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Resources for the use of artificial intelligence (AI) in education

Compiled by: Dr. László Horváth
(*ELTE DOKK Artificial Intelligence in Education Lab*)





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Glossary

Basic concepts from the field of AI and pedagogy



Artificial Intelligence (AI)

Artificial intelligence is the study and development of intelligent agents that can perceive their environment and take actions to maximize their chances of successfully achieving specific goals.

Source: Russell, S. J., & Norvig, P. (2020). Artificial intelligence: A modern approach (4th ed.). Pearson.

Generative AI

Generative AI refers to models that can create new, original content such as text, images, or music based on patterns learned from existing data.

Source: Bozkurt, A., & Sharma, R. C. (2023). Generative AI and prompt engineering: The art of whispering to let the genie out of the algorithmic world. Asian Journal of Distance Education, 18(2), i-vii.

<https://doi.org/10.5281/zenodo.8174941>

Large Language Model (LLM)

Large language models are machine learning models trained on vast amounts of text data to understand and generate human-like text, enabling them to solve a wide range of language tasks.

Source: Russell, S. J., & Norvig, P. (2020). Artificial intelligence: A modern approach (4th ed.). Pearson.

Natural Language Processing (NLP)

Natural language processing is the field that focuses on the interaction between computers and human language, enabling machines to understand, interpret, and generate text.

Source: Russell, S. J., & Norvig, P. (2020). Artificial intelligence: A modern approach (4th ed.). Pearson.

Prompt Engineering

Prompt engineering is the process of crafting well-designed inputs to guide generative AI models, optimizing communication between humans and AI to achieve desired outputs.

Source: Bozkurt, A., & Sharma, R. C. (2023). Generative AI and prompt engineering: The art of whispering to let the genie out of the algorithmic world. Asian Journal of Distance Education, 18(2), i-vii.

<https://doi.org/10.5281/zenodo.8174941>

Differentiation

Differentiation refers to designing, organizing, implementing, and evaluating teaching-learning processes tailored to students' diverse abilities, prior knowledge, and learning needs. Its goal is to ensure that all students achieve their best possible performance based on their individual capacities.

Source: Oktatás 2030 Tanulástudományi Kutatócsoport. (2020). Pedagógiai és módszertani szakkifejezések. Oktatás2030. <https://www.oktatas2030.hu/wp-content/uploads/2020/10/pedagogiai-s-modszertani-szakkifejezesek.pdf>

Assessment

Assessment involves measuring and providing feedback on student performance and progress in achieving learning outcomes, using diagnostic (assessing students' initial knowledge level), formative (supporting progress during the learning process), and summative (providing a summary evaluation at the end of the process) methods. Its purpose is to support student development and reflect the added value of the learning process.

Source: Oktatás 2030 Tanulástudományi Kutatócsoport. (2020). Pedagógiai és módszertani szakkifejezések. Oktatás2030. <https://www.oktatas2030.hu/wp-content/uploads/2020/10/pedagogiai-s-modszertani-szakkifejezesek.pdf>

Reflectivity

Reflectivity is a higher-order thinking process where students and teachers review their actions to learn from them and improve future outcomes. It is a critical component of effective learning and teaching.

Source: Oktatás 2030 Tanulástudományi Kutatócsoport. (2020). Pedagógiai és módszertani szakkifejezések. Oktatás2030. <https://www.oktatas2030.hu/wp-content/uploads/2020/10/pedagogiai-s-modszertani-szakkifejezesek.pdf>

Self-regulated learning

Self-regulated learning is a process in which students actively plan, monitor, and evaluate their learning activities to achieve their goals more effectively. In higher education, it is particularly important for fostering independent learning and professional development.

Source: Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice*, 41(2), 64–70.

https://doi.org/10.1207/s15430421tip4102_2

Adaptable prompt ideas

To carry out activities related to the pedagogical use of AI



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I use AI-based tools to reflect on and improve my teaching and research work.

Technique: Chain-of-Thought (CoT) Prompting

Description:

Chain-of-Thought Prompting (CoT) encourages the model to generate intermediate reasoning steps, enhancing its ability to tackle complex tasks that require logical progression. It helps break down the thought process into manageable steps for better clarity and depth. For more information, visit [Prompting Guide: Chain of Thought](#).

Prompt for Reflection on Teaching Practice:

I am a university teacher who wants to reflect on and improve my teaching practices. Help me by breaking the reflection process into clear steps. Guide me to:

1. Identify specific moments in my teaching that I found effective or challenging.
2. Analyze the reasons behind the success or challenges in these moments.
3. Propose actionable steps to enhance what worked and improve what didn't.
4. Suggest relevant teaching strategies or methods I can experiment with to address these challenges.
5. Help me summarize this reflection into a brief action plan for my next semester's teaching.

I use AI-based tools to encourage and support students in developing self-directed learning strategies.

Technique: Zero-Shot Prompting

Description:

Zero-Shot Prompting asks the AI to perform a task without providing any examples, relying on its pre-existing knowledge and training. It is ideal for generating responses when the task is straightforward or the instructions are clear. For more information, visit [Prompting Guide: Zero-Shot Prompting](#).

Prompt to Encourage Self-Directed Learning:

I am a university teacher seeking to encourage my students to develop self-directed learning strategies. Please provide me with a detailed list of practical methods and activities I can implement to:

1. Teach students how to set clear, achievable learning goals for themselves.
2. Guide students in organizing their study plans effectively to manage time and resources.
3. Help students reflect on their learning progress and identify areas for improvement.
4. Foster intrinsic motivation by connecting learning objectives to their personal and professional interests.
5. Use AI-based tools, such as chatbots or virtual assistants, to support their self-directed learning.

I use AI-based tools in higher education to design and implement diverse and effective assessment strategies that meet students' needs.

Technique: Prompt Chaining	Step 1: Define Assessment Goals	based tools or technology-enhanced assessments. Please explain the advantages and potential challenges of each method.	constructive, and actionable feedback to students.
Description: Prompt Chaining involves breaking down complex tasks into a sequence of simpler, logically connected prompts. Each step builds upon the previous one, making it easier to handle multifaceted processes such as designing effective assessments. This approach ensures comprehensive and iterative task completion. For more information, visit Prompting Guide: Prompt Chaining .	Help me define clear and measurable goals for an assessment strategy in a university-level course. Provide questions I can ask myself to identify: 1. The specific skills, knowledge, or competencies I want to assess. 2. How these align with the course learning outcomes. 3. The balance I need between formative and summative assessments.	Step 3: Design an Example Assessment Create a specific example of an assessment task for my course. It should: 1. Align with the learning outcomes defined earlier. 2. Be accessible to all students, considering diverse needs. 3. Include clear instructions for students and criteria for grading. 4. Demonstrate how AI-based tools can enhance the assessment process (e.g., auto-grading, real-time feedback)."	2. Ways to encourage students to reflect on their performance and identify areas for improvement. 3. Methods for me to gather feedback from students about the assessment itself to improve future iterations.
	Step 2: Select Assessment Methods Based on the following goals [insert goals from Step 1], suggest diverse assessment methods that: 1. Address different learning styles and student needs. 2. Incorporate a mix of individual and group activities. 3. Include innovative approaches such as AI-	Step 4: Plan for Feedback and Reflection Help me plan a feedback and reflection process for the assessment. Include: 1. Strategies for providing timely,	Step 5: Finalize the Assessment Strategy Combine all the elements from the previous steps to create a cohesive assessment strategy for my course. Provide a summary that includes: 1. Goals and learning outcomes. 2. Chosen assessment methods with a rationale. 3. A sample assessment task. 4. Feedback and reflection plan. Ensure the strategy is diverse, student-centered, and meets the needs of all learners.

I use AI-based tools to motivate and actively involve students in the learning process.

Technique: ReAct (Reasoning and Acting)

Description:

ReAct is a prompting technique that combines reasoning with actionable steps. The AI first generates a logical thought process and then proposes practical actions based on that reasoning. This dual approach helps in addressing challenges and implementing solutions simultaneously. For more information, visit [Prompting Guide: ReAct](#).

Prompt for Motivating Students:

I am a university teacher looking to motivate and actively involve students in my course. Use the ReAct technique to:

1. Reason through why students might feel disengaged or unmotivated.
2. Propose specific actions I can take to address these issues, such as incorporating interactive activities, using AI-based tools, or adapting course content to students' interests.
3. Ensure the suggestions include both in-class and out-of-class strategies that foster engagement and active participation.

Prompt for Designing an Interactive Learning Session:

I want to design a highly engaging 90-minute learning session using AI tools. Use the ReAct technique to:

1. Reason through the best methods for engaging a diverse group of students with varying interests and learning preferences.
2. Propose an actionable session plan that includes:
 - An opening activity to capture attention.
 - A main learning activity that incorporates AI tools to facilitate interaction.
 - A closing reflection activity to consolidate learning and gather feedback.
3. Ensure the session plan is adaptable to both in-person and online formats."

I inform students about the ethical implications of AI technologies and promote the responsible and informed use of AI in their academic, personal, and professional lives.

Technique: Tree of Thoughts (ToT)

Description:

The **Tree of Thoughts (ToT)** technique uses iterative and collaborative reasoning to refine answers. By simulating a discussion among three "experts," each contributes step-by-step ideas, evaluating and refining them as they go. If an idea is invalid, it is discarded, leaving only robust conclusions. For more information, visit

[Prompting Guide: Tree of Thoughts](#).

Prompt:

Imagine three different experts are answering this question:

'How can I teach university students about the ethical implications of AI technologies and promote its responsible and informed use in their academic, personal, and professional lives?'

Each expert will:

1. Write down one step of their reasoning or teaching plan.
2. Share their idea with the group for evaluation.
3. Refine their next step based on the group's feedback.

If any expert realizes their reasoning is flawed, they will leave the discussion.

At the end, combine the strongest ideas from all three experts into a detailed and actionable plan for a lesson or workshop that includes:

- Key ethical principles to teach.
 - Interactive activities or case studies to engage students.
 - Tools or resources to guide responsible AI use.
- Make the final plan practical, engaging, and applicable to real-world scenarios.