & Astronomy
    - During this pilot students would also use AI for mock exam questions and to clarify course content.

Debate

- Practicing communication skills can be time intensive and expensive

- But the practice is really important for students in their future work

Debate

- Specialized bots/personas can:
  - Argue from a specific ideological belief (liberal, conservative, right wing)
    - Students would pose questions and discuss topics with the persona to learn how to counter different beliefs
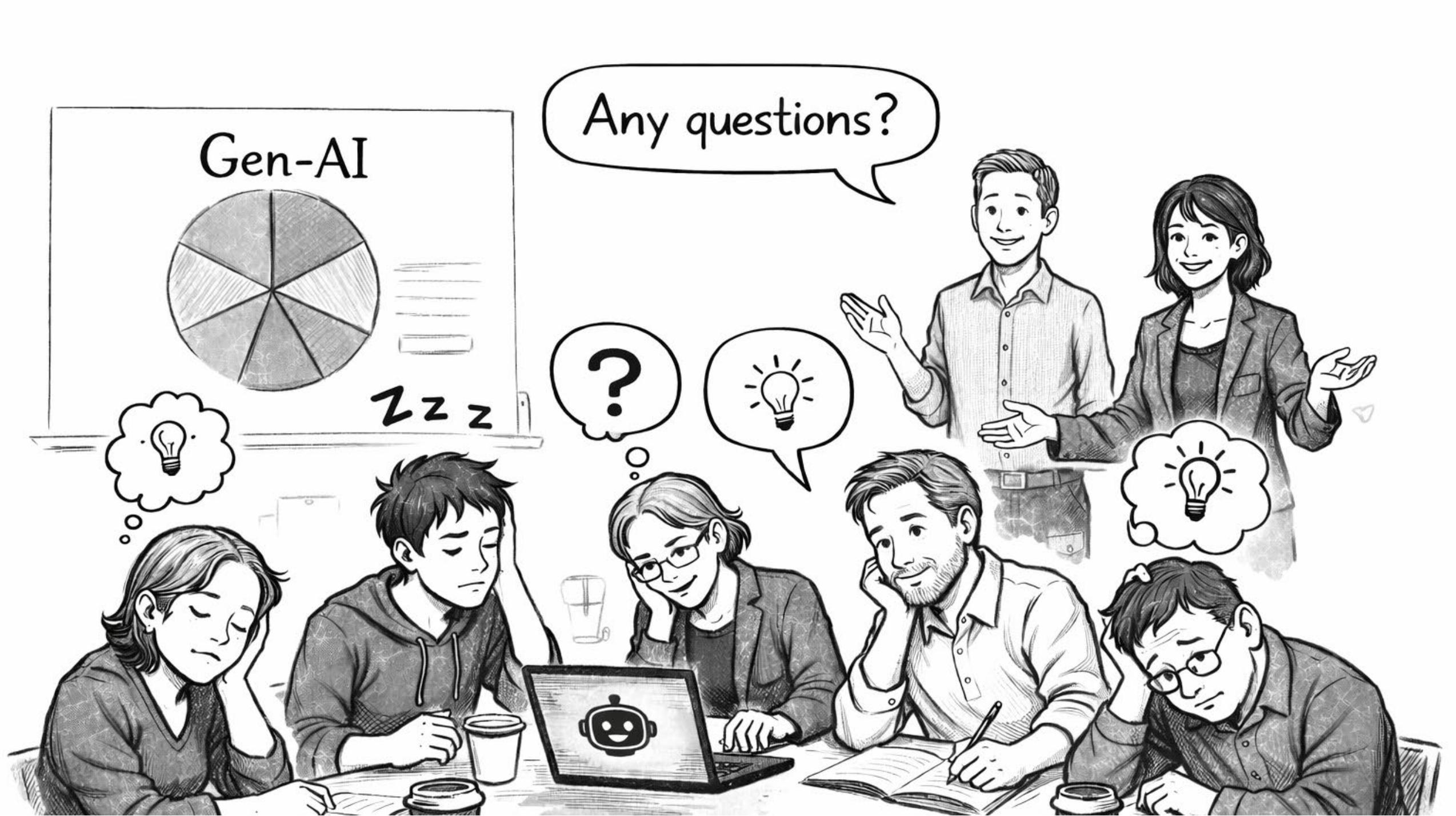 - Play the role of a patient for conversation practice

https://tlc.uva.nl/en/article/ai-pilot-auc/
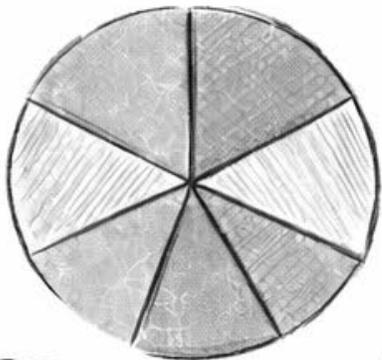
Need a hand setting up AI for your course

- Materials available from TLC
- Workshops and hands-on sessions how to implement AI in your education
- Student assistants available that can work with you on creating AI for your course!

Next lunch seminar

- **Faculty AI literacy: "take the pulse of your own needs"** *by Ivana Bušljeta Banks*

- **Tuesday 17 February 12:00-13:00**
- **REC C0.03 (TLC-FMG space)**

edu.nl/8cvpw

Evaluation form

- Help shape future editions: Scan the QR code!

Background materials

- Dai, W., Lin, J., Jin, H., Li, T., Tsai, Y. S., Gašević, D., & Chen, G. (2023, July). Can large language models provide feedback to students? A case study on ChatGPT. In 2023 IEEE international conference on advanced learning technologies (ICALT) (pp. 323-325). IEEE.

- Holt, L. (2024) A Map of Generative AI for Education: https://medium.com/@LaurenceHolt/the-edtech-insiders-generative-ai-map-08664f7425da

- McGrath, C., Farazouli, A., & Cerratto-Pargman, T. (2024). Generative AI chatbots in higher education: A review of an emerging research area. Higher Education, 1-17.

- Nguyen, K. V. (2025). The Use of Generative AI Tools in Higher Education: Ethical and Pedagogical Principles. Journal of Academic Ethics, 1-21.

- Suryanti, F., & Ramadhanti, G. (2024). The Use of Generative AI in Higher Education Students' Writing: A Systematic Literature Review. Journal of English as a Foreign Language Education (JEFLE), 5(1), 34-49.

- Wang, J., & Fan, W. (2025, May). The effect of ChatGPT on students' learning performance, learning perception, and higher-order thinking: insights from a meta-analysis. *Humanit Soc Sci Commun* **12**, 621. https://doi.org/10.1057/s41599-025-04787-y

- AI in het onderwijs: Juridische kaders, https://wij-leren.nl/ai-juridisch.php