

AI in research and teaching – an orientation

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AI is computationally advanced math and statistics. It is a powerful tool, with generative AI being very good at redoing lots of and even niche things. However, as AI can only pick up on patterns, information about, for example, recent research with only one existent paper on it is not going to be picked up reliably.

There are great use cases for AI. You may use AI for brainstorming, translation, summarization, coding, creating stimulus materials, or the creation of training materials. In general, it is advisable to use specific AI tools and to provide them with as much detail as possible. That is because specific tools will show more accuracy, typically have fallbacks integrated for common mistakes, and use less resources. As such, instead of general-purpose AI such as ChatGPT, ...

- use DeepL or Grammarly for textual processing
- use Elicit or scite for academic research
- use Stable Diffusion or Dalle for image generation
- use CoPilot (e.g., in RStudio) to assist your coding

Keep in mind that *you* are using it. While AI tools surely are handy, they cannot be used as an excuse for whatever effect their (*your!*) actions have. After all, you as the one using an AI tool are both responsible and accountable for any actions and consequences—legally, personally, but also with your own reputation.

Fundamental academic principles are a good primer. Principles like autonomy, responsibility, transparency, replicability, but also fairness and diversity, should keep guiding your academic doings—also and particularly in combination with AI.

Curate your AI knowledge. Be aware of AI's lack of fact-checking, hallucination, temperature, or jailbreaking. Also know that AI is mimicking bias and that providers react to that with "alignment". Of interest, the IfKW curates an AI guide for students.

Think about AI in terms of geopolitics. AI is done by very few very big providers. All the others, including all of academia, lack the resources to accomplish the same. Be aware that the interests shared by these providers vary. Also, be aware that AI, particularly generative and general-purpose AI, is incredibly resource intensive. Serious estimations consider one ChatGPT prompt/response to require about ten times as much energy as one Google query/result consumes. Specific rather than general-purpose AI (e.g., DeepL instead of ChatGPT) are much more efficient in this regard.

Consider open models. Some providers of AI share (parts of) their tools and the details necessary to run AI models on local hardware. This allows for better control of data and

temperature, hence fostering data protection and replicability. LMU also co-maintains <https://chat-ai.academiccloud.de/> with several open models at hand.

Respect the law. A lot of AI tools track how they are used and store any data submitted to them. From that, respect privacy and data protection laws but also copyright infringements and do not enter any personal information or upload any unpublished or copyrighted materials.

Okay, but what about students employing AI in their work without permission and sufficient documentation? Remember that the results of “AI detection software” alone do not constitute sufficient proof of the actual use of AI-generated text in student work. They provide probabilities that cannot, on their own, justify a failed assessment. The results of automated checks can only be one reason to inspect the text in more detail, looking for demonstrable violations of the norms of good scientific practice, and/or to contact students and sensitize them to the risks of unacknowledged AI use. You must then evaluate student work based on whether such issues are sufficient for a failed exam or whether they should be weighed against the overall strengths and weaknesses of the text.

Can I use AI to grade my students’ work? Certainly not if it contains uploading student work somewhere. And even in local environments you should make sure not to include personal information in any prompt. It is worth knowing that the EU considers the evaluation of a person’s competences or of their work as a case of high-risk use of AI which comes with lots of restrictions and prohibitions. Other than that, also be aware that you (and not an AI) are responsible and accountable for grading.

What is your take on employing AI for reviewing? Arguably, asking a machine to review others’ academic achievement when you have been explicitly asked as one of only very few experts, raises questions about the reviewing competence. And indeed, AI tends to hallucinate, converge toward middle grounds, and present inconsistent or inadmissible conclusions.

Could AI be used for evaluation of, for example, CVs? It should not, for three reasons. First, evaluating almost certainly includes personal data which should never be put into a prompt. Second, it is very easy to manipulate such AI. Third, even the EU’s AI Act prohibits AI practices to be used for evaluation of natural persons as it could lead to discriminatory treatment.

Any ideas on how to integrate AI into teaching? Yes. In general, it is good advice to create tasks that require and enforce the reflected use of AI. For that, IfKW curates a list of exercises in its slides on AI use for students.