

AI Toolbox for Academic Research and Writing

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About the Project

The goal of this project was to curate a set of AI tools that could be used by faculty and students for academic research and writing. For most of us, ChatGPT is what we think of when we hear the term Generative AI (GenAI), and while that is certainly one of the most widely known GenAI tools, at the time of this writing, there are an increasing number of tools emerging that are designed for use in academic work. While I set out to use, assess, and develop a comparative matrix of the available AI tools for academic work, it became clear that a comprehensive review was a nearly impossible task and that even if I were to succeed, the list would be outdated as soon as it was completed. I found the proliferation of AI tools nearly impossible to keep up with. Tools that I used a month ago for free are now fee-based. Every day, I discovered several new tools that I had never heard of before.

The technology in this space is evolving so rapidly that it is overwhelming. The pressure to keep up with this emerging technology and integrate it into pedagogy is growing. In this report, I will take you through the process I followed to research AI tools for academic research and writing. I will share the insights I gained and the results of my research and provide practical suggestions on using AI tools in academic work effectively and ethically.

About the Process

To begin developing a list of AI tools for academic research and writing, I began by searching for existing lists. While I was familiar with sites like [There's an AI for That](#), I also found the [AI Applications for Social Science Research](#) spreadsheet compiled in October 2023 by Stubbs-Richardson et al., and a list of [Apps for Academic Writing](#) compiled by Mushtaq Bilal, PhD, and last updated June 2024 to be useful. I also had a list of AI tools I had been tracking since the Fall of 2023, some of which I have already used and some I added to my list for future investigation. My list grew when I attended the [Teaching and Learning with AI Conference](#) in Orlando, Florida, in July 2024. Another unexpected source of new AI tools was from targeted ads I became inundated with on Facebook and Instagram. I guess if you google "AI tools for academic research and writing" too many times, this is what happens. This is an important discovery because students are likely also encountering targeted ads for AI tools promising to help them with their academic work.

At one point, the list grew to over 250 tools, and I curated it using the following criteria:

1. **Focus on academic research and writing:** I categorized the tools and focused on those specific to academic research and writing. I eliminated tools for other purposes, such as translation, presentations, or corporate content writing.
2. **Accuracy of Outputs:** When testing the AI tools, I picked a topic I have researched in the past to be able to review the AI output for accuracy and spot hallucinations and apparent errors in content. I used this same topic (mass incarceration in the US and its disproportionate impact on Black and Brown men) with research tools, concept mapping

tools, and generative writing tools. This exercise was fascinating as sometimes the AI would suggest a real source, but the link it provided would be to another, unrelated source. I found that, for the most part, all the AIs consistently suggested the same sources. This is an important consideration when using these tools for research as, for the most part, they are all using the same datasets, and important research may be missing if you rely on AI tools alone.

3. **Ensure accessibility:** For equity and accessibility reasons, I focused on useful free tools. I eliminated tools only available with a paid subscription and tools where the free version was limited by time (only seven days) or by use (only 5,000 credits or 25 uses). Note: This is why Scite (7-day free trial) is not among the recommended tools despite being one of my favorites.
4. **Focus on web-based tools:** I am less familiar with deploying and using “plug-ins” or deploying a “self-hosted” AI tool on my laptop, so I removed these from the list in the interest of time. I did include Sapien on my list as, at the time, it was “self-hosted,” but they are building a web-based tool that will be available “soon,” and it sounds useful.
5. **Review of Privacy Policies:** Finding and reviewing privacy policies for these tools takes significant time. On some sites, these policies were easier to find than others. I did not look at the privacy policy for every AI tool. I prioritized reviewing the policies when the tool requires you to upload a document. For those tools, I have noted the policy (if found) in the spreadsheet, and I am only recommending tools with a policy stating that your file upload is not retained and is not used to train their model. You should still consider reviewing the privacy policy when using a tool, as these policies change frequently and are often difficult to find. You should also assume that any information you put into a tool is not private and never put personal identifying information or copyrighted content into a tool.

About the Results

The result of this project includes a [Padlet](#) and a [curated spreadsheet of 48 AI tools](#) with information about each tool, including pricing at the time of writing and a link to access the tool. Given that the technology in this space is expanding rapidly, this spreadsheet will likely be outdated as soon as it is published. As such, I also wanted to develop some decision-making guidance to assist faculty and students when selecting an AI tool. Below I have included some questions to consider when selecting an AI tool. I also developed the table below, which includes some of the stages of the research and writing process, advice for selecting an AI tool, and links to recommended tools. I found interesting and useful information throughout the project, so I have also included some of those resources, such as the [Academic ID’s Key Guidelines for Using Generative AI in Academic Research](#) (Academic ID, 2024) as additional resources at the end of the report. But before any of that, I will start with some key terms and definitions (without getting overly technical) that will be helpful when working with generative AI.

Key Terminology

Artificial intelligence (AI) is a technology that enables computers and machines to simulate human intelligence and abilities.

Corpus refers to a large number or collection of texts stored in a database.

Generative AI (GenAI) uses machine learning algorithms to create new content from existing data. Because GenAI generates new content rather than reproducing or copying existing content, it can produce false or inaccurate information (commonly called hallucinations) if it is not grounded correctly. This is an important consideration when selecting an AI tool for your academic work.

Grounded data sets—While the LLM makes a generative AI tool work, the tool can be “grounded” in a specific dataset, meaning it will only search and generate responses from that dataset. This is sometimes also referred to as a “closed” data set. Using a tool grounded in scholarly research is essential when conducting academic research.

Large Language Model (LLM) refers to the dataset on which the AI was trained. Chatbots like ChatGPT, Gemini, Claude, Perplexity, and CoPilot use different LLMs to power their tools, and each has different benefits and drawbacks.

Retrieval-augmented generation (RAG) is a technique for grounding the LLM in a specific data set. By querying specific knowledge bases, RAG can help generate more accurate and up-to-date information.

Web scrapping refers to extracting content and data from websites.

Key Considerations for Selecting and Using AI Tools in Academic Work

1. **Is the tool capable of web scrapping?** When you use the free version of ChatGPT and some other chatbots, they are incapable of web scrapping and only generate text from the LLM on which they are trained. This is why we hear a lot about hallucinations and we see made-up sources. Use a chatbot capable of web scrapping (Perplexity, CoPilot), as they will be more (but not completely) accurate. A tool like Perplexity also allows you to select an academic focus so that it will be grounded in academic sources.
2. **Is the tool “grounded?”** It is important to consider the corpus or collection of research the tool uses. You want to make sure that the corpus matches your area of research. Sometimes, a tool will say it has the “largest scientific collection in the world,” but you will not find any information about those datasets. If easily found, I noted the corpus in the spreadsheet.
3. **Does the tool search full text or abstracts?** Some AI tools search full text, and some only search abstracts. Selecting a tool that searches full text rather than abstracts alone will provide more comprehensive results (Westergaard et al., 2018).
4. **How is the tool using your data?** It is important to consider how the tool is using your data, particularly if you are copying and pasting or uploading your own work. For some of these tools, the information is clearly stated; for others, it is buried in an extensive privacy policy, or a privacy policy does not exist. If the privacy information could be found, I noted in the description what happens to the document once you upload it. You should always be cautious when uploading documents and using AI and check the tool's privacy policy first.
5. **Test out multiple tools.** Each AI tool works differently based on the underlying LLM, web scrapping, corpus, etc. You should try the same task with multiple tools to see which ones work best for your content area and the task you are working on.
6. **Make sure you are selecting the right tool for the task.** It is essential to consider what you are seeking to accomplish and to select the tool that will be most effective for that task.

For example, if you seek academic sources for your research paper, you want to use a tool grounded in an academic corpus. If you are looking for spelling and grammar assistance, you want to use a tool that will provide that help without re-generating your writing and potentially changing the meaning.

7. **Use AI as an *assistant* and not a *replacement* for your own work.** When using AI in academic work, you should collaborate with AI rather than delegate your work to the AI (Myers, 2024). AI can assist you with many tasks throughout the research and writing process. To use AI effectively, you must critically evaluate the outputs, fact-check AI-generated content, and ensure copyrighted material is cited correctly.

AI Guidance by Task

Stage/Task	General Guidelines	Recommended AI Tools
Brainstorming	Generative AI can help you brainstorm about your research topic. When selecting a tool, consider one with web scraping capabilities or is grounded in academic sources to increase accuracy and minimize hallucinations. You should use multiple tools and compare the results.	CoPilot Perplexity Groq Claude Gemini Mistral Le Chat
Getting Started – planning your project	If you have a big project ahead and are struggling with where to start, consider using an AI tool to help you break the larger task down into smaller tasks.	Goblin.tools
Finding Scholarly Sources	If you are seeking scholarly sources, selecting an AI tool grounded in research that includes your content area is important. This will ensure the most accurate results.	Research Rabbit Semantic Scholar Consensus AI Elicit SciSpace
Finding open-access sources	Use an AI tool grounded in open content if you are specifically looking for open-access sources.	Inciteful Lumina Chat
Finding Census Data sources	If you are looking for US Census data to support your research, use an AI tool grounded in Census data.	Block Atlas CensusGPT
Finding keywords and search strings	If you get stuck in your search and need ideas for variations on your keywords and search strings, you can use AI for assistance. If you use a GenAI chatbot, consider using more than one and comparing the content. You might ask the chatbot to suggest keywords specific to the search tools you plan to use. <i>Prompt: I am researching <insert topic>. Can you suggest keywords and search strings that I can use in Google Scholar, JSTOR, ProQuest, PubMed, ScienceDirect, and Scopus academic databases?</i>	Search Smart CoPilot Perplexity Groq Claude Gemini Mistral Le Chat

Finding the best database to search for your content area.	If you aren't sure which database to use for your content area, you can ask AI to help. You can enter your keywords and search strings into Search Smart, and it will suggest databases to use and tell you which ones are open access.	Search Smart
Concept mapping	There are many AI tools to choose from to assist with concept mapping. While many chatbots have this feature, consider using a tool designed specifically for concept mapping and grounded in scholarly work.	GitMind Mapify
Literature mapping	AI can be used to create a visual representation of the interconnected research related to your topic.	LitMaps Open Knowledge Maps Connected Papers Research Rabbit
Outlining	Generative AI can help you outline your research paper. You can also use other AI tools that use a grounded data set of scholarly literature to assist with developing an outline. Ask multiple tools to help you create an outline and then combine the most effective parts of each suggestion.	PaperPal CoPilot Perplexity Groq Claude Gemini Mistral Le Chat
Summarizing research	AI tools for summarizing are numerous and have been built into many research tools listed above. To get a more customized summary, you might consider a tool where you can "chat" with a specific document. This allows you to get an AI-assisted deeper understanding of the paper. When selecting a tool that asks you to upload a file, you should be cautious of their privacy policies. Select a tool that provides secure storage and will not use your files to train their model.	AskYourPDF ChatPDF NotebookLM
Synthesizing Research- Creating a synthesis matrix	There are tools designed to assist with synthesizing research from multiple papers. Several allow you to find a paper and add columns to a table to compare the studies. You can also use NotebookLM as a more customized option. This tool allows you to upload up to ten documents, ask questions, and get summaries of content and themes across the documents.	Elicit SciSpace NotebookLM
Writing your draft	This is all you! You can use AI to gather literature and organize your paper in the prewriting phase, but when it is time to write, you want to be sure you are the author.	
Revising and editing your draft	When using AI to revise your work, you want to ensure that you are in control and making decisions about how the work is being revised. It is best to avoid putting your work into a chatbot and	Grammarly WordTune DeepLWrite Wordvice AI

	allowing it to generate revisions. You could ask a chatbot for advice on revising using specific prompts and then make the changes yourself. You can also use a tool that is specifically designed to assist with revisions and allows you to decide whether to accept or reject changes.	PaperPal
Claim/fact-checking	Another important aspect of writing your paper is ensuring that you have supported any claims you make in your paper. There are AI tools designed to identify your claims and the accuracy of the evidence that supports them.	Longshot Fact-Check-Cite Honesty Meter
Check citations and ensure sources are correctly cited	Accurately citing sources is essential, and throughout the revision process, it can be easy to miss one or to forget to remove a source from your reference list. You can use an AI citation checker to generate a report highlighting potential citation issues.	Recite - APA Citation Checker PaperPal

Conclusion

As AI tools become more available, student use of AI will likely increase in the coming months and years. Intentionally integrating AI into the classroom is one way to ensure that students use AI in a way that aligns with your expectations. While having an AI policy in your syllabus is a way to start setting expectations around AI usage with your students, it is also important to clarify your expectations at the assignment and task level. As you can see from the table above, there are many aspects of the research and writing process where AI can be helpful, so you will need to set expectations with students regarding AI usage. One way I do this in my classes is with an [AI policy statement that uses a “stoplight system”](#) highlighting the acceptable use of AI. I provide students with a table that highlights when they can use AI (green), when they cannot use AI (red), and when they may use AI with some caution (yellow). This transparent and collaborative approach ensures faculty and students can effectively and ethically integrate AI tools into their academic work.

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Additional Resources

Academic ID's Key Guidelines for Using Generative AI in Academic Research:

<https://academicid.io/research>

AI Literacy Lib Guide: <https://libguides.macalester.edu/ailiteracy>

AI Syllabus Policy Statement by Dr. Torrey Trust:

<https://docs.google.com/document/d/1caSLk2JM40K4tdQHILRwftYVGM6k8z0ZA2J12SwLhtU/copy>

A Student Guide to Navigating College in the Artificial Intelligence Era by AAC&U and Elon University: <https://www.aacu.org/publication/ai-u-v1>