

Generative AI and its use in student work

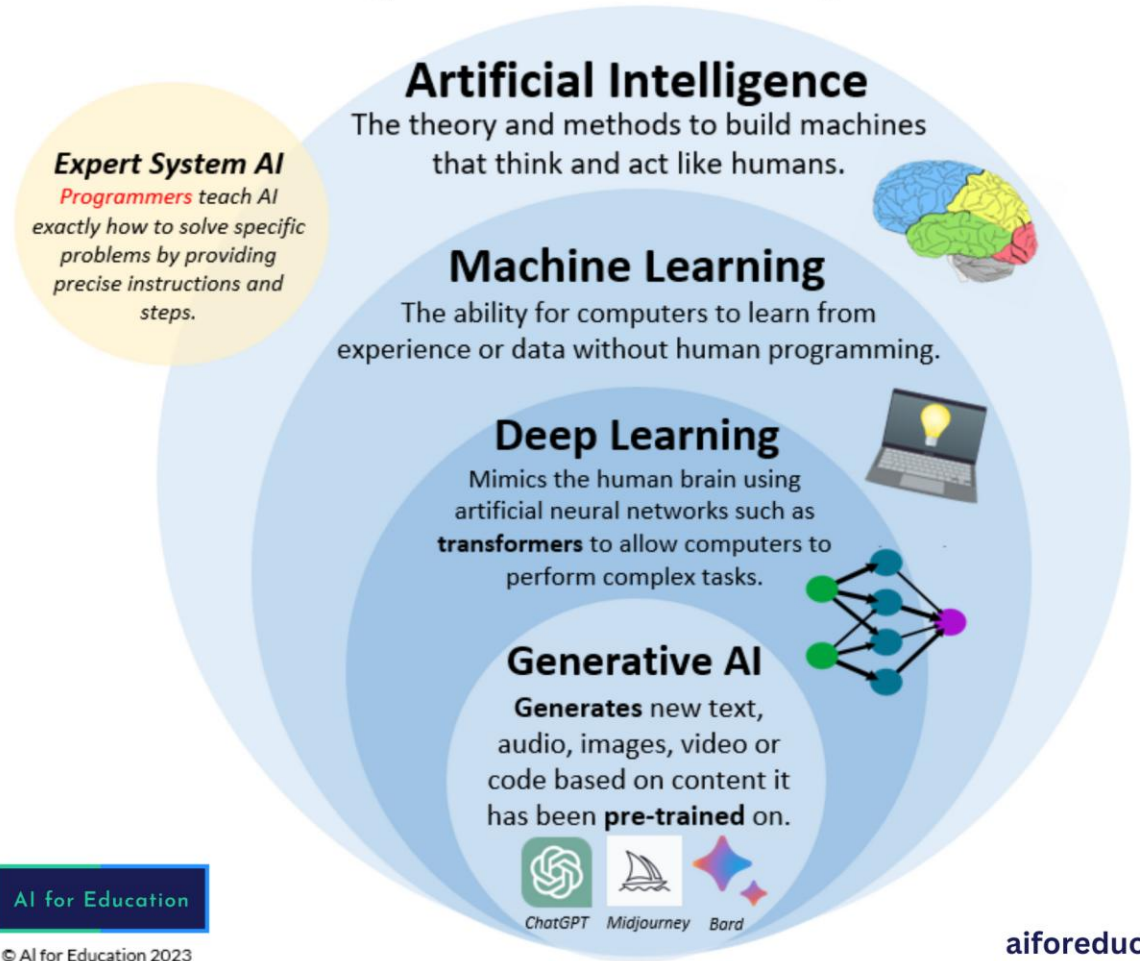
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Defining Generative AI

To understand generative artificial intelligence (GenAI), we first need to understand how the technology builds from each of the AI subcategories listed below.



Artificial intelligence - generative artificial intelligence

Artificial intelligence:

- **Computer systems** that perform tasks and mimic human intelligence
 - Data analysis and classification
 - Decision-making functions
 - Pattern recognition
 - Automation
- Based on processing and interpretation of data
- **Examples:** voice recognition (Siri, Google Assistant), image classification, self-driving cars, chatbots

Generative artificial intelligence:

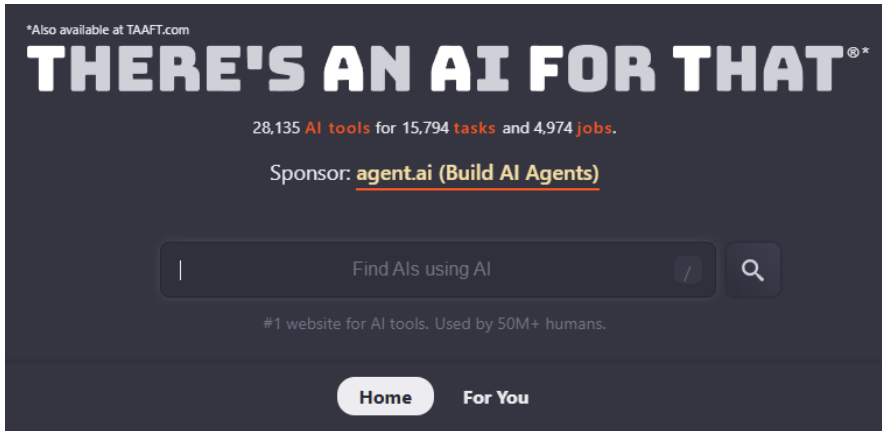
- Creates new content (text, images, music, code, video)
- Uses deep learning models such as neural networks
- Creative and capable of producing new content
- It can learn from data to create patterns
- Does not reason
- Generates answers based on probability
- **Examples:** ChatGPT (text generation), DALL-E (image generation), Midjourney (images), AlphaCode (code generation).

Features of GPT (Generative Pre- Trained Transformer)

generative (creates new text), **pre-trained** on massive amounts of data, and uses a **transformer** neural network architecture to understand and produce human-like language for conversations

- **Adaptability:** provides relevant responses in different contexts
- **Creativity:** able to generate new ideas, write stories or help with creative content
- **Natural language processing:** understands the nuances, questions and intentions in a text
- **Linguistic versatility:** the ability to understand and generate text, translate or grammatically correct in several languages
- **Speed and efficiency:** it can answer complex questions or process large amounts of data in seconds
- **User-focus:** the style, length and level of detail of your answers can be tailored to users' needs
- **Limit detection:** although effective, it can give warning if unsure of the correctness of the result on a particular issue

Applications of generative AI



<https://theresanaiforthat.com/>
<https://anakin.ai/>

Text-based applications

- **Content creation:** ChatGPT, Gemini, Copilot, Manus
- **Editing:** correcting language errors, optimizing style - ChatGPT, Grammarly
- **Research:**
 - literature search: Google Scholar, Elicit, Consensus, Perplexity
 - citing literature: Scite.ai, ChatGPT
- **Summary:** summarizing long texts or sources - Google NotebookLM
- **Translation:** ChatGPT, DeepL
- **Search engines:** Google, Perplexity, Bing
- **Excel formulas:** AIExcelbot

Multimedia content

- **Image creation:** illustrations, design ideas, generation of marketing materials: Canva, HotPot
- **Video and animation:** short videos or visual effects - Vidnoz, Gamma, Invideo
- **Voice:** voice generation, transcription, text to voice - Vidnoz

Always check for newer applications and tools!

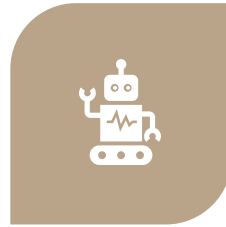
Dangers in using AI



BIAS / ALGORITHMIC BIAS:
A PHENOMENON IN WHICH AN AI MODEL'S DECISIONS OR OUTPUTS REFLECT PREJUDICES DUE TO BIASED TRAINING DATA OR MODEL STRUCTURES, POTENTIALLY DISADVANTAGING CERTAIN GROUPS, SUCH AS DEMOGRAPHIC SEGMENTS. (FINANCIAL TIMES, 2023)



DEEPFAKE:
SYNTHETIC OR MANIPULATED MEDIA CREATED USING AI AND MACHINE LEARNING TECHNIQUES THAT CONVINCINGLY DEPICT A PERSON AS SAYING OR DOING THINGS THEY NEVER ACTUALLY SAID OR DID. (ALANAZI & ASIF, 2024)



SYNTHETIC MEDIA:
MEDIA FORMS THAT ARE CREATED OR MANIPULATED USING AI OR MACHINE LEARNING TECHNOLOGIES, SUCH AS DEEPFAKES, AI-GENERATED IMAGES, AUDIO, OR VIDEO. (U.S. DEPARTMENT OF HOMELAND SECURITY, 2021)



DATA PROTECTION AND PRIVACY (GDPR)



ETHICAL CONCERNS

I. Prompting

Prompt engineering

The process of efficiently managing and optimizing AI models by generating targeted and structured instructions (prompts) for the AI.

Talk to AI like you would to a house elf!

Problem and goal definition:

- identify the problem and the expected outcome
- clear definition of the task and the desired output
- highlight relevant information and key elements that may influence the response generated

Create an effective prompt:

- clear and concise
- provides AI with enough information to properly interpret the task
- without unnecessary details
- provides clear and specific instructions
- Does not allow loopholes

Iterative refinement:

- analysing the responses generated by the AI and identifying areas for improvement
- clarifying the instructions, rephrasing the questions or adding additional information
- repeated until the expected result is achieved
- **BUT the less steps, the better the answers will be!**



Six Key Elements for Effective AI Prompting

1. Define Your Objective

- "Summarize this research paper,"
 - "Create a promotional poster"
 - "Generate a video script for social media,"
- Avoid ambiguity
- "help me with this" leads to unfocused results

2. Identify Your Audience

- students
- academic audience,
- managers
- a 6-year-old
- an intelligent alien

3. Specify format and output type

Text formats:

- essay
- bulletpoint list
- report
- news article
- email draft
- agenda

Visual formats:

- infographics
- presentation
- poster
- social media post

Multimedia formats:

- video
- short form video
- animation
- interactive content

4. Articulate style, tone and format

- academic
- professional
- entertaining
- conversational
- dialogue

5. Detail content requirements

- core message
- brand elements
- supporting data
- technical specifications

6. Establish constraints

Text constraints

- Maximum 150 words
- Avoid technical jargon
- Maximum 5 paragraphs

Audiovisual constraints

- High resolution
- print-ready quality
- Only 30 seconds
- Only female tone
- No background music



A good prompt

Create an **executive summary** of maximum 300 words for **Hungarian SME managers** about the **advantages of the use of AI** in daily company practices. Include the most important advantages, **broken down by company functions**. Keep a **professional, but clear and understandable tone**, and use text formatting and **bullet points** to improve readability. Use **only recent academic articles and reliable publications** from the past 2 years.

The background of the slide is a dark, textured surface featuring a prominent fingerprint pattern. A thin, red crosshair is centered in the upper half of the image, consisting of a vertical line and a horizontal line intersecting at a point.

II. Ethical use of AI

Ethical AI use at ELTE GTK



THE USE OF AI DOES NOT EXEMPT STUDENTS FROM THEIR INDIVIDUAL RESEARCH AND LEARNING OBLIGATIONS



AI MAY PROVIDE SUPPORT IN SEARCHING ACADEMIC LITERATURE, BUT INTERPRETATION AND ANALYSIS REMAIN THE RESPONSIBILITY OF THE STUDENTS



USE OF AI MUST NOT RESULT IN A VIOLATION OF COPYRIGHT, ETHICAL REGULATIONS, OR OTHER FACULTY REGULATIONS AND GUIDELINES ON ACADEMIC GOOD PRACTICE



FULL OR PARTIAL USE OF AI-GENERATED CONTENT WITHOUT THE REQUIRED DOCUMENTATION FALLS UNDER THE SAME ASSESSMENT AS **PLAGIARISM**



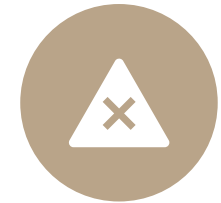
UNMARKED USE OF AI ALSO CONSTITUTES AN ETHICAL VIOLATION
FURTHER GUIDANCE ON THIS MATTER MAY BE FOUND IN ELTE STUDENT REQUIREMENTS SYSTEM



WHEN USING AI, STUDENTS ARE REQUIRED TO COMPLY WITH DATA PROTECTION AND DATA MANAGEMENT REGULATIONS



IT IS PROHIBITED TO USE AI TO PROCESS DOCUMENTS CONTAINING OTHER SENSITIVE INFORMATION OR BUSINESS SECRETS, OR TO MAKE SUCH DOCUMENTS ACCESSIBLE TO THIRD PARTIES



IT IS PROHIBITED TO UPLOAD DATA OR INFORMATION THAT MAY INFRINGE THE RIGHTS OF THIRD PARTIES OR GIVE RISE TO LEGAL LIABILITY

The obligation to document



Which AI tool was used, for what purpose, and how it influenced the final form of the work



Referencing AI-generated content in the bibliography is unnecessary



The origin of figures and tables produced with the assistance of AI must be indicated in accordance with the “Literature Review and Referencing Requirements”



AI application in the creation of a figure or table must be referred to in both the template-based table and the in-text reference

The following artificial intelligence systems have been applied:

(In red are labels to aid interpretation, and the essay should document its own uses in a similar way.)

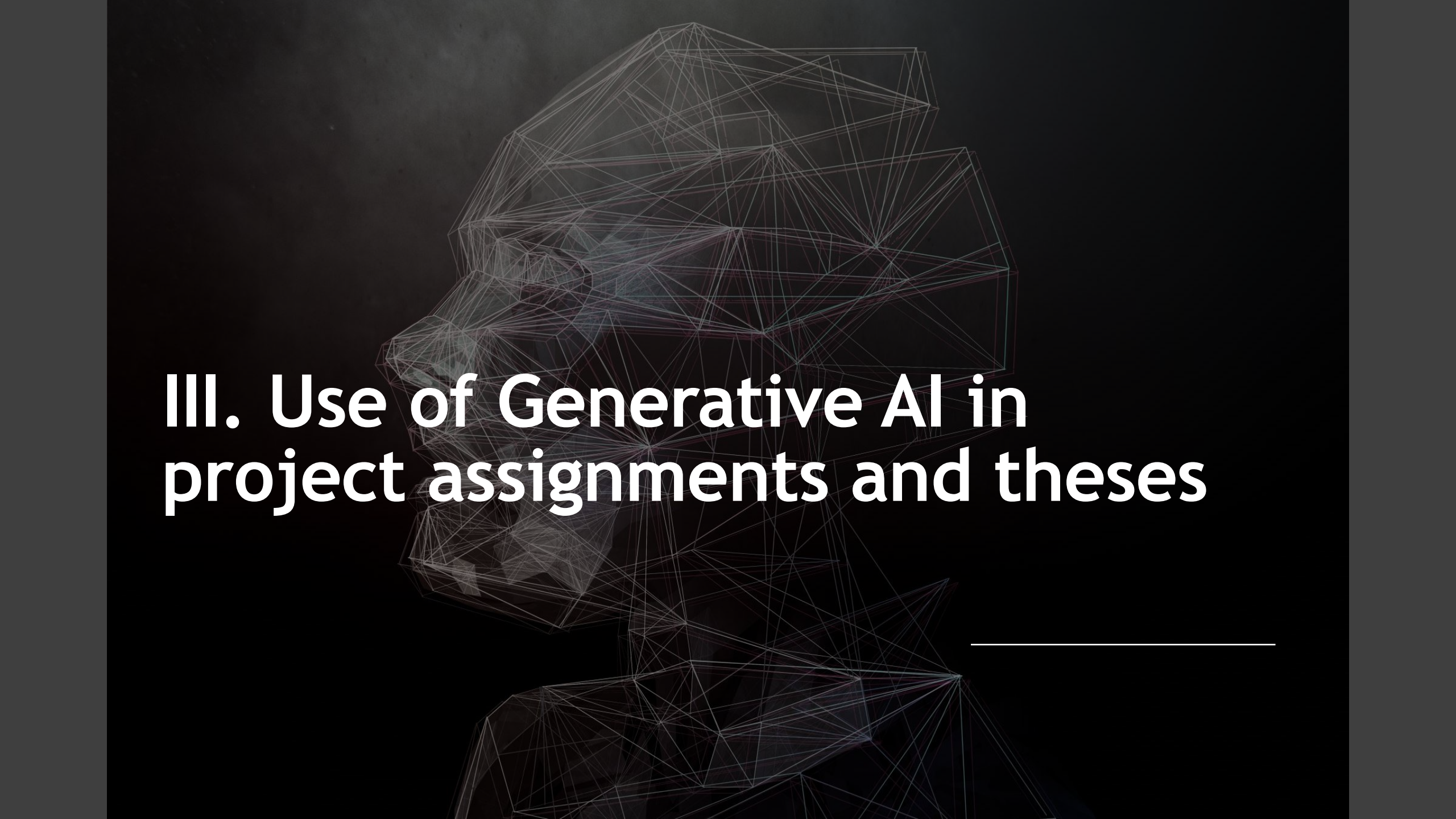
Areas of use	Used artificial intelligence system(s)	A description of how the work is used and how it complies with good scientific practice, chapter by chapter if necessary.
Research project design and concept	None	
Collection and evaluation of literature	Perplexity Consensus	Chapter 2: Support for initial literary research.
Develop, collect and/or obtain data	ChatGPT, Gemini	Chapter 3.1: Using ChatGPT to generate ideas and using Gemini to reformulate the interview guide. Chapter 4.2: Using ChatGPT for a comprehensive linguistic review of the experiment invitation text.
Processing the data	None	
Choice of methodology	None	
Programming	ChatGPT	Chapter 4.5: Joint programming of the pilot software with ChatGPT.
Analysis/evaluation of data/sources	None	
Interpreting the analysis/evaluation and drawing conclusions	Gemini	Chapter 4.5, 5: Programming the scripts for data analysis together with Gemini.
Writing the manuscript: making visualisations	ChatGPT	How to create Figures 3, 5, 8 with ChatGPT
Writing the manuscript: structuring the text	ChatGP	The first version of the full dissertation is divided into chapters and sections, with meaningful and precise chapter titles.
Writing the manuscript: Wording of the text	None	
Writing the manuscript: revising the text	ChatGPT	Proofreading and stylisation of the full manuscript text
Additional contributions	ChatGPT	Chapters 2.2 and 2.3: Initial outline.

Declaration in the thesis

In the declaration in the beginning of the thesis students declare that

- they have responsibly informed themselves about the capabilities and limitations of the artificial intelligence systems used
- they are aware that, as the authors of the work, they are responsible for the information and statements contained therein
- they acknowledge that any violation of the rules governing the use and documentation of AI constitutes plagiarism and may entail consequences in accordance with the provisions of the ELTE Student Requirements System.



An abstract, complex wireframe structure composed of numerous interconnected lines and polygons, resembling a 3D mesh or a complex geometric form. The structure is rendered in a light gray color against a dark, textured background. The lines vary in thickness and color, with some appearing in shades of blue and purple. The overall shape is irregular and multi-faceted, with many sharp angles and protrusions. It appears to be a digital or mathematical construct, possibly representing a complex data structure or a 3D model of a natural object like a crystal or a biological structure.

III. Use of Generative AI in project assignments and theses

In the process of thesis writing

1. Topic selection and preparation of the research project

AI may assist in identifying relevant research areas and questions, conducting preliminary topic exploration, and developing the structure of the research plan.

2. Generating inspiration

AI may generate creative ideas, suggest new perspectives, examples, and analogies, and help initiate a line of reasoning when a student encounters difficulties during the writing process.

3. Explanation and correct use of concepts

AI may assist in the interpretation of professional terminology and theories, particularly in the case of complex topics or those spanning multiple disciplines.

4. Translation and linguistic clarification

AI may support the understanding of academic literature in foreign languages, assist in proofreading texts, and help improve the style of academic writing.

5. Searching for and organizing academic sources

AI may provide support in identifying relevant scholarly articles, studies, and sources, as well as in their thematic organization.

6. Developing outlines and structuring the work

AI may assist in designing the logical structure of a paper or research project and in arranging chapters and subchapters in a coherent order.

7. Preparation for data analysis

AI may provide support in the initial stages of data processing, such as organizing data and developing preliminary analytical strategies.

8. Preparing bibliographies and reference lists, and standardizing sources

AI may assist in the consistent formatting of references, the preparation of bibliographies, and the appropriate classification of sources.

9. Text editing and final review

AI may support linguistic and stylistic refinement of the paper, the identification of spelling errors, and the improvement of readability.

10. Preparation of presentations

AI may assist in compiling presentation materials, arranging slides logically, and optimizing visual presentation.



1. Topic selection and preparation of the research project

AI may assist in identifying relevant research areas and questions, conducting preliminary topic exploration, and developing the structure of the research plan.

- identify business problems and research opportunities
- find relevant theories and models
- recommend search strategies for keywords
- formulate key questions and arguments

Useful tools: ChatGPT, Manus, Copilot, Gemini

2. Generating inspiration

AI may generate creative ideas, suggest new perspectives, examples, and analogies, and help initiate a line of reasoning when encountering difficulties during the writing process.

Useful tools: ChatGPT, Manus, Copilot, Gemini

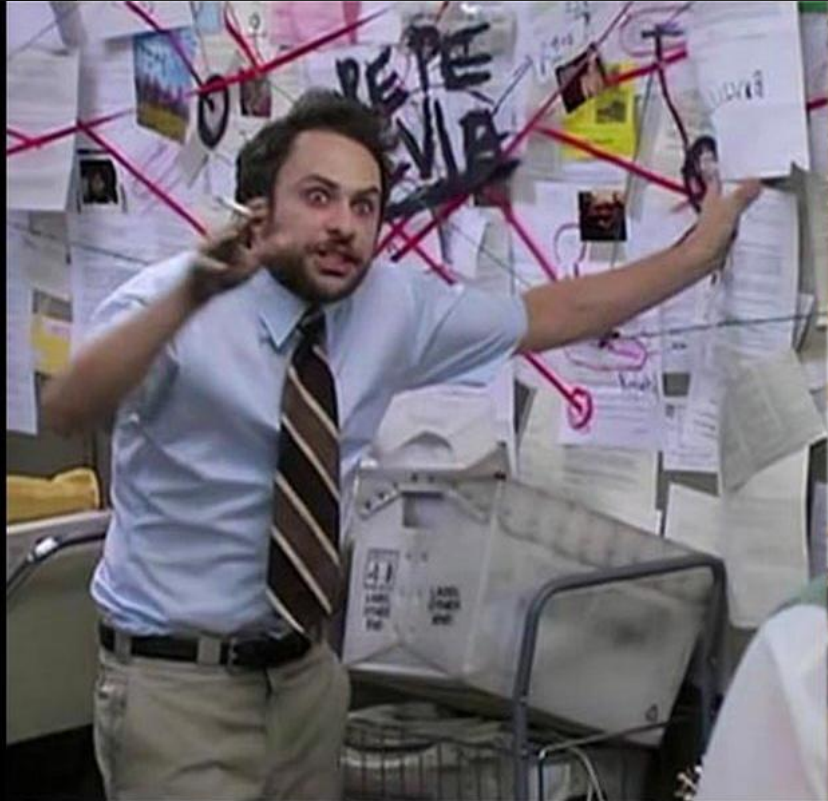
Further
elaboration
of a
research
area

Identify
areas to
cover

Support
logical flow
and
linkages



3. Explanation and correct use of terms



AI may assist in the interpretation of professional terminology and theories, particularly in the case of complex topics or those spanning multiple disciplines.

- **Clarify concepts**
- **Ensure that the language is professionally grounded**
- **Define and contextualize concepts**
- **Show application of concepts through examples**

Useful tools: ChatGPT, Manus, Copilot, Gemini



4. Translation and linguistic clarification

AI may support the understanding of academic literature in foreign languages, assist in proofreading texts, and help improve the style of academic writing.

In research

- review research material
- translate longer scientific texts
- summarize texts

Useful tools: Google NotebookLM, ChatGPT

When writing

- standardize technical terminology
- Translation (e.g. of executive summary)
- standardize the language of quotations and references

Useful tools: ChatGPT, DeepL, Grammarly, Quillbot

Human supervision is always necessary to ensure professional accuracy!

5. Searching for and organizing literature sources

AI may provide support in identifying relevant scholarly articles, studies, and sources, as well as in their thematic organization.

When searching literature

- finding the most relevant sources
- should be treated with caution

Useful tools: GoogleScholar, ScienceDirect, Elicit, Consensus, ChatGPT, Perplexity (Pro!)

When using literature

- organize the resources collected
- relate them to the research questions
- overview literature to find important information

Useful tools: Google NotebookLM, ChatGPT, Manus



6. Developing outlines and structuring the work

AI may assist in designing the logical structure of a paper or research project and in arranging chapters and subchapters in a coherent order.

- Defining and structuring the main parts
- Suggestions for chapter headings and subheadings
- Outline of the content of each chapter
- Strengthening connections and logical relationships

Useful tools: ChatGPT, Manus, Copilot

Always take the formal requirements for form and content into account!



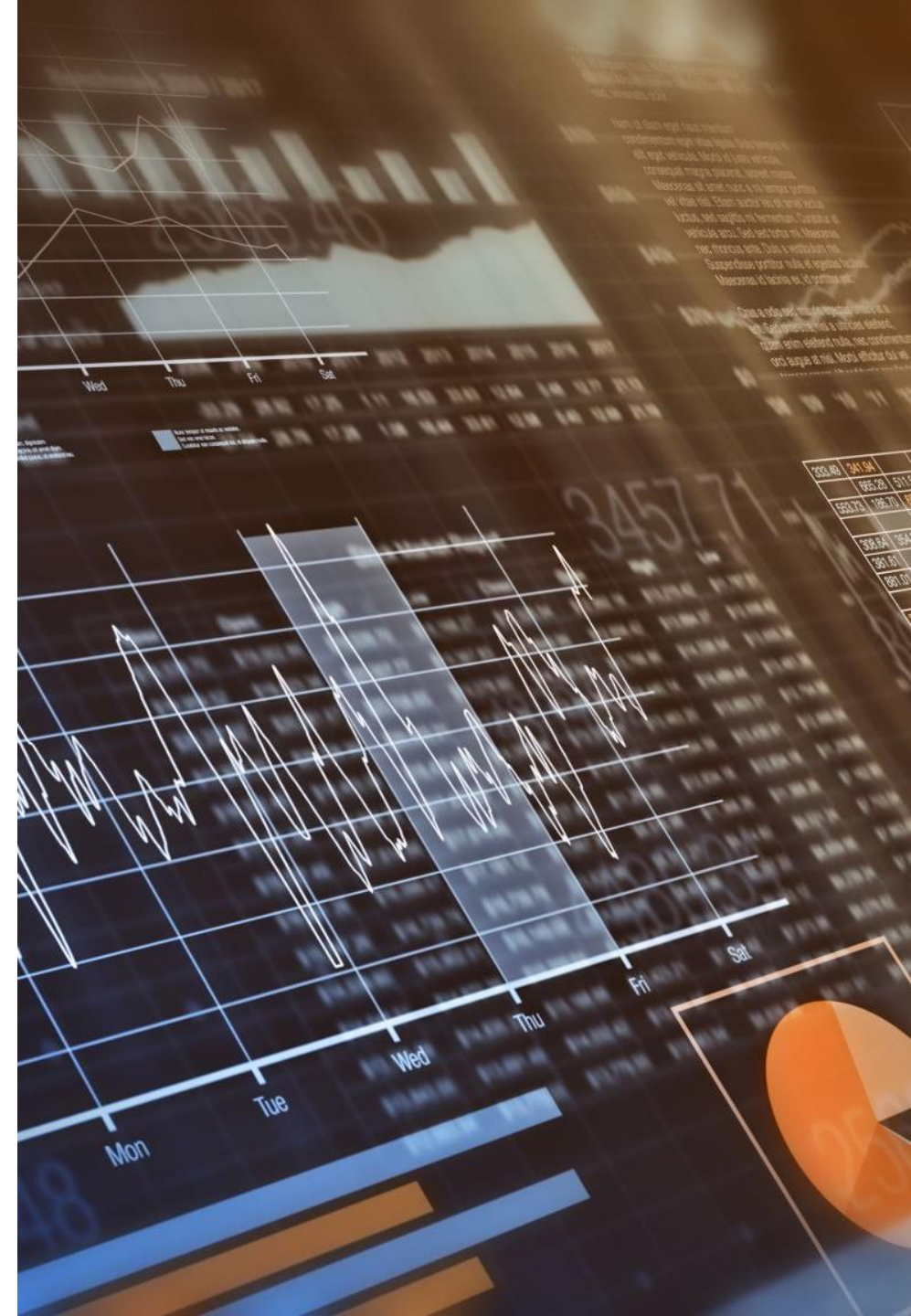
7. Preparation for data analysis

AI may provide support in the initial stages of data processing, such as organizing data and developing preliminary analytical strategies.

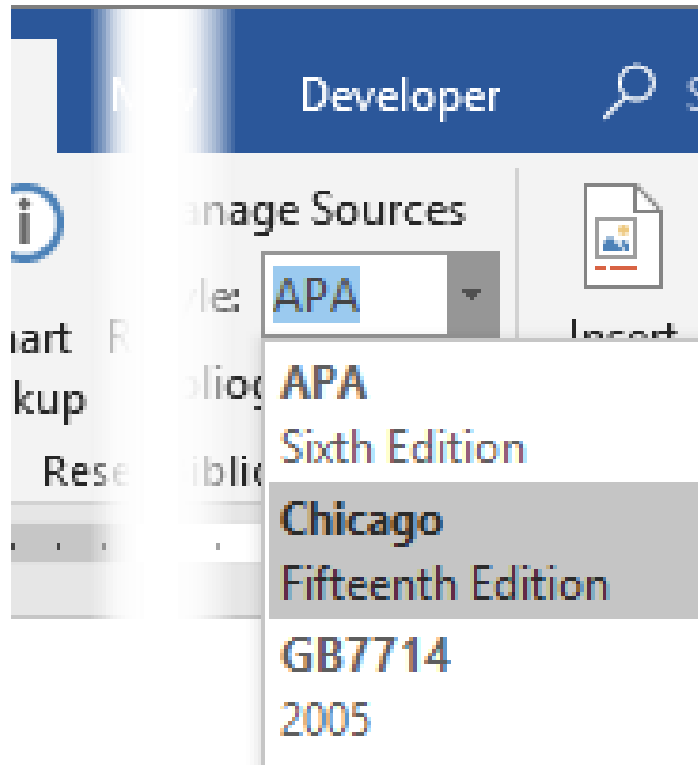
- Selection of statistical methods and their applications
- Definition of data analysis steps and criteria
- Data cleansing and transformation
- Preparing the interpretation of the results
- Help to put results into context, by comparing them with previous research, or by helping to draw business and scientific conclusions

Useful tools: ChatGPT, Manus, AIExcelbot

These tools cannot be used for carrying out data analysis, just for support!



8. Preparing bibliographies and reference lists, and standardizing sources



AI may assist in the consistent formatting of references, the preparation of bibliographies, and the appropriate classification of sources.

- Formatting of cited sources according to APA
- Checking, sorting and consolidating bibliography
- Alphabetize the sources in the bibliography
- Filter duplicates
- Check authors' names, years and publication dates
- Identify and correct incorrectly formatted or incomplete references
- Find missing data and help find resources
- Automatic conversion of referencing systems

Useful tools: Scite.ai, Copilot, ChatGPT

Human supervision is always necessary to ensure reliability, quality and existence!

AI may support linguistic and stylistic refinement of the paper, the identification of spelling errors, and the improvement of readability.

Language corrections

- Identify and correct spelling and grammatical errors in texts
- Correct language errors
- Improve readability and comprehensibility

Useful tools: Grammarly, Quillbot, ChatGPT

Stylization

- Rephrase the text to make it appropriate in style and tone

Useful tools: Quillbot, Copilot, ChatGPT

Human supervision is always necessary to ensure professional accuracy!

9. Text editing and final review

10. Preparation of presentation

AI may assist in compiling presentation materials, arranging slides logically, and optimizing visual presentation.

Content

- Develop a presentation structure
- Condense text content
- Suggestions for the appropriate insertion of visual elements (graphs, tables)
- Identify content, number of slide frames and focal points

Useful tools: ChatGPT, Copilot, Gamma (Pro), Manus

Visuals

- Creating slides and graphic design

Useful tools: Gamma, Copilot



Reviewing content generated by AI as a student

- Precise definition of research requirements
- Verification from multiple sources
- Seeking expert feedback
- Checking the accurate and consistent use of terminology
- Verification of numerical data
- Checking mathematical relationships
- Direct verification of the sources provided
- Examining the consistency of AI responses
- Parallel use of multiple applications, cross-checking
- Linguistic and structural revision of the content

Standout text
elements

Use of capital
letters at the
beginning of a
word

Special
characters

Long dashes

Prompt
elements left
in the text

Unnaturally
uniform
language usage

Repetition and
generalisation
s

Deviation
from the usual
style

Outdated data
(mainly for the
free version)

Nonexistent
references
and data

Conclusion

AI cannot write the thesis – you have to write it according to the faculty rules!

Human in the loop: humans actively participate in training, tuning, and testing algorithms, providing feedback or corrections to enhance accuracy, safety, and reliability.



Lesson learned

AI is no substitute for thinking by yourself and doing scientific work

Think about AI as a good assistant that has to be given good instructions to work well

All generated content **must be checked**, all generated text requires "human" transcription

Use it consciously and responsibly to make it really help!
