U!REKA CONNECTS
LISBON 2026

AI-HED Workshop: AI in Higher Education – From Challenges to Innovation

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AI-HED

Artificial Intelligence in Higher Education Teaching and Learning

The AI-HED Project in a Nutshell

Key facts

- Erasmus+ Cooperation Partnership “Artificial Intelligence in Higher Education Teaching and Learning” (AI-HED)
- Duration: 09/2024 - 02/2027
- Funding: 250.000 EUR
- Website: https://ai-hed.eu

AI-HED
Artificial Intelligence in Higher Education Teaching and Learning

Co-funded by the European Union

AI-HED Consortium:

- Amsterdam University of Applied Sciences (coordinator) **(U!REKA)**
- University of Applied Sciences BFI Vienna **(U!REKA)**
- Polytechnic University of Lisbon, School of Communication and Media Studies **(U!REKA)**
- University of Zagreb, Faculty of Organization and Informatics

Amsterdam University of Applied Sciences

FH University of Applied Sciences BFI Vienna
Economics Management Finance

ESCS SCHOOL OF COMMUNICATION AND MEDIA STUDIES

foi UNIVERSITY OF ZAGREB FACULTY OF ORGANIZATION AND INFORMATICS VARAŽDIN

AI-HED objectives

Adjusting the teaching and learning environments at our HEIs to the shifts caused by Artificial Intelligence (AI)

Exploring impact of AI on teaching & learning

- transnational syllabus development workshop
- 24 pilot courses
- 4 European HEI

Enhancing AI skills of teachers & students

- 34 teachers
- 1000+ students
- 4 local follow-up workshops

Recommendations, guidelines, tools for HEI

- website & social media
- MOOC for teachers
- 4 national multiplier events
- white paper
- final conference

AI-HED Teachers & Project Team



What is the current state of AI in our universities?

Let's share what AI is like at our universities ...

… and answer three questions in MS forms.



25 syllabi for AI-infused courses

A key element for implementation and evaluation of pilot courses were syllabi for the pilot courses, with:

- AI-related learning outcomes
- definition of learning tasks and assignments to be accomplished with AI
- methodologies for assessing assignments done with AI

Intended learning outcomes (ILO)

Paste the learning outcomes from your existing course description and indicate for each learning outcome if students will use AI to accomplish it:

Intended learning outcome	Will students use AI to accomplish this ILO?	
After successful completion of the course, students will be able to …	*Yes*	*No*
• explain the foundations and key features of quantitative research approaches (ILO 1)	☐	☒
• explain the main types of hypotheses and methodological approaches of qualitative research (ILO 2)	☐	☒
• conduct systematic literature search and literature analysis (ILO 3)	☒	☐
• develop research questions and qualitative research designs based on the findings of the literature search (ILO 4)	☒	☐
• apply selected methods of qualitative data analysis to data sets (ILO 5)	☐	☒
• critically assess the quality, the scope, and the limitations of qualitative research designs (ILO 6)	☒	☐

AI learning scenario(s)

Explain in detail how your students will use AI to achieve the learning outcomes as indicated in the previous section.

Example:

For ILO 3, students will

- be assigned to carry out a literature search using a given AI tool,
- present the findings systematically in a literature table.

For ILO 4, students will

- use two prescribed AI tools to develop a matrix of 3 research questions and 2 hypotheses for each research question,
- present the findings in a matrix with at least 3 research questions divided into 5 quality dimensions of qualitative research using prescribed AI tools,
- compare the AI-generated results with the requirements of good research questions presented in a textbook, focusing on the scientific content and the feasibility of the research questions.

For ILO 6, students will

- participate in a tutoring process with a 'ResearchBot' where they get hints that help improve their individual proposals,
- reflect on and weigh up the questions and advice given by the ResearchBot,
- justify which considerations of the Bot they have taken on board and which not in their research proposal.

For all uses of AI, students are obliged to document their usage according to the regulations of the UAS BFI Vienna.

AI learning materials

Specify the AI tools that you will use in your course including the purpose and whether using it is compulsory or mandatory:

AI tool	Purpose	compulsory	optional
• researchrabbit.ai	literature search	☒	☐
• elicit.com	literature analysis	☒	☐
• ResearchBot (self-developed)	development of research proposal	☒	☐

Assessment of AI Usage

Clearly state for each AI tool and ILO,

- **which assessment methods and criteria you will apply**
- **and how many points you want to award for specific AI usage.**

25 syllabi for AI-infused courses

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All courses implemented in winter term 25/26

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Evaluation of pilot courses

Work package lead: Erik Kostelijk, Amsterdam UAS
Researchers: Raúl Casado Linares, Alexandra Benitez

Student Surveys: **Quantitative impact measurement**

University	# enrolments [1]	# attendees first class [2]	# attendees last class [3]	# valid survey completions PRE COURSE SURVEY [4]	# valid survey completions POST COURSE SURVEY [4]
Amsterdam University of Applied Sciences (AUAS)	282	220	200	187	138
University of Applied Sciences BFI Vienna (FH BFI)	225	175	180	161	151
Polytecnic University of Lisbon (ESCS / IPL)	279	220	189	219	126
University of Zagreb – Faculty of Organization and Informatics (FOI)	379	338	287	337	248
Totals	**1165**	**953**	**856**	**904**	**663**

1) # enrolments: based on enrolments at the start of the semester
2) # attendees first class is a proxy for students actively participating in the pilot course semester
3) # attendees last class is a proxy for students completing the pilot course semester
4) Only unique student IDs were counted. In some cases, students participated in more than 1 course. These students were counted only once

Response rates:

pre course	95%
post course	70%
BA	82%
MA	18%
Male	45,4%
Female	52,1%
Other	2,5%
Nationalities:	53

Focus groups: **In-depth qualitative insights**

32 participants (16 teachers, 16 students) in 4 local focus groups

Topics:
- Changes in student competences and attitudes
- Changes in teaching practices
- Perceived added value of AI tools
- Challenges, risks, and implementation barriers

Logbook analysis: **Teachers' experiences**

32 teachers

Topics:
- Process-oriented reflections and implementation tracking
- Changes in student competences and attitudes
- Changes in teaching practices
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- **Large-scale pilot implementation**
  1,165 enrolled students across four partner universities
- **High course participation**
  953 students attended the first class and 856 the final class: overall completion rate of 89.8%
- **Substantial survey participation**

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Limitations:

- Results based on self-reported data, not objectively tested skills
- Selection of pilot courses
  - Pilot courses from business, management, informatics, media – no natural science, other engineering medicine, arts etc.
  - Teachers participating in the pilot courses may be more interested in AI than the average teacher, which could influence the results
- Broader AI adoption trends
  - The pilot semester lasted for 5 months. In this time, AI technologies continued to evolve rapidly
  - Some observed changes in AI use may therefore reflect broader developments in AI adoption, rather than effects of the pilot courses alone.

Focus groups:

In-depth qu ces

32 participants (16 tea

Topics:
- Changes in student
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Measuring AI skills development

Methodological approach

Full survey:

Self-reported changes in students' digital competences based on the European DigComp 2.2 framework

Operationalisation:

Each competence operationalized towards AI, by using eight items:

- six cognitive items (based on Bloom's taxonomy),
- one item measuring attitude,
- one item measuring self-efficacy (= confidence with using AI).

Rating:

5 point Likert scale

5 key competence areas:



Vuorikari, R., Kluzer, S. and Punie, Y., DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes, EUR 31006 EN, Publications Office of the European Union, Luxembourg, 2022, ISBN 978-92-76-48882-8, doi:10.2760/115376, JRC128415.

AI tool usage in the classroom

AI use for study

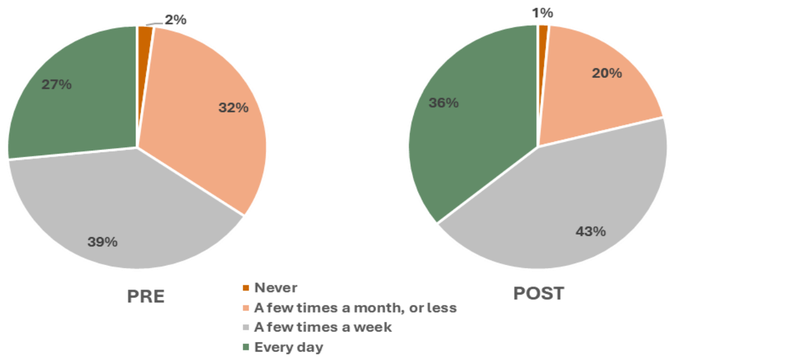
increased by 14% during the semester (usage “daily” or “a few times a week”)

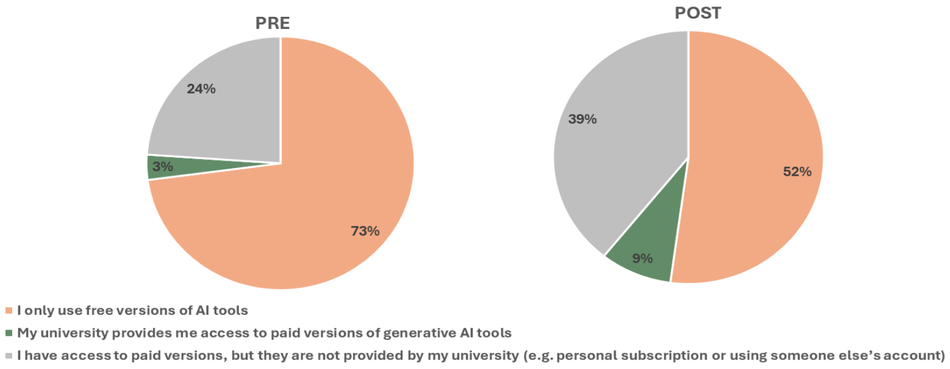
Free / paid access

Use of paid versions increased from 24% to 39%

In general, students had to pay for their AI tools. In only 3% (PRE) to 9% (POST) of the cases, the university sponsored AI usage

PRE | **POST**





Which tools?

	Student % PRE	Student % POST
ChatGPT	94,3	95,3
Google Bard / Gemini	19,4	32,2
Notetaking & research AI (e.g., Perplexity, NotebookLM)	12,0	24,5
Microsoft Copilot	20,0	21,6
Grammarly	20,2	17,2
DALL-E	5,1	4,7
Other generative AI tool	9,4	13,7
No use of any generative AI tools	3,2	1,4

- **Increased use of Gemini and AI tools for notetaking and research**
- **Limited diversification in AI tool use**
- **ChatGPT remains the dominant AI tool**

Students‘ AI skills growth by Bloom‘s taxonomy

Increase across all Bloom levels.

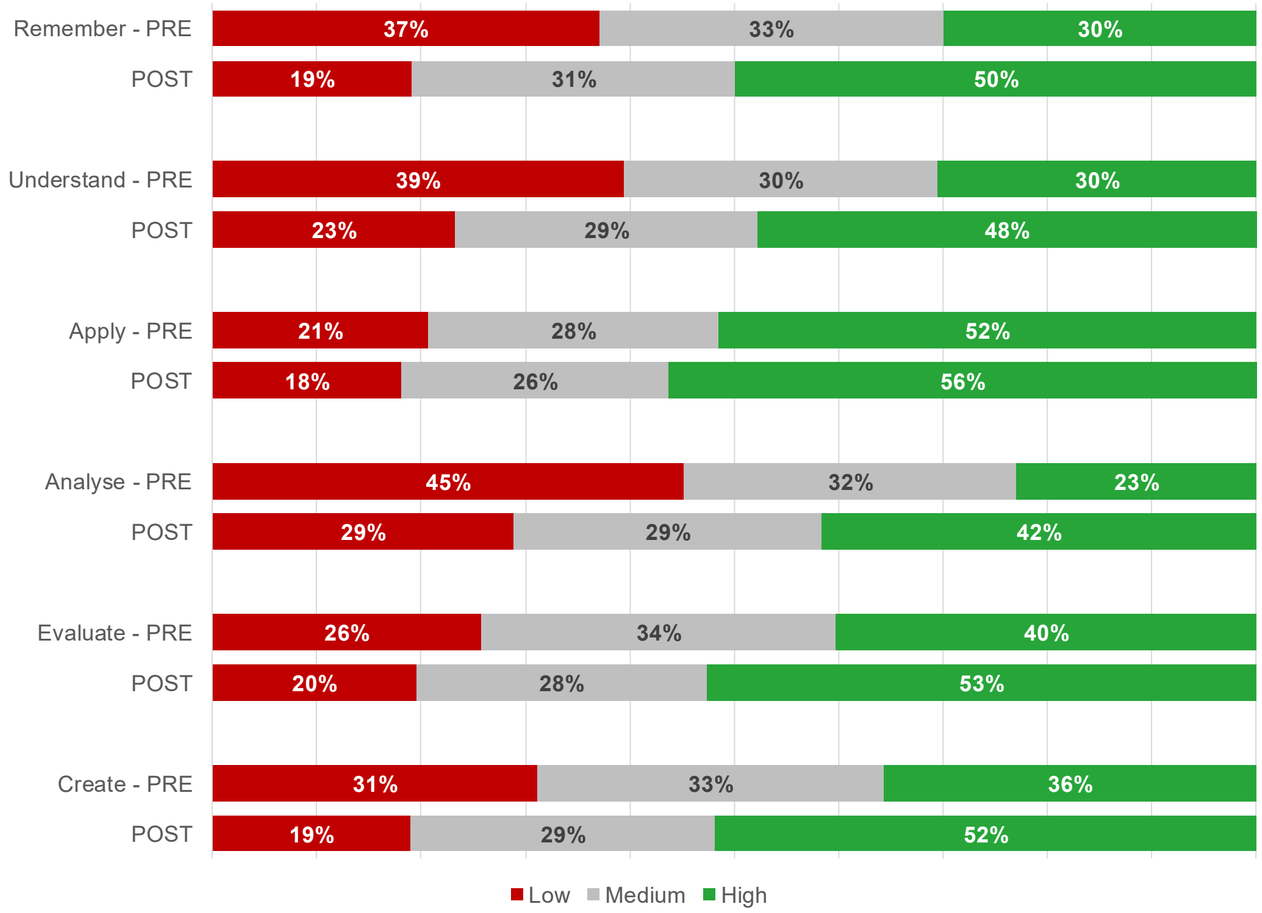
Substantial increase in student’s abilities to integrate AI in their activities.

From basic AI use to productive integration

The share of high competence students increased substantially, especially in higher Bloom levels (Analyse, Evaluate, Create).

Reduced low-competence group

The number of students reporting low competence in using AI decreased across all Bloom levels, indicating broader AI capabilities.



All reported increases are statistically significant (p<0,01; 95% confidence level). Effect sizes are moderate to substantial, based on Cohen’s d using Kraft’s (2020) benchmarks for educational interventions.

Attitude & confidence in using AI increase

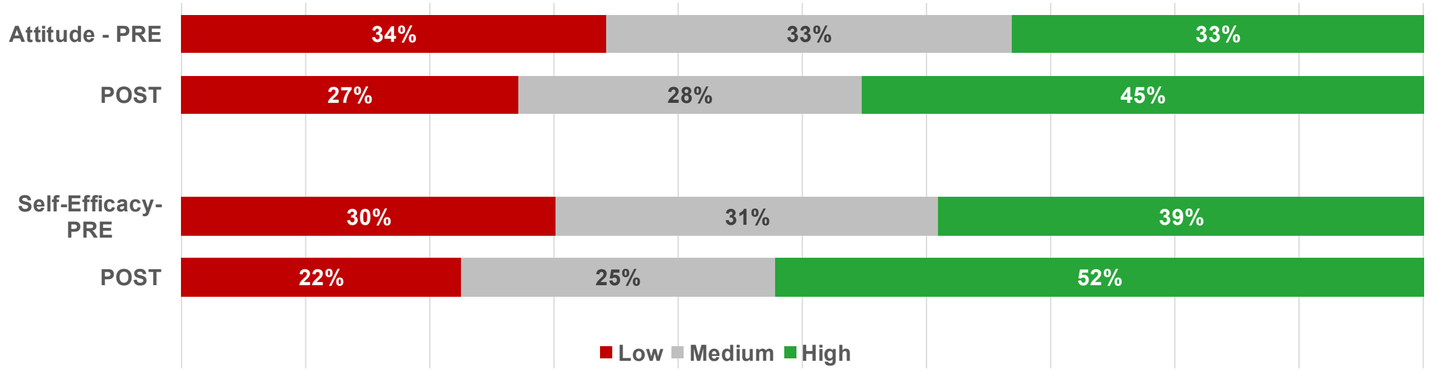
Students

Increased confidence in using AI

Share of students with high self-efficacy increased from 39% to 52%, indicating greater confidence in using AI in their work - fewer students feel uncertain or uncomfortable using AI.

More positive attitude towards AI

Without pilot courses, roughly one third of the students dislike using AI in their work (34% low scores), more or less similar to the percentage of students that like using AI in their work. After the pilot course semester, 45% of students like using AI, versus 27% who still dislike it.



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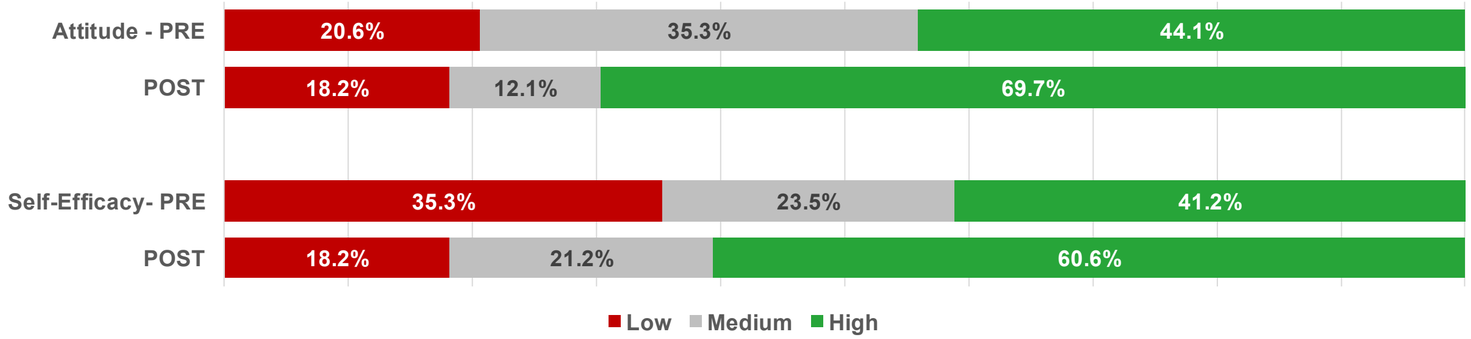
Teachers

Substantial increase of confidence in using AI

The share of teachers reporting high confidence in using AI increased from 41% to 61% during the pilot semester. The proportion of teachers reporting low self-efficacy dropped considerably, indicating growing familiarity with AI tools.

More positive attitudes towards AI use

The number of teachers with a highly positive attitude towards AI increased from 44% to nearly 70%.

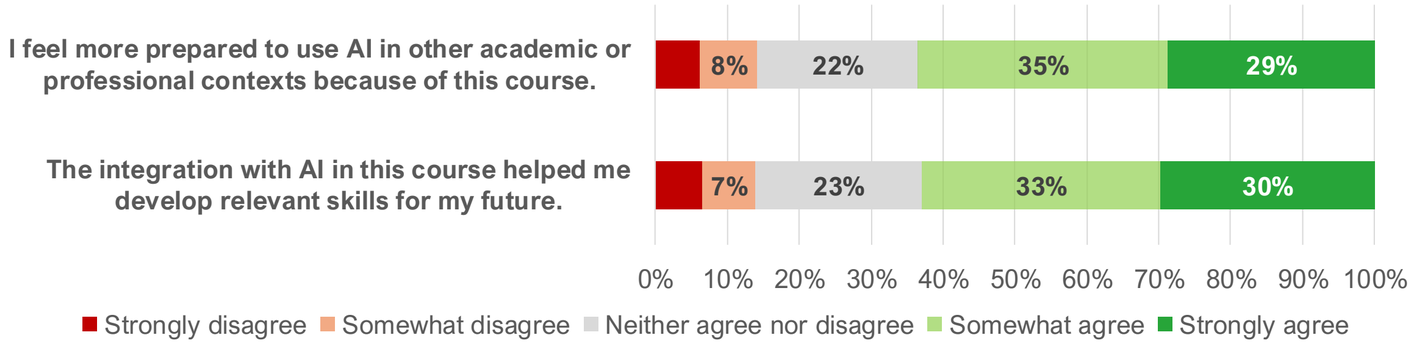


The increase in self-efficacy is statistically significant ($p < 0,05$), the increase in attitude is indicative ($p=0,068$) (95% confidence level). The effect sizes are substantial, based on Cohen's d using Kraft's (2020) benchmarks for educational interventions.

Added value of AI for learning

Students

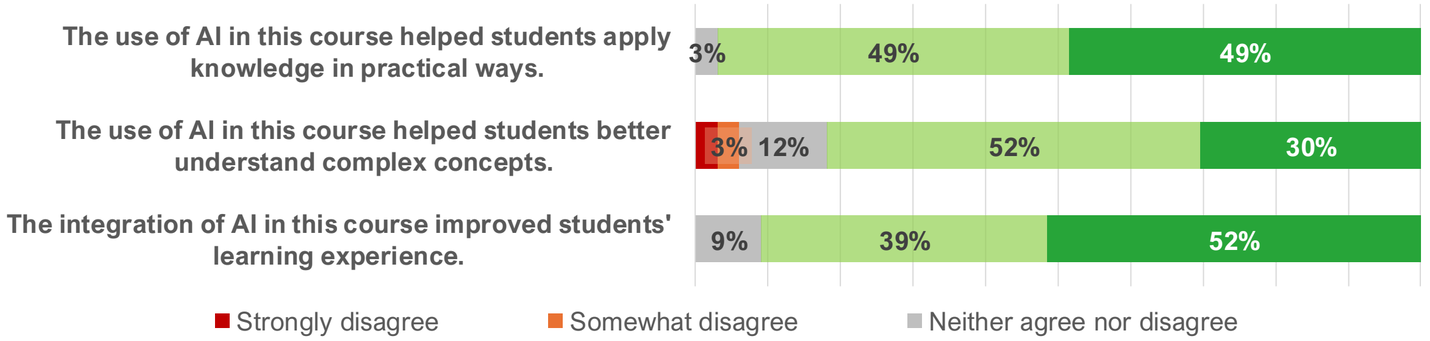
- Two-thirds feel better prepared to use AI beyond their course.
- Majority finds that AI integration supports future-relevant skill development.



Teachers

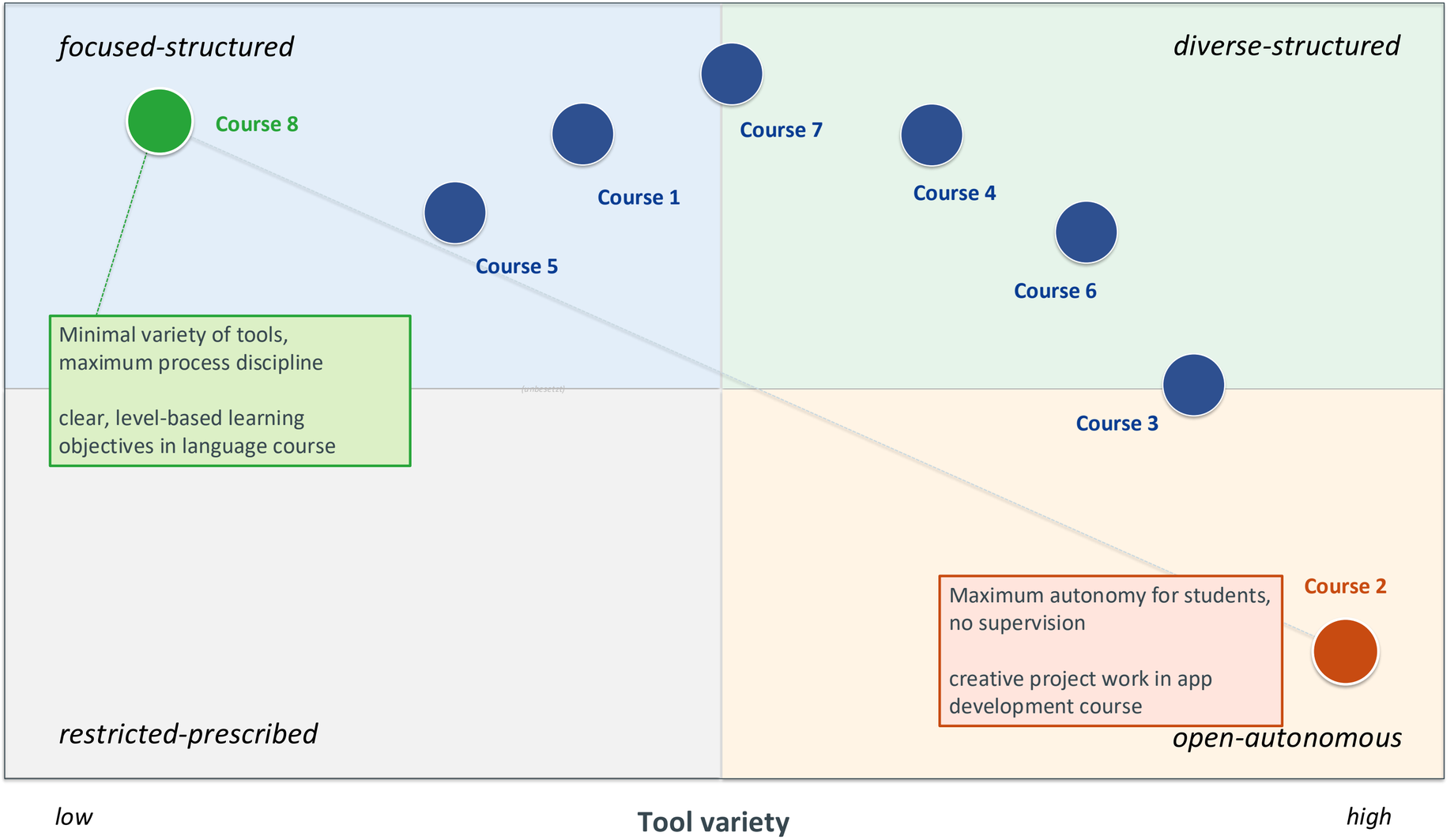
See clear added value for learning

- AI helps students better understand complex concepts.
- AI helps students to apply knowledge.
- More than 90% of teachers agree that AI integration improves the overall learning experience.



Contrastive comparison of pedagogical approaches

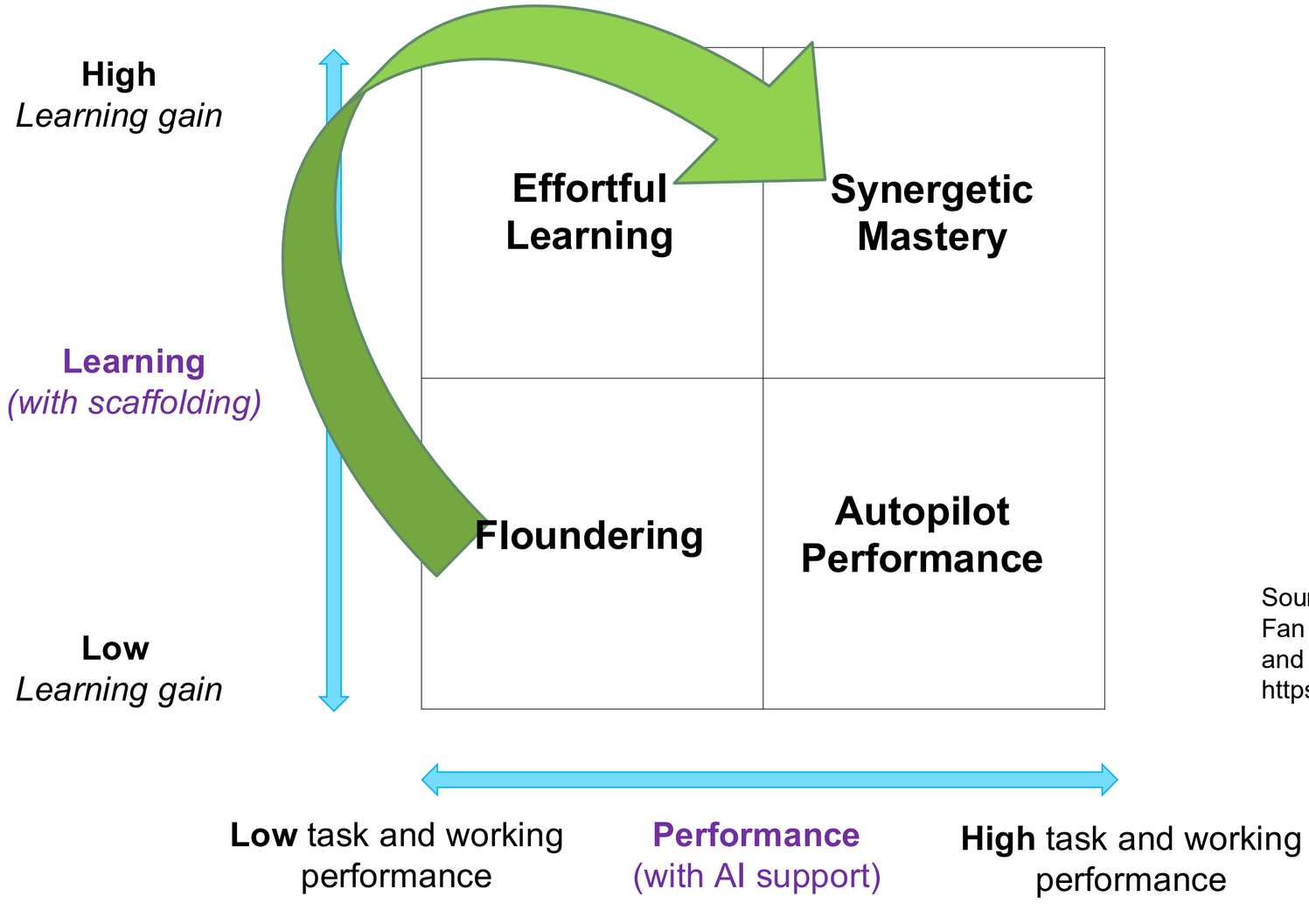
Positioning of eight courses (UAS BFI Vienna) according to tool diversity × didactic structure



Thematic analysis based on 392 logbook entries from 8 courses at the UAS BFI Vienna

Researcher:
Dietmar Paier,
UAS BFI Vienna

The AI teaching challenge



Source:
Fan et al. (2026) A Metacognitive Approach to Learning and Performance in Human-AI Interaction (preprint). https://doi.org/10.31234/osf.io/s7dvk_v1

AI is integrated systematically:

Idea generation, writing support, language correction, search and research, document analysis, persona building, prototyping, presentations, visualization, process modelling, and exam preparation.

Ethics in socio-technical environments:

Many practical concerns appeared: hallucination/misinformation, unreliable sources, loss of critical thinking, transparency and disclosure, fairness and inequality, privacy/data protection, bias and representational skew, hidden or shame-based use.

Need of rules & frameworks for transparency & guidance:

Teachers and students say that they are improvising, expectations vary by course, and students are left navigating inconsistent rules.

AI-“familiarity” ≠ AI literacy

Many participants already used AI before the pilot, but the pilot exposed how shallow that familiarity often was when compared with professional AI competence.

Equal access:

Commercialization and unequal access to premium (= paid) tools is a present and future problem.
Pay more, better performance, better grades?

Communication & metacognition:

Traditional assignments and take-home tasks focused mainly on the final product, are now less viable.
Need to disclose, elaborate learning processes, and to reflect and assess AI outputs individually and groupwise

Redesign of assignments & assessment needed:

Participants repeatedly imply that traditional take-home writing tasks, or assignments focused only on final product, are now less viable. What recurs is the need to assess process, disclosure, critical thinking, or oral reflection rather than polished output.

The art of scaffolding:

Students asked for explicit guidance, staged skill development, shared institutional policies, teacher training, technical support, equitable access to tools, time and space for reflection, and clear expectations for disclosure and evidence.

AI integration through individual improvisation?

Much of the success described in the transcripts appears to depend on individual teacher initiative rather than a mature institutional infrastructure and explicit programs for academic staff development.

Conclusions & Questions

Topics for group discussions (25‘)

AI literacy & skills development

1. Developmental Staging of AI Literacy

First-year students benefit less from AI because foundational knowledge is prerequisite for meaningful AI use; AI literacy is developmentally sequenced, not uniform. Early AI use without foundational knowledge can inhibit rather than support learning.

Should our universities implement different AI integration policies for different study years?

With foundational knowledge built before extensive AI use begins? Or with integrated approach?

Digital sovereignty empowerment

2. Equitable Access as Institutional Choice

Differences between paid and free AI tools create unequal learning opportunities; institutions cannot sidestep this by ignoring it. The choice is explicit: subsidize access, standardize free tools, or accept and manage inequality.

Should our universities guarantee equal access to AI?

If so, should we do it by subsidizing premium versions? Or establish own safe AI infrastructures? Or design pedagogy exclusively around free alternatives?

Responsible AI integration

3. Critical Epistemic Awareness of AI Systems

Students encounter AI biases effectively when comparing same prompts across multiple models and understanding whose interests are embedded in system design. This awareness becomes prerequisite for scientific integrity in AI-assisted work.

What learning environments and pedagogical methods should we employ to advance their ability to exercise critical judgment?

AI literacy & skills development

4. Process Scaffolding, Not Output Generation

AI adds measurable value when it scaffolds cognitive process; it is ineffective when it generates final outputs that bypass student reasoning.

How can we design learning processes and tasks, so AI supports thinking rather than replacing it?
And what indicators tell us we've achieved this balance?

Digital sovereignty empowerment

5. Technical Infrastructure as Sovereignty Factor

Version drift, limited functions, free-tier function changes, and LMS incompatibilities create institutional dependency on external platforms. Control is illusory without stable infrastructure. Institutional decision-making about tool selection directly affects pedagogical autonomy.

Should our universities invest in building or hosting custom AI tools for educational use, or is integrating third-party tools with their inherent instability an acceptable cost?

Responsible AI integration

6. Authorship and Attribution in AI-Assisted Research

As AI becomes involved in ideation, drafting, and analysis, traditional authorship models become ambiguous. Scientific integrity requires explicit frameworks for documenting and evaluating AI contributions while preserving the distinction between tool assistance and intellectual authorship.

Should our universities establish clear guidelines on AI disclosure and contribution attribution in research outputs, funding applications, and publications?

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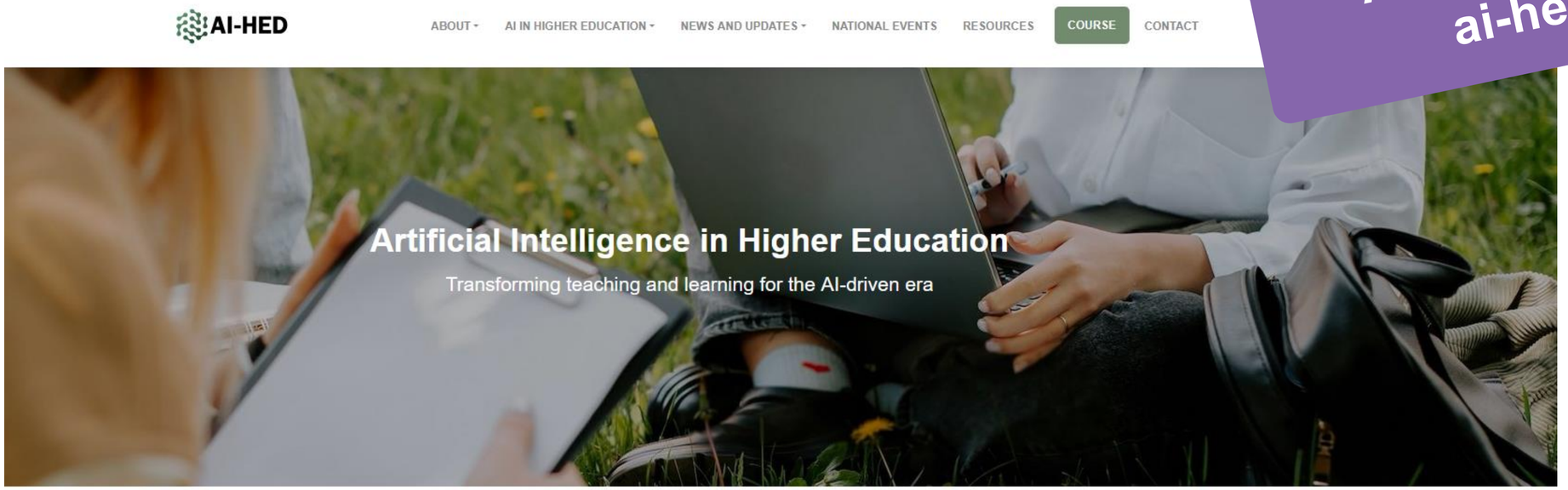
Stay with us - stay AI-HED!

RESOURCES AVAILABLE AT: ai-hed.eu

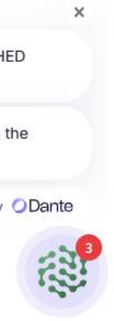


What is the AI-HED project?

We aim to adjust teaching and learning environments in Higher Education Institutions (HEIs) to the shifts caused by Artificial Intelligence.

This project focuses on enhancing skills, developing AI-integrated courses, and creating recommendations for HEIs to adopt AI responsibly and inclusively.





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THANK YOU!

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We would like to ask you to take part in our survey about your experience with the ‘Courses’ portal.