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AI Impact on Higher Education Quality: Experience, Trends and Prospects

Practical implementations at TU Graz

Adj.Prof. PhD. Martin Ebner, TU Graz

TAM CONFERENCE ON
«European Integration of Ukraine' Higher Education in the context of Bologna Process. Strategies for using Artificial Intelligence in Higher Education»
10.11.2026 Taras Shevchenko National University of Kyiv

TU Graz

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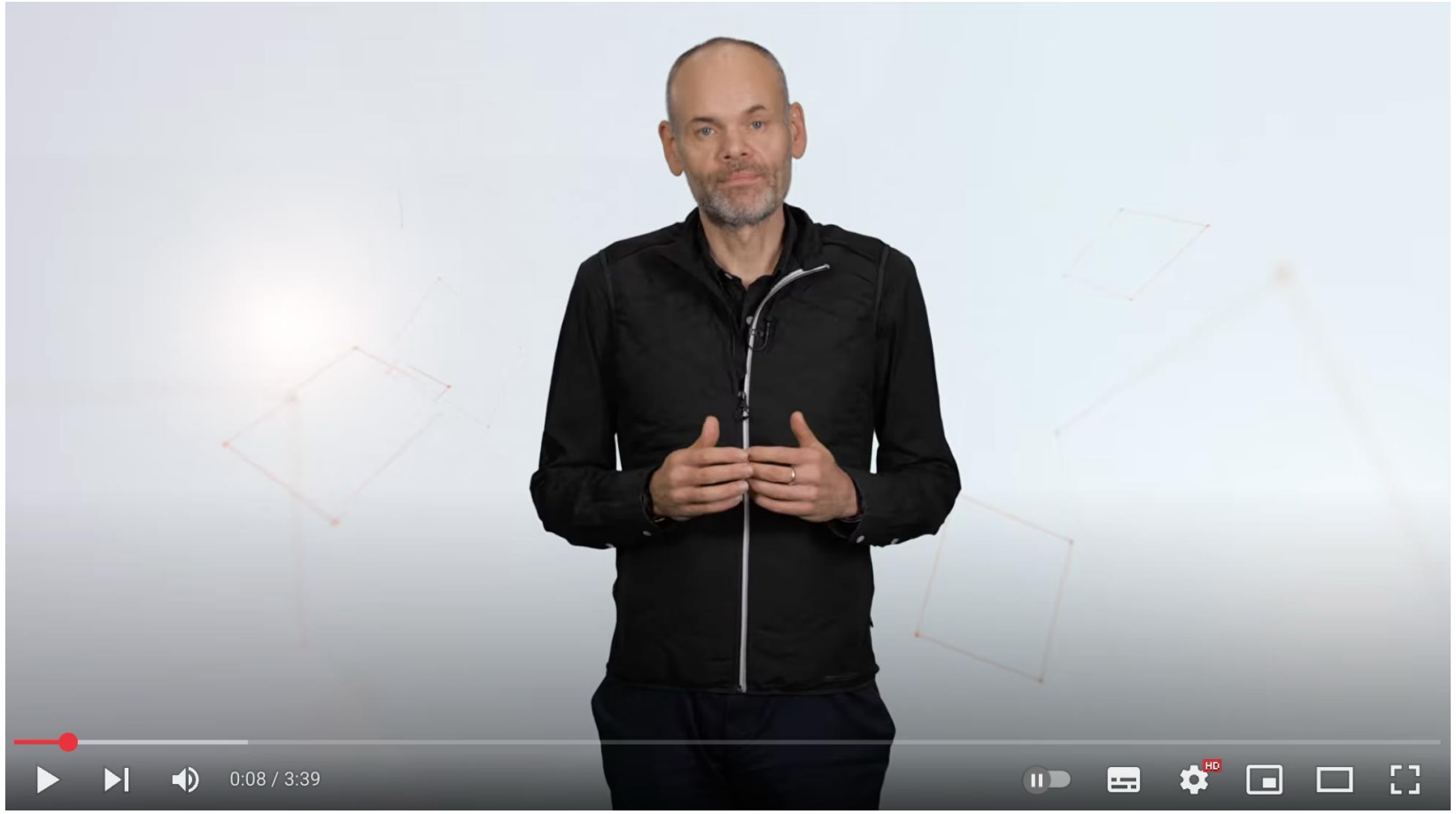


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The slides are available online at:
https://doi.org/10.3217/kxh02-7cj89

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German version : https://youtu.be/wW7s8RmVuAw?si=18mFO2D3PaxeViP3
English version : https://youtu.be/Yjm6cGn0zAc?si=10EK6v9BUkEB8ri3

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Why bother with AI technologies?

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AI in everyday learning

... Natural language processing (DeepL, ...)

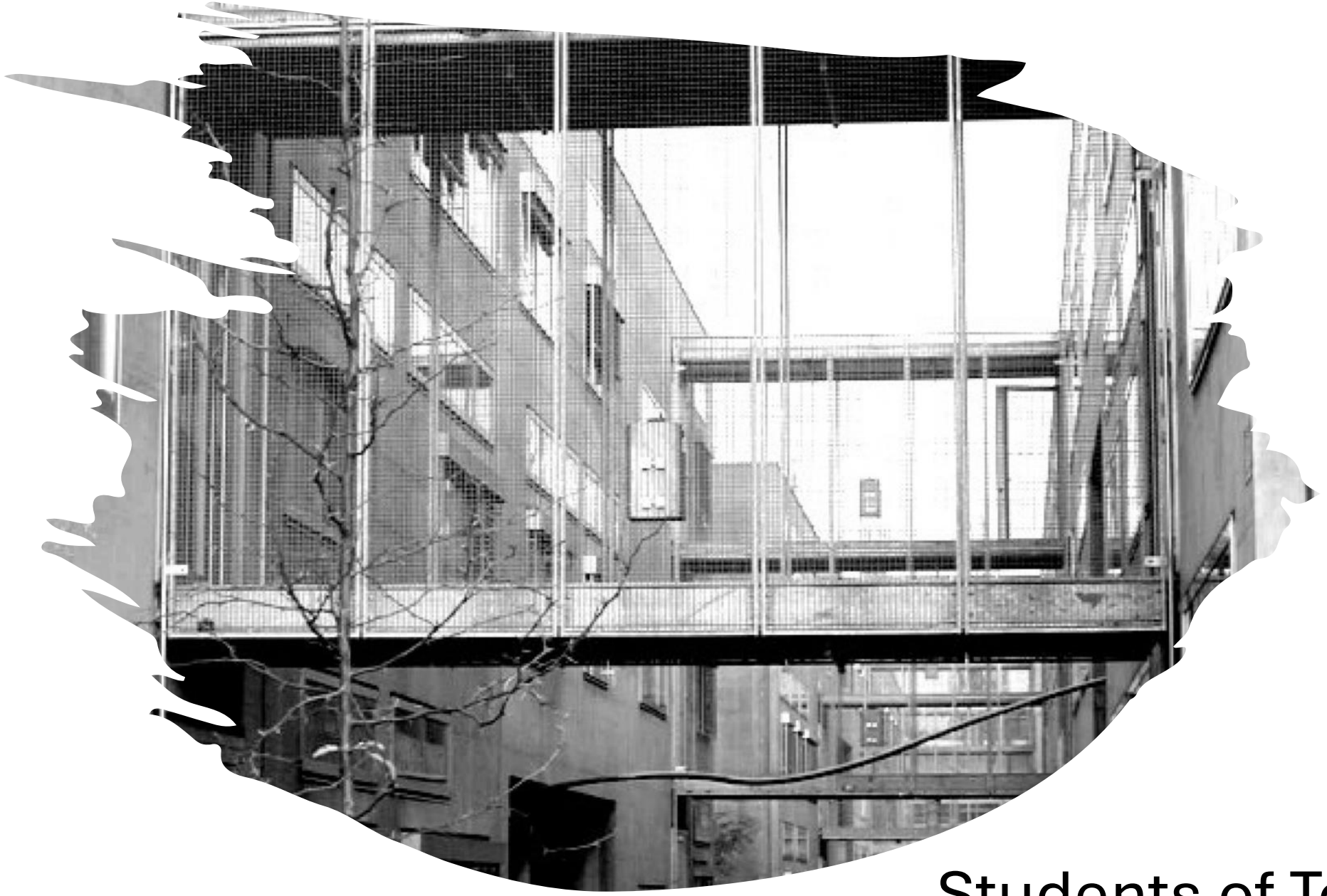
... Speech recognition (Text-to-speech, ...)

... Predictive models (Predictive analytics, ...)

... Image recognition (Handwritten text, ...)

... Recommendations (Recommendations, ...)

... Generative AI (ChatGPT & Co. ...)



Students of Today

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18-year-old Long-term study (n=15,879)

- WS 2007/2008 n=578
- WS 2008/2009 n=821
- WS 2009/2010 n=757
- WS 2010/2011 n=702
- WS 2011/2012 n=632
- WS 2012/2013 n=715
- WS 2013/2014 n=789
- WS 2014/2015 n=968
- WS 2015/2016 n=889
- WS 2016/2017 n=944
- WS 2017/2018 n=872
- WS 2018/2019 n =898
- WS 2019/2020 n=824
- WS 2020/2021 n=955
- WS 2021/2022 n=1207
- WS 2022/2023 n=1089
- WS 2023/2024 n=1102
- WS 2025/2026 n=1137

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What devices do you own?

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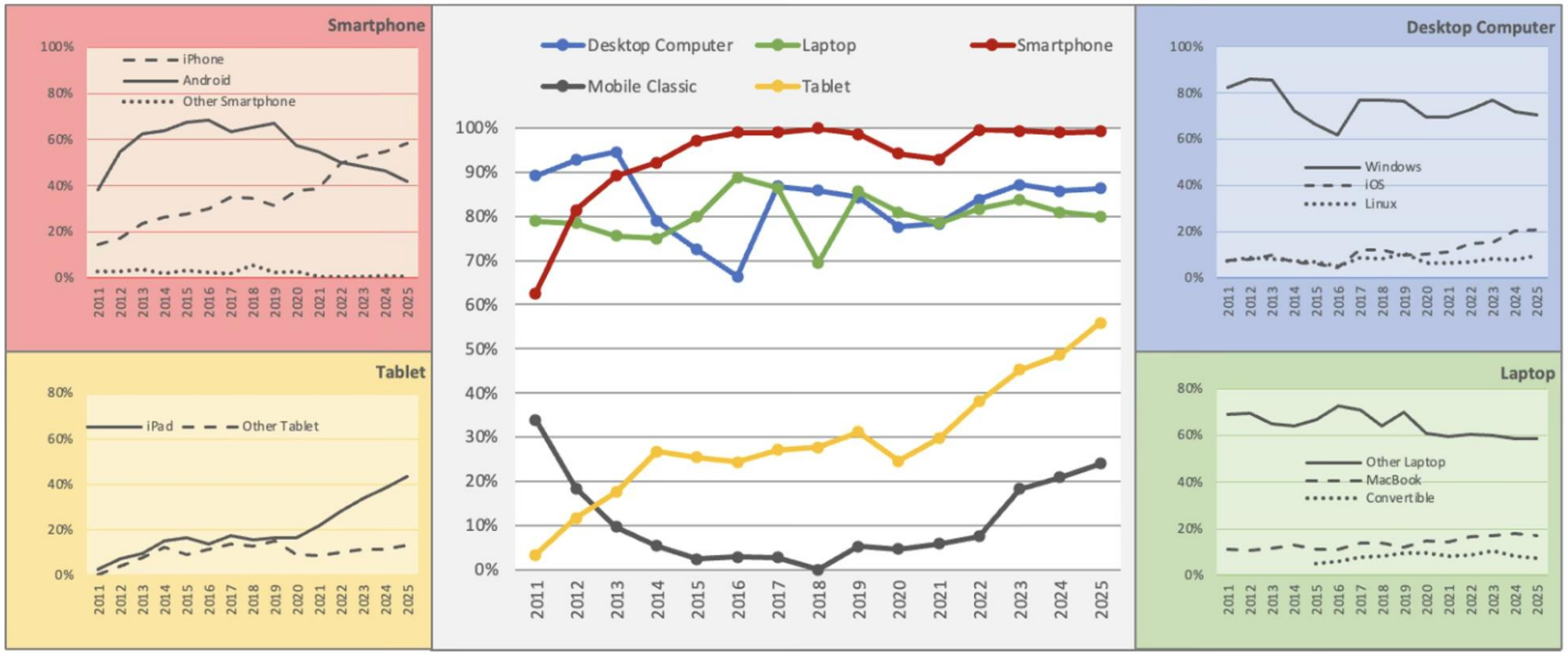


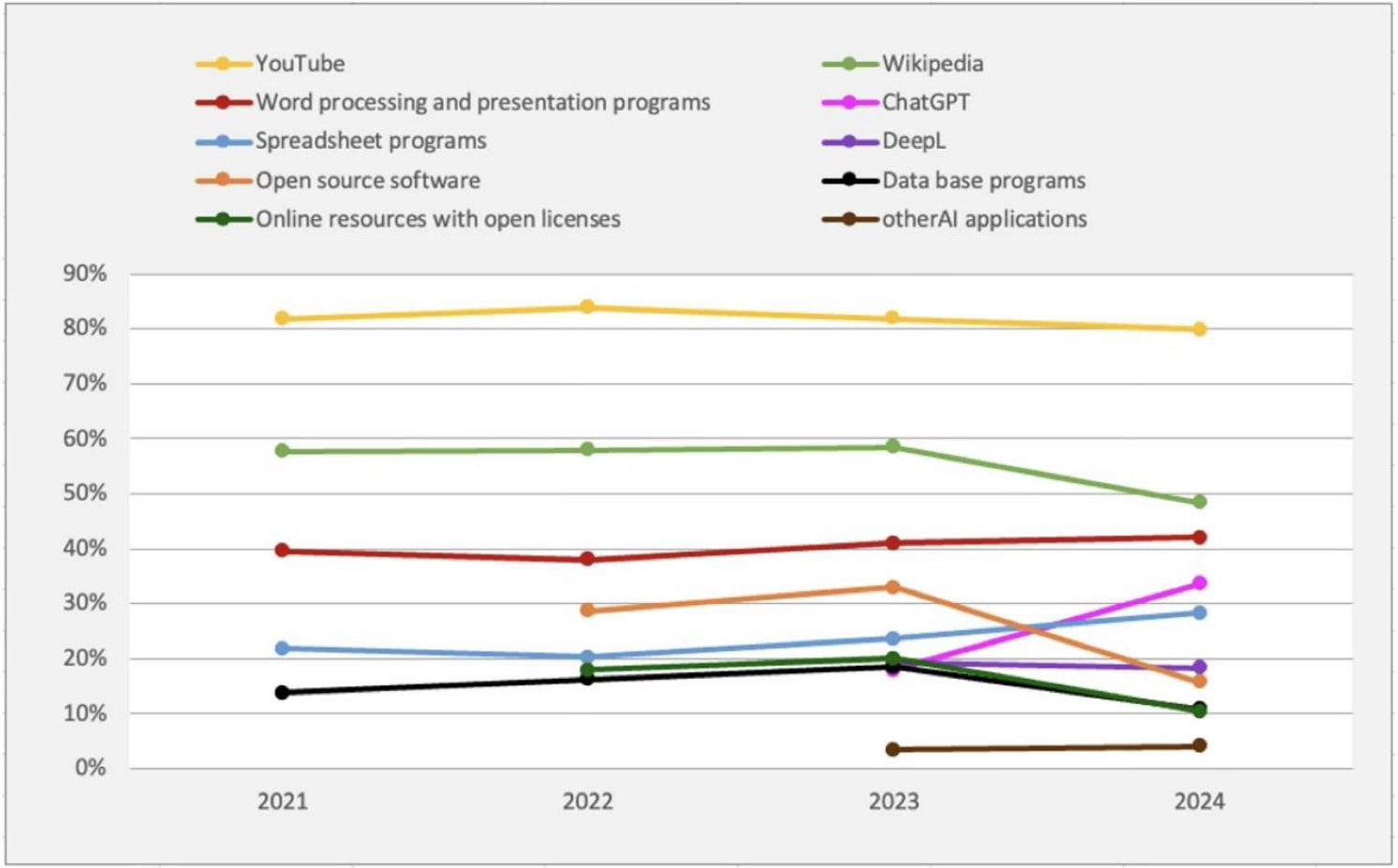
Figure 1: Equipment of first-year students at TU Graz between 2011 to 2025. Source: Annual survey of study beginners at TU Graz (n2011=632, n2012=715, n2013=789, n2014=968, n2015=889, n2016=944, n2017=872, and n2018=898, n2019=824, n2020=955, n2021=1,207, n2022=1,089, n2023=1,102, n2024=1,110, n2025=1,137).

Nagler, W., Mayr, B., Ebner, M., Schön, S. & Bruenner, B. (2026). Digital Equipment Evolution and IT Activity of TU Graz study beginners (2011-2025): Challenges of Tablet and AI Dominance for University Digital-Sovereignty Initiatives. In Proceedings of EdMedia 2026 Edinburgh (pp. 119-129). Waynesville, NC: Association for the Advancement of Computing in Education (AACE). Retrieved June 15, 2026 from [https://www.learntechlib.org/primary/p/2129631/]

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AI applications for learning?

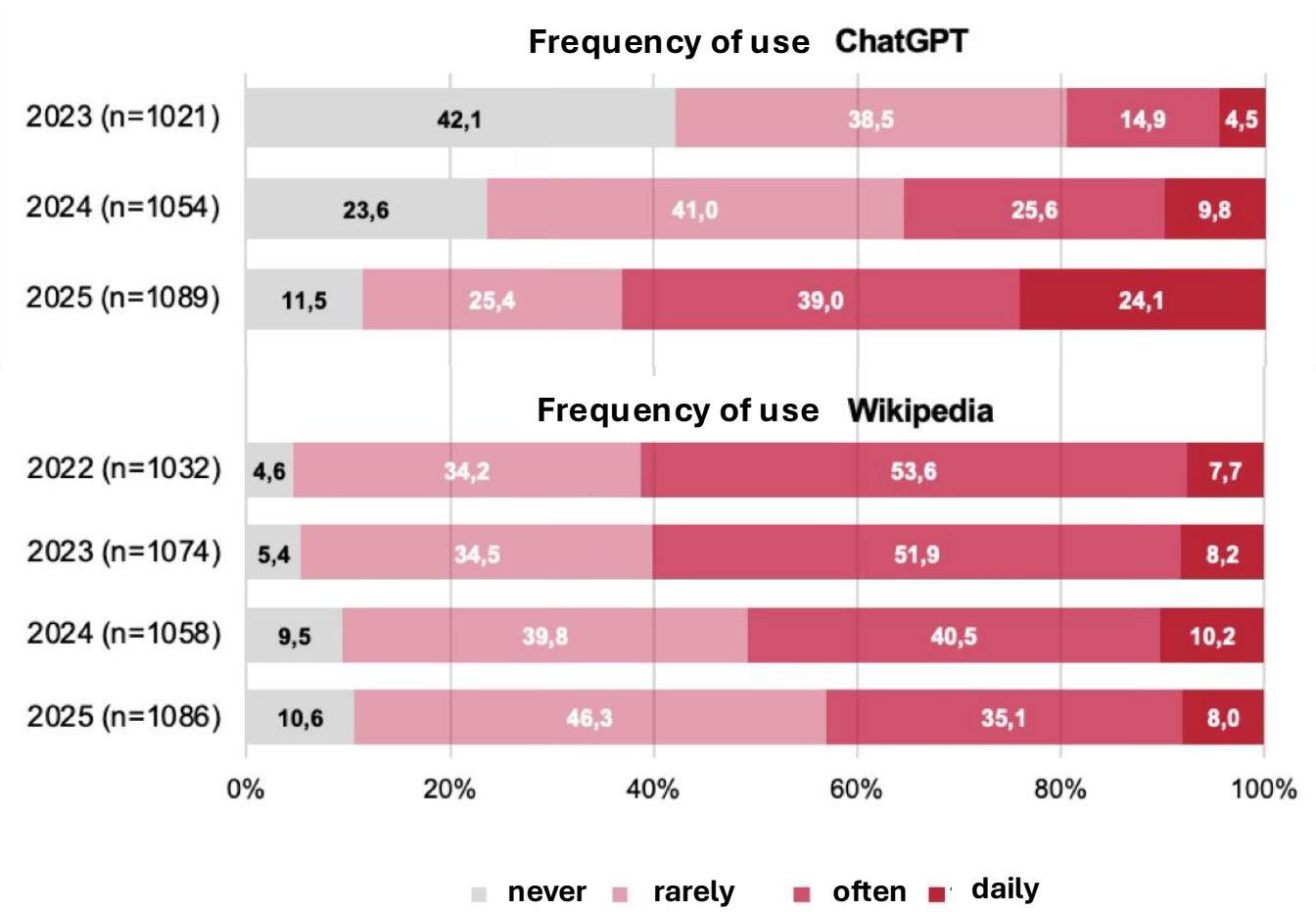
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Nagler, W., Mair, B., Ebner, M., & Schön, S. (2025).Inspired by generative AI, Ignoring Open Knowledge? Findings from a Longitudinal Study on Digital Equipment and Activities of Study Beginners at TU Graz (2011–2024). EdMedia + Innovate Learning 2025 Conference.

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ChatGPT vs. WikiPedia?



Schön, Sandra; Ebner, Martin; Mair, Bettina & Nagler, Walther (2026). Veränderungen von Wissen und Nutzung von OER, Open-Source-Spftware und generativer Künstlicher Intelligenz bei Studienanfänger:innen - und welche Bedeutung das hat. In: Beiträge zur Hochschulforschung, Bd. 48, Nr. 2 (2026). DOI: https://doi.org/10.58069/bzh.2026.2.177

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Basic AI skills

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Wissenschaftliche Einordnung:

Rechtswissenschaften (505)

Kursstart: 10. März 2026

Der EU AI Act im Hochschulkontext: Grundlagen für Lehre, Forschung und Verwaltung

Universität Wien, Hochschule Campus Wien
Univ.-Prof. Dr. Nikolaus Forgó

Dieser Kurs ist Teil einer MOOC-Serie: KI-MOOCs

Anmelden & Einschreiben

Umfang: 10 Lektionen
Aufwand: 2 Stunden/Lektion
Teilnehmende aktuell: 382
Lizenz: CC BY-NC 4.0
Kursstart: 10. März 2026
Kursende: -

https://imoox.at/course/AI-ACT (verfügbar seit 10.3.26)

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Basic AI skills

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https://imoox.at/course/genKI (verfügbar seit 1.10.25)

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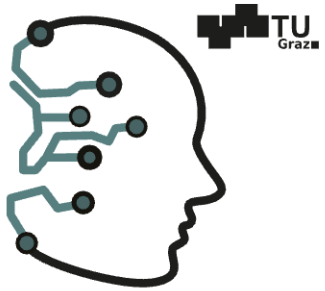
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AI Teaching and Applications at Graz University of Technology

FLAAIT

Future Learning, Analytics & AI for Teaching



About us

FLAAIT is a group of researchers, developers, and analysts from Graz University of Technology, Austria.

We are part of the Educational Technology service department, whose motto is "We care about eEducation". We support high-quality, location-independent teaching through innovative digital solutions and promote open, sustainable education for students.

Our EdTech Research Community Graz is dedicated to advancing the field of education through innovative research and practical applications of educational technology (EdTech).

Contact us at flaait.llt@tugraz.at

https://flaa.it/

https://www.tugraz.at/oe/lehr-und-lerntechnologien/angebote-und-services/future-learning-analytics-ai-for-teaching

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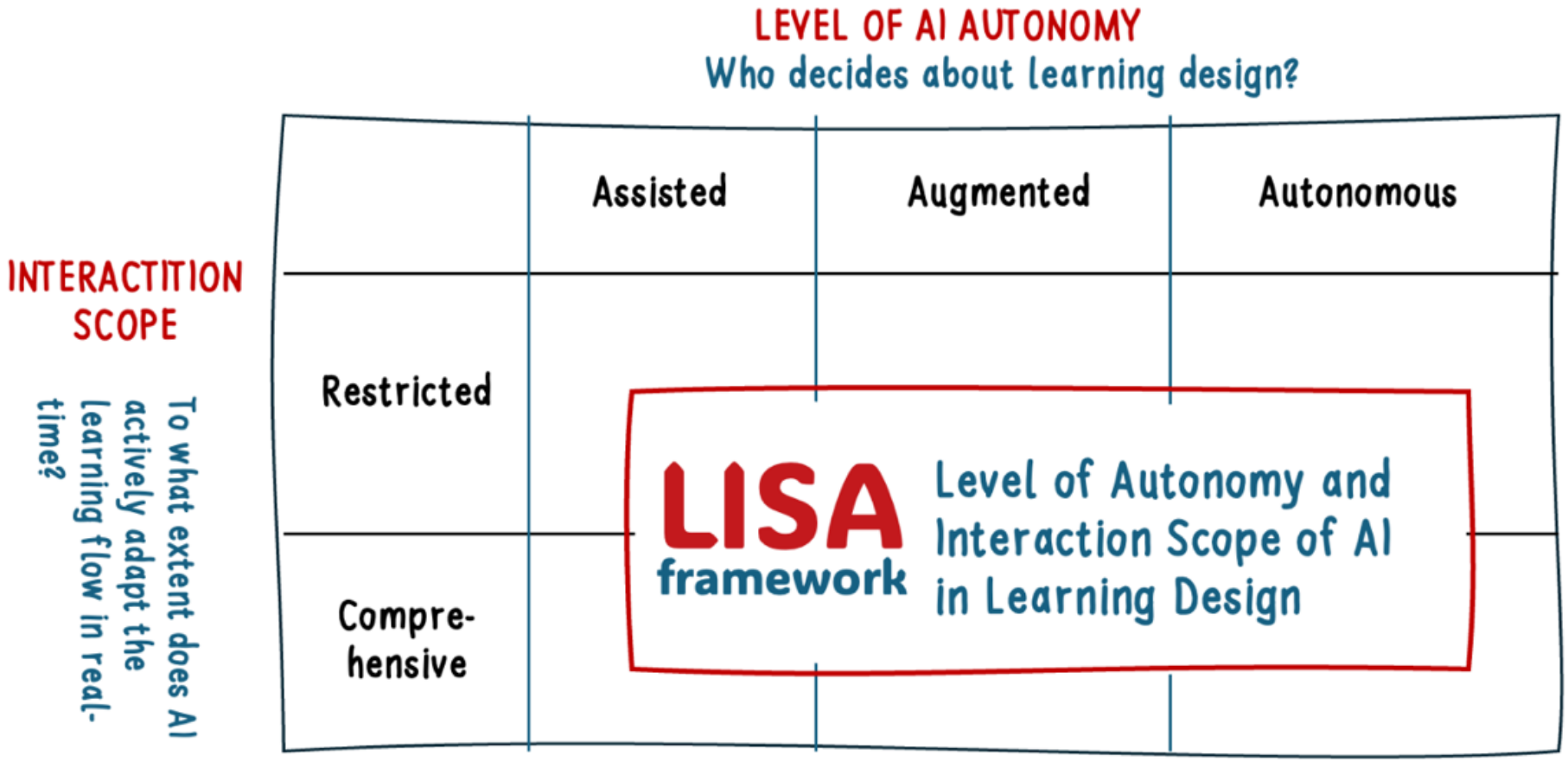
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Development of an Exploratory Conceptual **Framework**

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LISA framework

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Schön, S., Brünner, B. Ebner, M. (2026). Introducing the LISA Framework: Level and Integration Scope of Artificial Intelligence in Learning Design. submitted, under review

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Levels of AI Autonomy

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Term	AI-Assisted Learning Design	AI-Augmented Learning Design	AI-Autonomous Learning Design
Core Definition	The AI provides supportive services (data aggregation, idea suggestions, draft creation, quality checks); the human designer remains the sole decision-maker.	The AI expands the design process by delivering adaptive pathways, generative content, or predictive analytics; control becomes difficult or impossible to retain fully.	The AI takes over the entire instructional-design workflow (needs analysis, content creation, sequencing, assessment, optimization) without active human intervention.
Primary Decision-Maker	Human (instructional/learning designer)	Shared control (human defines parameters, AI operates within them)	AI (only governance/compliance review)
How AI Operates	Helps, potentially reduces feedback loops with third parties.	Builds dynamic learning structures, creates personalized media, supplies data-driven predictions.	Fully automated, self-learning systems that produce content from analytics, web-mining, and generative models.

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Categories of Interaction

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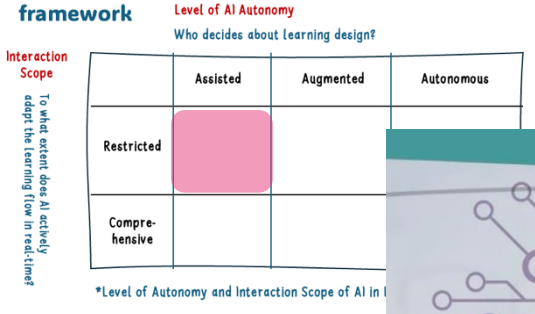
Term	Restricted Interaction	Comprehensive Interaction
Core Definition	AI operates as a static tool; executes tasks based on fixed rules without altering the learning trajectory in real-time.	AI operates as an adaptive agent; dynamically adapts content, sequence, and feedback based on real-time learner data and context.
Form of Interaction	Linear and discrete. The AI provides output and waits for the next command. No continuous adaptation loop.	Non-linear and iterative. The AI continuously monitors and adjusts the flow, anticipating needs and modifying delivery instantly.
Agentic Capability	Low/None. Follows a pre-defined script regardless of learner performance or state.	High. Actively perceives context, plans actions, and reshapes the learning path based on immediate feedback.

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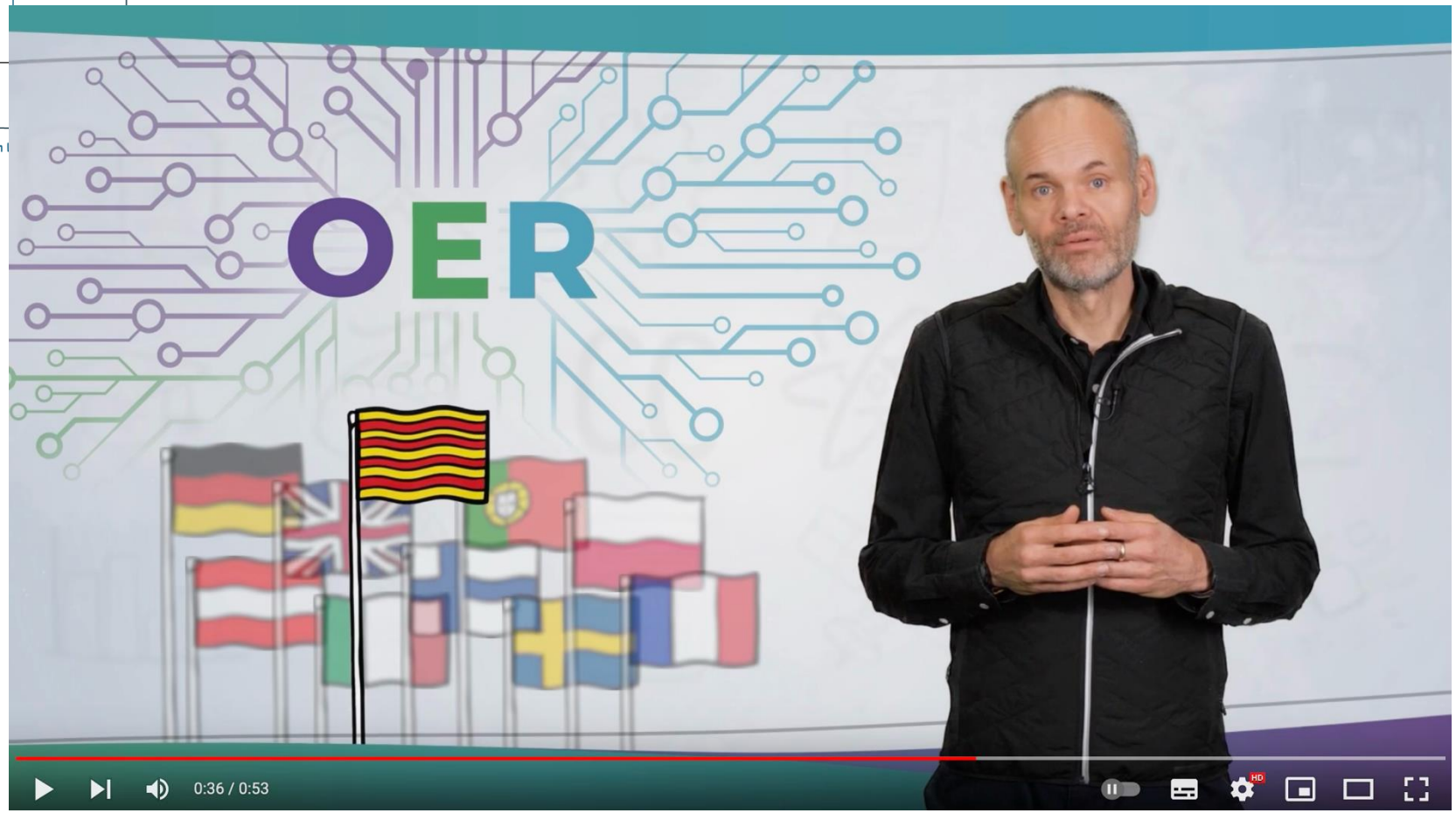
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Practical examples of Graz University of Technology

LISA framework



Multilingual AI avatar

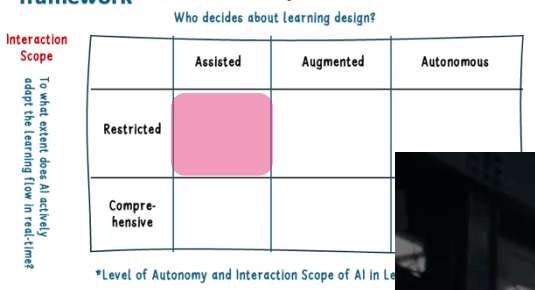


https://youtu.be/KpEWw5zz--c?si=2aWJe2J9L3c4zt_8

Trailer of the MOOC „Open Educational Resources in Higher Education“

https://imoox.at/course/OERinHE

LISA framework



*Level of Autonomy and Interaction Scope of AI in Le

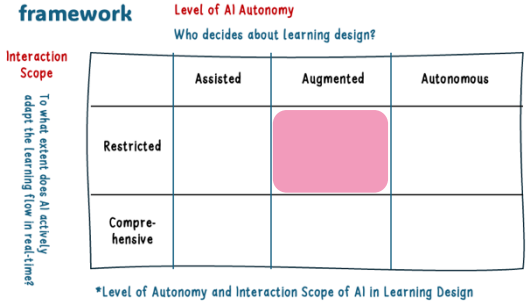
AI-based MOOC

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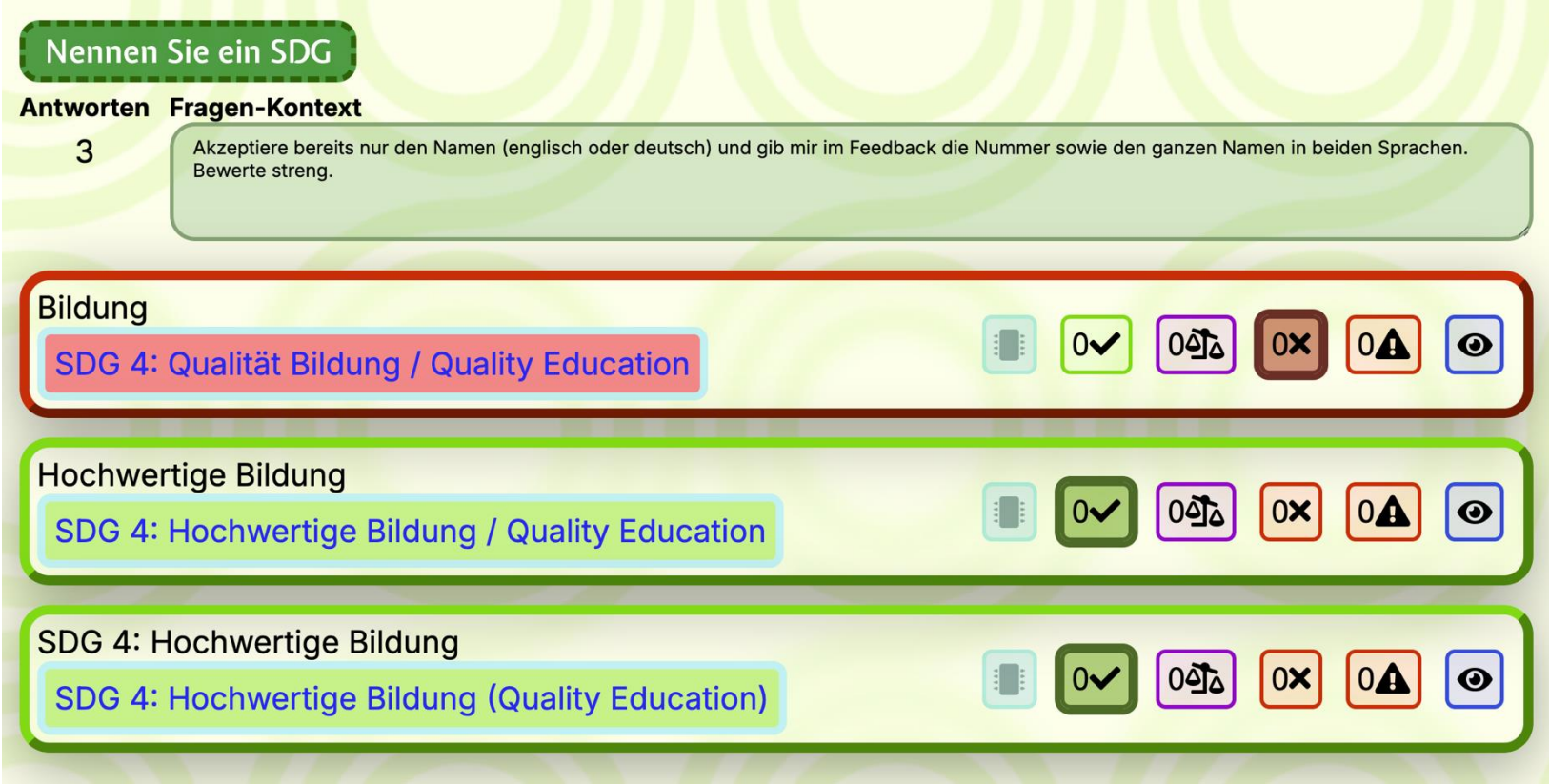
LISA framework



*Level of Autonomy and Interaction Scope of AI in Learning Design

Echo-Quiz

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Brünner, B., Ebner, M. (2026). Enhancing Synchronous Collaborative Learning with AI-Supported Audience Response Systems: The EchoQuiz Approach. In: Auer, M.E., Toth, P. (eds) Innovation via Collaborative Learning in Engineering Education. ICL 2025. Lecture Notes in Networks and Systems, vol 1847. Springer, Cham. https://doi.org/10.1007/978-3-032-18885-4_2

LISA framework

Level of AI Autonomy

Who decides about Learning design?

Interaction Scope

To what extent does AI actively adapt the learning flow in real-time?

	Assisted	Augmented	Autonomous
Restricted			
Compre-hensive			

*Level of Autonomy and Interaction Scope of AI in Learning Design

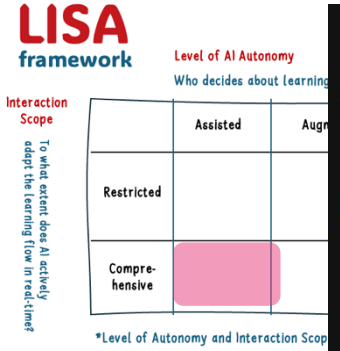
AI-generated video path

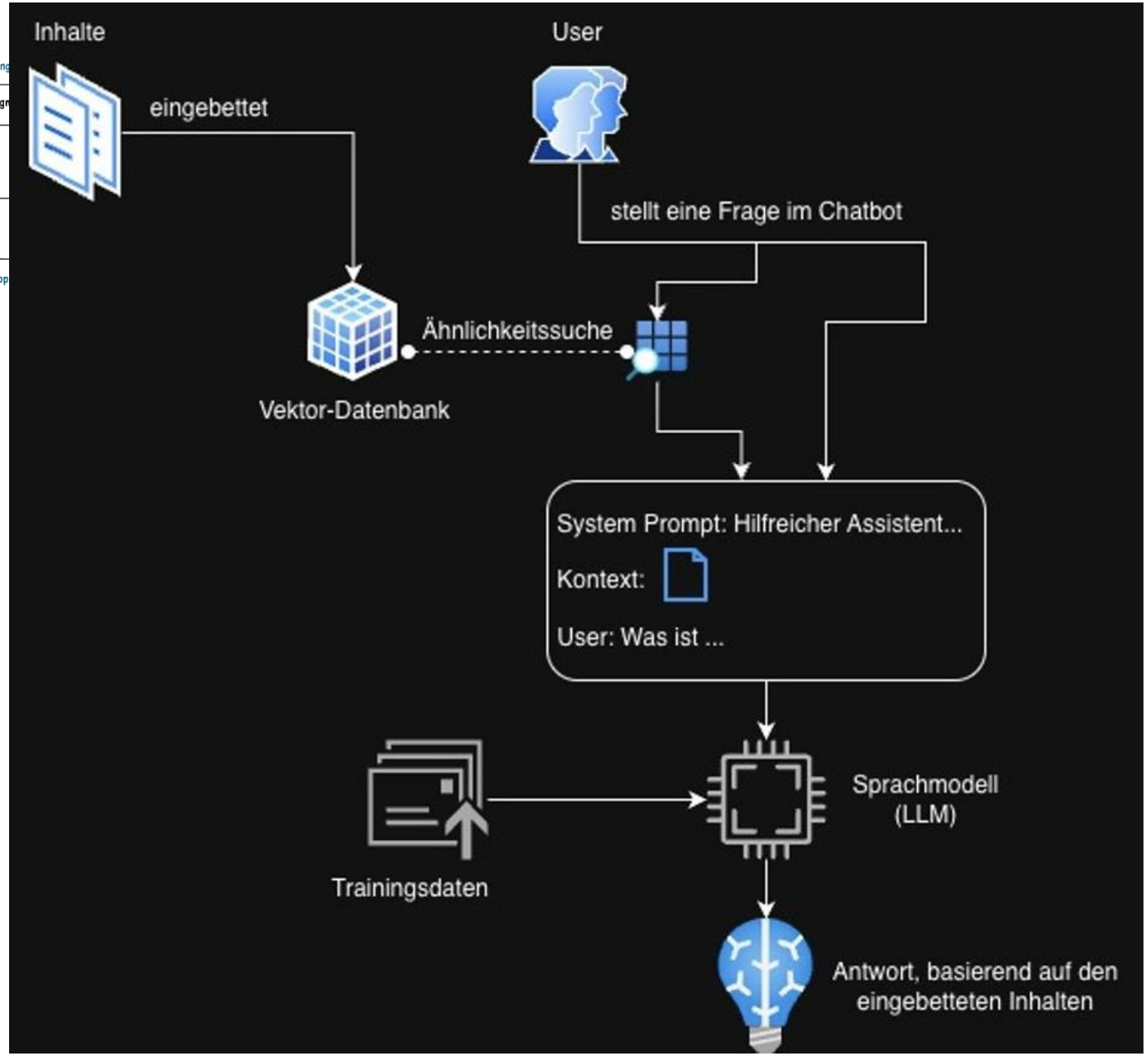
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Zur Eingabe

Alle Video-Pfad-Eingaben löschen und neu anfangenLogout from story: genkimooc for user Siegi

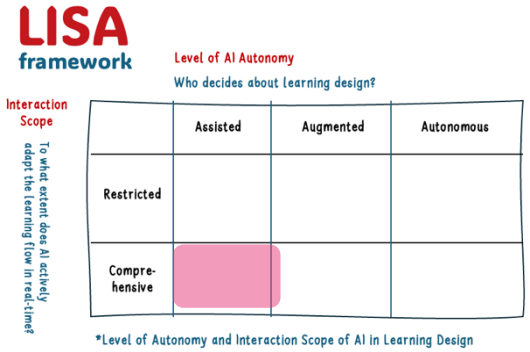




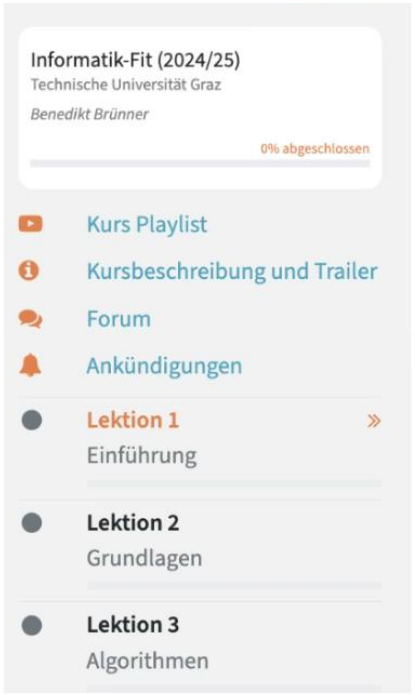
Chatbot

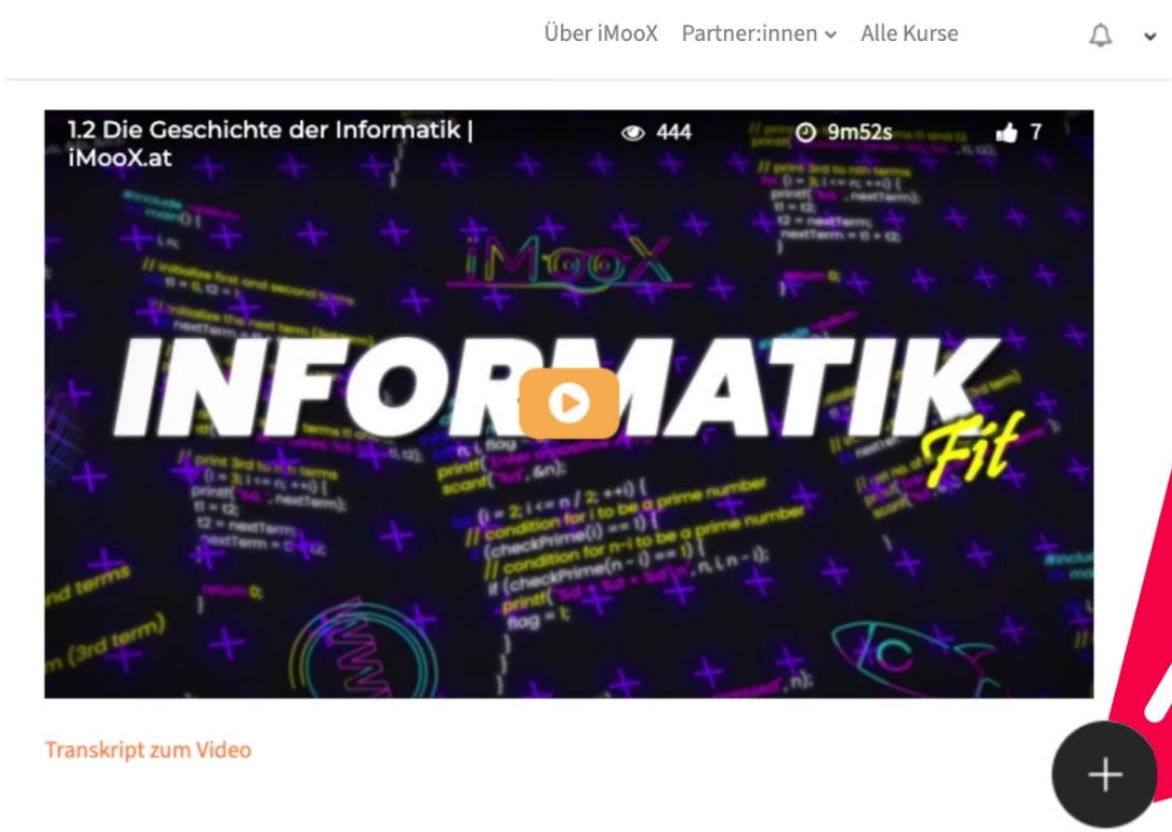
Brünner, B., Ebner, M. (2025). InfoFit and Beyond: AI Chatbots as EdTech Tools for Self-Regulated Learning in MOOCs. In: Smith, B.K., Borge, M. (eds) Learning and Collaboration Technologies. HCII 2025. Lecture Notes in Computer Science, vol 15807. Springer, Cham. https://doi.org/10.1007/978-3-031-93567-1_4

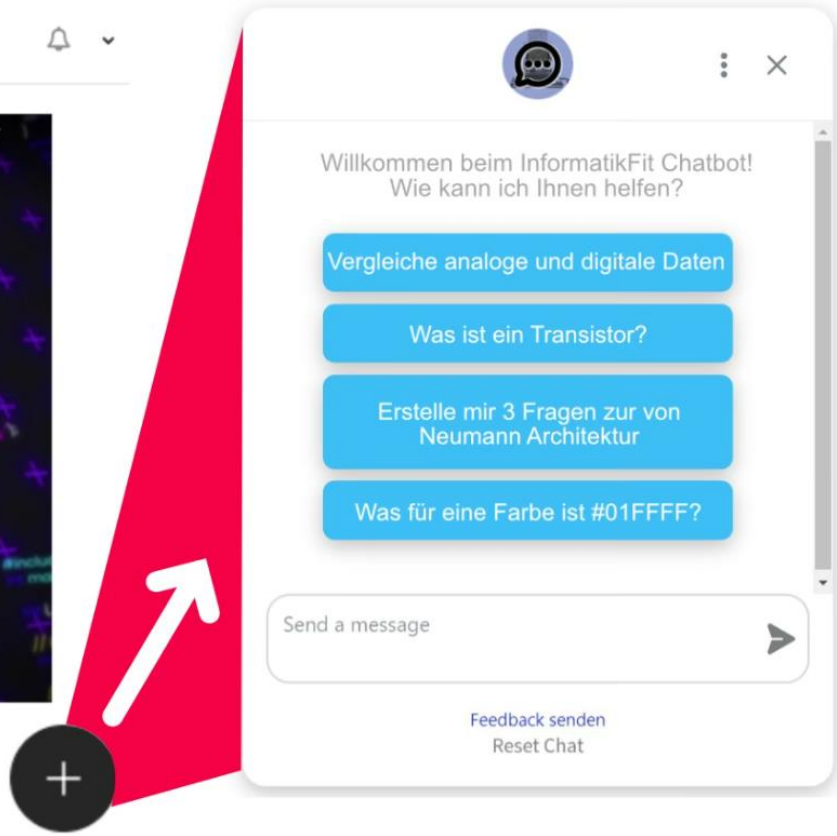
Chatbot



*Level of Autonomy and Interaction Scope of AI in Learning Design

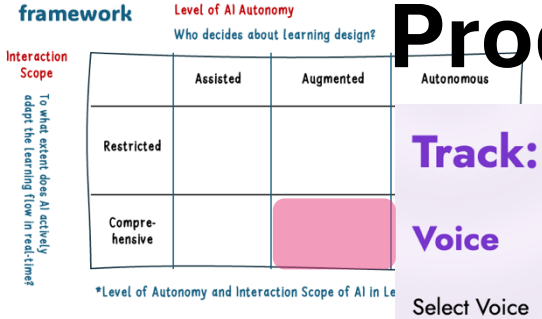






Brünner, B., Ebner, M. (2025). InfoFit and Beyond: AI Chatbots as EdTech Tools for Self-Regulated Learning in MOOCs. In: Smith, B.K., Borge, M. (eds) Learning and Collaboration Technologies. HCII 2025. Lecture Notes in Computer Science, vol 15807. Springer, Cham. https://doi.org/10.1007/978-3-031-93567-1_4

LISA framework



Production of educational podcasts

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Track:

Voice

Select Voice

Christian Plasa

Listen to Voice

0:00 / 0:01

Questions to generate your Episode

Was ist ein Ziel, das du dir zuletzt selbst gesetzt hast?

Your answer here

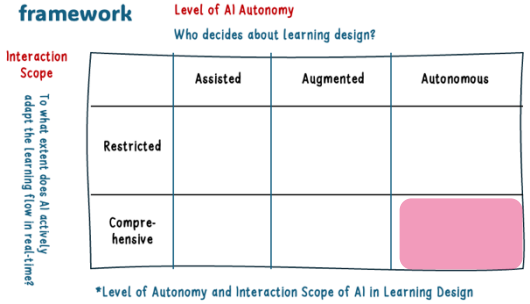
Hast du ein Ziel, das du in den nächsten drei Jahren erreichen willst?

Your answer here

Submit and create Episode

Ebner, M. & Brünner, B. (2025). Workshop for Special Interest Group Emerging Technologies for Learning and Teaching: Exploring Educational Podcasts with AI. In T. Bastiaens (Ed.), Proceedings of EdMedia + Innovate Learning (pp. 1375-1376). Barcelona, Spain: Association for the Advancement of Computing in Education (AACE). Retrieved June 4, 2025 from https://www.learntechlib.org/primary/p/226347/

LISA framework

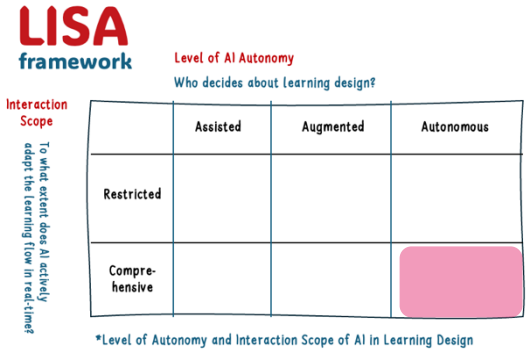


*Level of Autonomy and Interaction Scope of AI in Learning Design

Prompting School

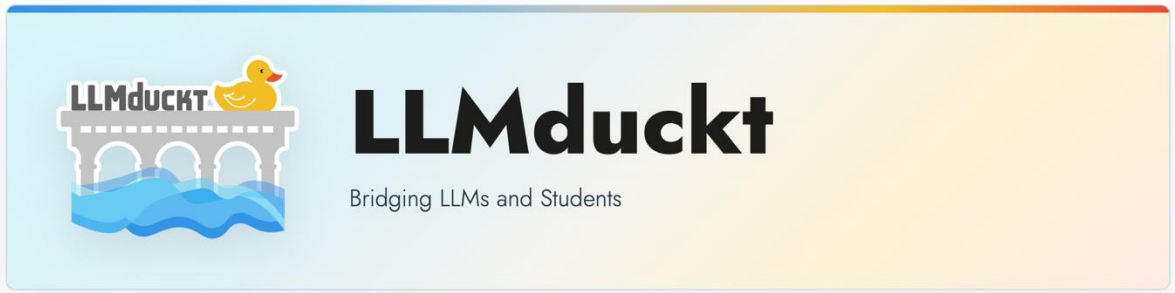


https://prompting.school



Gateways to LLMs





Awarded with the **Prize for Digital Sovereignty** in Higher Education

https://llm.tugraz.at/

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AI can be used in teaching in a **wide variety** of complex ways,
so the distinctions outlined in the LISA framework are very helpful.
This framework provides an **essential initial categorization** that can **support teaching strategies** in a **sustainable** way.

Post-Generative

Benedikt Brünner **Martin Ebner** **Sandra Schön** **Kajetan Hoffmann** **Christian Ortner** **Philipp Leitner**

Educational Technology, Graz University of Technology, Austria

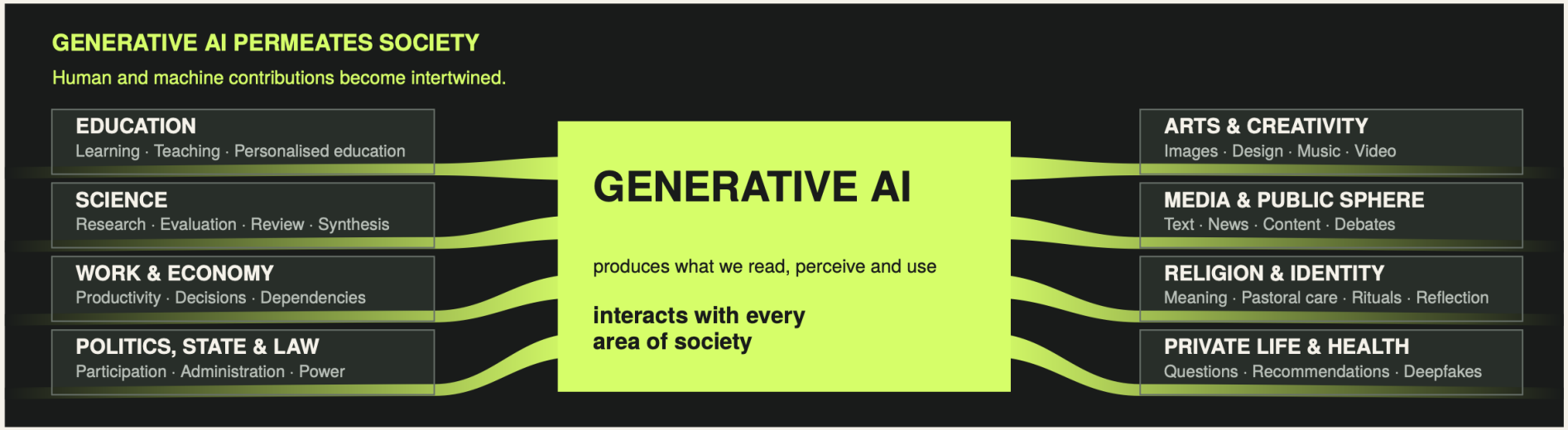
Everyday life permeated by generative AI.

https://postgenerative.at/

POST-GENERATIVE / CONCEPT PROPOSAL

Post-generative describes a societal condition in which generative artificial intelligence permeates everyday life. It shapes how people work, learn, communicate, design and produce knowledge. Its outputs enter the information, tools and environments we encounter every day, affecting even those who do not consciously use it. [1] Human and machine contributions become intertwined and increasingly difficult to distinguish. AI outputs are increasingly adopted or passed on without people reviewing them individually. The volume and speed of generation can overwhelm human oversight. At the same time, new dependencies emerge: whoever controls AI systems shapes access to knowledge and participation. Drawing on the idea of the post-digital [2], the post-generative describes a world already transformed by generative AI, whose possibilities, expectations and conflicts it helps to shape.

TERM HISTORY / With this new term, the author team Brünner, Ebner et al. aims to put the condition they perceive into words. While searching for a term, we found it already in use with a different meaning: in Kyoto in 2025 as ポスト生成AI共生社会 (“Post-Generative AI Inclusive Society”). [3] [4]



ADOPTION EU 2025: 32.7 % of people aged 16-74 used GenAI in the previous three months. [5] More than 70 % of the ChatGPT messages analysed in 2025 were unrelated to work. [6]

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THANKS

Martin Ebner
martin.ebner@tugraz.at
https://elearningblog.tugraz.at

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