

## A NOTE ON THE USE OF AI AND AI-POWERED ONLINE TOOLS

**Or: When does relying on artificial intelligence conflict with honing your own, natural intelligence?**

### ► In a nutshell:

- **AI and other online tools can be valuable** for your academic work as long as you use them **to advance *your own* thinking, understanding and argumentation** (e.g., finding sources, figuring out arguments, improving your own writing).
- Whenever you use AI and other online tools, you should remain aware of their limitations and biases: You should **never trust them to be complete, fair, or for that matter, factually correct**, without checking and judging things yourself. For the sake of transparency, it is usually wise to flag where and how you rely on such tools; for any use of generative AI, it is mandatory.
- **You can use AI and other online tools to aid your thinking, but never to substitute for it:** Reading, thinking, and building your arguments remains your own job, and no AI can do it for you. If you pass off content created by AI or other online tools as your own, this constitutes an academic violation, similarly to plagiarism and other forms of fraud.

### ► How does Artificial Intelligence matter in scientific education?

There is currently a lot of talk about generative Artificial Intelligence (AI) – automated tools that can generate text – and their potential implications for students' work in education, both in university and beyond. While there are important potentials to the availability of such and other tools, there are also important risks and limitations that you should be aware of. There are essentially three topics that need to be considered: How online tools may legitimately help you advance your understanding and learning experience; how these tools remain limited, and may lead you toward wrong or bad conclusions; and where their use conflicts with the purpose of your university education, and may get you into serious trouble.

To understand how AI and other online tools matter in academic education, it is useful to first note that the point of academic education is to enable you to understand things and master key academic skills as best as possible, while the point of academic grades, credits and degrees is to distinguish those who understand from those who do not. Accordingly, most uses that really help you understand things are legitimate, or even much welcome; those uses that may lead you to some answers, but limit your understanding in other ways are problematic; and those that help you pretend that you understood or achieved something when in fact, you did not are illegitimate, and are regarded as academic violation.

### ► What are legitimate uses of AI?

There are some things that AI-powered online resources are overall great for. For instance, many AI-powered solutions can help you find relevant information, such as academic search engines (e.g., Google Scholar) and tools that find works related to what you already identified (e.g., ResearchRabbit); there are automated or semi-automated collections of topical works based on keywords (e.g., on the “Web of Science”), and even Wikipedia entries will occasionally link you to relevant resources. AIs can also help you decide what to read by summarizing texts (although most academic work should have an abstract, which is usually better). There is no reason why you shouldn't use any available tools to try and find relevant information. Likewise, it may be useful for you to interact with an AI to explore how an issue that you are writing on can be put into perspective, or to check out web resources to get ideas about how others have structured their work, and thereby devise a strategy for structuring your own. Moreover, online tools can help you write better. Translation tools can not only facilitate reading work in languages that you are not fluent in, they can also help you express things that you know how to say only in your own language. Writing aids (e.g., Grammarly) can help you formulate better, find better words, cut wordiness, and so on. It is totally okay to use AI-powered tools to help you formulate, as long as what you are formulating are your own thoughts and conclusions.

### □ What are the limitations of AI?

At the same time, all of these tools have limitations. Translation tools do get translations wrong occasionally, and many AI writing aids use a rather formulaic, general writing style that may fail to convey exactly what you meant to say. More consequentially, AI-powered search tools can sometimes lead you to think that you found key sources, but actually overlook entire domains of available knowledge, because they depended too narrowly on your given keywords, or simply went for popular, but less relevant resources. When you ask AIs to summarize things for you, they will usually capture the topic and broad idea correctly, but they don't actually understand the text – so there

is always a good chance that they miss key points, misrepresent things, or fail to give you what you needed to know. As **it is your job to know what you are doing**, there is no way around reading, checking and evaluating things yourself. It is therefore essential that you never fully trust those online tools that you use: It is your responsibility to check what they suggest, remain critical, vary your keywords and prompts, and make sure that they give you what you needed to do your best possible work.

Remember that AI is not actually smart: AI tools collect and rearrange contents that others have put online, including ideas that might be outdated, problematic or simply wrong, and they do so without actually understanding what they are creating. In addition, AIs have a known tendency to hallucinate: They shamelessly invent people and sources, events, examples and other facts. Even where AIs base their creations on solid information (which you cannot know, because that's part of the black box algorithm), they are often biased: They tend to rely disproportionately on U.S. content, they reproduce societal biases (so, for instance, they tend to find male, Western-named authors more important than women and people from other cultural contexts), and they have a strong tendency to go for the most mainstream, least original ideas and arguments. This is to some extent true also for older online tools. For instance, Wikipedia entries identify some of the relevant information, but they miss a lot, they are often biased or shallow (especially on topics that are contested or niche), and they are quite miserable at sourcing. Thus, while online tools can often help you understand better, they can also just give you the **impression of plausible information**, when in truth, all you got is a low-quality collection of **rumor, biased claims, popular knowledge, and AI fabrications**. Unfortunately, however, in academic work and education, the quality of information – its sourcing and verification, balance and completeness – are absolutely critical: You simply can't understand things well from reading one opinion on Wikipedia, or scrolling through a machine-generated summary of what matched a keyword in a data base. For this reason alone, it is never sufficient to base any academic claim on information presented by such tools alone: If you cannot verify what you see based on quality-controlled academic sources, don't trust it, and definitely don't use it.

### ► What are illegitimate uses of AI?

Which gets us to the final point, the violations. Online tools may not only help you understand things better – they can also help you generate output that looks smart, without the need for you to actually understand anything. However, in university, that's what you are here for: You get your credits, your grades, and eventually your degree for understanding what you are speaking about, and knowing what you are doing. Hence, it is essential that the intelligence that goes into your writing is your own, and nobody else's. As long as you **read and understand yourself, and present your own thoughts and conclusions**, it is fine to employ online tools as aids on the way. However, the moment that you use online tools to pretend that you read, thought and understood when in reality, you did not, this undermines the entire purpose of your studies. You can think of it in analogy with non-artificial intelligence: It is fine to talk to people to get ideas, learn from them, and then create your own work wherein you yourself check the information and build your own arguments; it is fine to ask a friend to check your spelling, or to tell you where your argument trails off; but it would be fraud to ask them to write a section for you, just as it would be fraud to plagiarize someone else's argument and pass it off as your own. The same logic applies for here: You can consult with AI and other online tools to inform your thinking and polish your work, but you absolutely cannot hand in work created by AI as if it were your own.

### ► What happens if I use AI in an illegitimate way?

If you still decide to hand in work that reflects the work of AI or the contents of other available online resources and tools, and not your own thinking, three things will likely happen. First, **your work will likely be bad**. Just as Wikipedia-based papers are shallow, unoriginal, and biased, also AI-based writing is typically full of superficial comments, incoherent arguments, and factual mistakes, which will get you a low grade even if it should remain undetected. Next, it is actually quite **easy to recognize AI-based texts**, not only due to their specific style, but also owing to small (and big) AI-typical mistakes that you may not even notice, but which an expert on a topic will spot immediately – and that is *before* using available software that checks whether text has been written by an AI. Third, once the suspicion arises that an assignment has been written by AI, it is very **easy to verify whether you actually did the reading, gained the understanding, and did the thinking** needed to present the work as your own – and if you did not, you're in trouble. Handing in AI-based work as your own, finally, constitutes a violation of university rules and of academic ethics. Once it is established, it will **at the very least result in your assignment being rejected, possibly along with the class** for which it was required. Beyond this, passing off AI-generated work as your own, attempting to advance with your studies without actually doing the thinking and understanding things yourself, raises the question whether you are fit to be an academic to begin with: If you don't actually care about acquiring the skills and knowledge required for your studies, then what are you really doing here?

To avoid any confusion, it is thus strongly recommended to make sure you use any online tools, whether AI-based or otherwise, **only to support your own thinking**, but never to replace it; that you **check for yourself** anything that such tools suggest to you, using quality-checked academic source; that you carefully **document where you got things from** in your writing, providing references; and that you flag (e.g., in a footnote) where and how you relied on online tools to create your work (e.g., if you created a draft in your own language before machine-translating it, or if you used AI to smooth your writing). For all the reasons specified above, I strongly advise against using generative AI to produce text (as opposed to editing text that you produce) that you intend to use assignments - but if you do, you absolutely need to flag this.