UCF College of Graduate Studies – Effective and Responsible Use of AI: Guidance for Graduate Research, Writing Dissertations, Theses, and Manuscripts for Publication

Generative AI and Large Language Models (LLMs), such as ChatGPT, OpenAI, Microsoft Co-Pilot, and Google Gemini, are now accessible to a wide range of users and are increasingly integrated within many day-to-day tasks, including for the enhancement of research practices. Recognizing their growing relevance in higher education, this guidance document has been developed specifically to assist thesis and dissertation students in effectively and ethically incorporating these tools into their research processes.

It is important to note that the following recommendations outlined represent suggested best practices rather than formal policy at UCF, and they are subject to change in response to the dynamic and rapidly advancing capabilities of AI technologies.

Here are some questions graduate students should ask before embarking on their research journey using AI:

1. How can I use AI effectively to help generate research ideas and approaches for my thesis or papers?
2. How can I utilize AI as a tool for writing or editing my publications and thesis without over-relying on it?
3. How accurate are the results that AI generates, and can I trust it for my academic work?
4. How confidential is the process when using AI? Am I risking sharing valuable research ideas or results on an open platform like ChatGPT before they are peer-reviewed and published? Could this affect my intellectual property rights, like patents?
5. What steps can I take to improve my skills in using AI as a tool in my research process?
6. Am I at risk of plagiarism or research misconduct if I use AI to write portions of my thesis or dissertation?
7. How can I clearly acknowledge the contribution of AI or other assistive technologies in my academic work?
8. What guidelines or restrictions do professional societies and publishers have regarding the use of AI in writing, reviewing papers, or submitting proposals?

Recommendations for Use of AI in Graduate Student Research

Creating new knowledge and performing research is of paramount importance for graduate students. The research process involves developing critical thinking skills to create research ideas, choose methods, collect data, summarize results, and draw conclusions. While AI can be helpful, the responsibility for the research outcomes rests with the researcher, not the AI.

You should always reference, verify, and validate any information derived from AI. Researchers must always take full responsibility for AI-generated materials. All ideas must be attributed and all facts verified.

Guidance on Use of Generative AI in Generating Research Ideas or Approaches:

- Brainstorming: You can use the AI tool as a brainstorming partner, where you exchange ideas whether the AI prompts you or you prompt the AI for ideas. Brainstorming is an iterative process that can be made more effective with the way that the queries are posted. For more samples or information, post this query into your favorite LLM: “How can I use AI to help me to brainstorm an idea?”
- Surveying Existing Approaches: Large Language Models, if trained broadly in a topic, can give a good initial overview of existing approaches or existing literature on a topic. Current research sources such as library or professional society databases are more reliable in terms of accuracy of peer-reviewed content.
- Prompt engineering is important: Practice the prompts used for Generative AI. The value of the response depends on the value of the prompt. If you provide a low quality or vague prompt, you will get vague results.
- Critical thinking skills are enhanced by learning how to iterate on the prompts to refine results or to use the material gathered from one result to identify new avenues of inquiry to pursue. Varying skill levels among users might exacerbate existing inequalities among students. For example, students for whom English is the second language might be at a disadvantage.

Advice on Usage:

- Be very skeptical of the results. Do not trust any outputs that you cannot evaluate yourself or trace back to original credible sources. There are many stories of generative AI giving citations of articles that do not exist.
- Be scientific with your prompts (or queries): Prompting is not deterministic, so the same prompt at a different time may result in a different response. Small changes in the wording of the prompt may yield very different responses. Keep records, make small changes and see how it affects the outcome, etc.

- Don't share any data or information that is confidential, proprietary, or have IP implications. Your uploaded data or ideas might be incorporated into the learning model to be available for others in your research area, prior to you having a chance to publish it. If you intend to pursue commercialization or other Intellectual Property avenues for your work, putting the information into an open AI platform may be considered as disclosure.
- Protect confidential data. You should not enter data classified as confidential, including non-public research data, into publicly-available generative AI tools (see UCF's Information Security Policies. Information shared with generative AI tools using default settings is not private and could expose proprietary or sensitive information to unauthorized parties.
- Ultimately, you are responsible for any content that you produce or publish that includes AI-generated material. AI-generated content can be inaccurate, misleading, or entirely fabricated (sometimes called "hallucinations"), or may contain copyrighted material. Review your AI-generated content before publication.

Guidance on the Use of Generative AI in Writing Publications or Theses and Dissertations

Editorial Assistance:

- Using an AI editorial platform (such as Grammarly) for a grammar check and for editorial improvements is similar to having a person proofread a paper or essay and generally does not require acknowledgement.
- Depending on the AI platform, keep in mind that what is intended only as a grammar check may inevitably put your ideas into a system over which you don't have control.
- Also be aware that using an AI platform such as Grammarly can sometimes be flagged in systems like iThenticate and Turnitin as problematic entries.
- Preserve confidentiality of the information: any information that you upload into a Large Language Model may become part of that model's data and, as a result, be used to form responses to another person's inquiries on that topic. If your paper has not yet been submitted for peer review, then you may decide to seek AI editing help only on smaller sections of the paper that don't contain new research content. In some cases, you may be able to opt out of your information being included in the training data.
- Don't short circuit the learning process: For a graduate student, an important part of the learning process is to gain skills in analyzing, summarizing, and discussing their research results.

- Inputting data into a generative AI platform and asking it to write this type of content has two disadvantages: it does not give the student the experience to gain those skills and it may produce content that sounds good but would not withstand scrutiny by experts. Putting aside the confidentiality risk mentioned above and publishers' restrictions, hypothetically, a researcher could ask the generative AI platform to outline discussion points in order to gain ideas as a first step in doing their own analysis and write-up. The researcher should be aware of the limitations and possible consequences of that action.

Act Ethically:

The responsible conduct of research includes several practices that should be considered when using AI to assist in performing research:

- Authorship: Only include material in your writing that you or a co-author wrote or that you can cite from primary sources. Note also that there is no guarantee that an AI-generated response is not including passages verbatim from other sources, so quoting an AI-generated response may crossover to traditional plagiarism.
- Falsification or fabrication of data: There is no guarantee that Generative AI will produce accurate results or that it will not create new false data.
- Responsible collection and management of data: There are ethical standards on the treatments of research subjects and their data that must be upheld. For example, you would not upload sensitive data to an open AI platform. There's room also to reference the question of whether use of AI generated content is ever ethical by bringing up awareness of whether authors of the training data opted in, etc.
- Awareness of the tools you're using: make sure you're aware of their terms of service, where it obtained its data, and how it will use the information you put into it.

Publisher Expectations

Publishers have expressed apprehension regarding the potential utilization of generative artificial intelligence (GAI) in the creation of research papers. Consequently, numerous publishers have released statements outlining their respective positions. These statements address concerns pertaining to content quality, offering authors a range of perspectives, from preventative measures to methods of detection.

As such, students planning to publish their research within the scholarly community must consider how the use of AI will be received by various academic publications before undertaking their writing process. This is especially important in the context of a thesis or dissertation. Investigate individual publishers' policies on AI to determine what is permissible.

Advice on Usage:

- Understand the AI policies for publications prior to submission: A professional society may have specific restrictions on the use of AI in the writing of a publication to be submitted and reviewed. Make sure that you understand and abide by those restrictions before submission. For example:
    - Generally, authors are responsible for the content of their submissions, regardless of whether they used generative AI or not. So, authors would be responsible for errors in AI-generated content.
    - Some publishers require full transparency and credit for the source of AI-ideas in the manuscript.

Resources

UCF Artificial Intelligence Website: https://it.ucf.edu/artificial-intelligence

Rutgers University Library site for guidance and AI platforms for searching research databases: https://libguides.rutgers.edu/artificial-intelligence/ai-in-research

Strategies for prompt engineering are found in the OpenAI Guide and in Ivan Allen article on prompt engineering:

https://platform.openai.com/docs/guides/prompt-engineering/six-strategies-for-getting-better-results

https://iac.gatech.edu/featured-news/2024/02/AI-prompt-engineering-ChatGPT

Information in this document is inspired by guidelines from the Georgia Institute of Technology, University of Michigan, and Harvard University