



WESTERN CANADIAN
DEANS OF GRADUATE
STUDIES

Generative AI and Graduate and Postdoctoral Research and Supervision

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PURPOSE

The purpose of this working group is to facilitate conversations on the role and impact of generative AI and tools such as ChatGPT among the Western Canadian Deans of Graduate Studies. The three specific objectives of the working group is to:

- Discuss the possibilities and challenges of the use of generative AI in graduate thesis, postdoctoral research, and writing including applications for admission and scholarships
- Develop a set of recommendations and best practices in advising and supervising graduate students and postdoctoral fellows
- Develop recommendations for the ways in which educational opportunities can be provided for graduate students, postdoctoral fellows, and supervisors to develop and enhance AI literacy

CONTEXT

According to the latest available data, ChatGPT currently has over 180 million users. And the website currently generates 1.8 billion visitors per month. Since November 30, 2022, when ChatGPT became publicly available numerous articles and news stories have been published about the promises and possibilities as well as pitfalls, risks, and positive and negative impacts of generative AI. At the same time a growing number of generative AI tools are becoming available including Microsoft Bing, Google Bard, Perplexity.AI, and other generative AI tools for text-to-image generation such as DALLE, Stable Diffusion, Midjourney, Jasper.Ai.

Generative AI and Graduate and Postdoctoral Research

There are several opportunities for the use of generative AI in graduate and postdoctoral research and writing, including generating thesis topics and ideas, conducting literature reviews, text summarization and synthesis, data analysis, prototyping and simulations, public communication, and presentation, drafting and editing, and coding.

However, there are significant concerns, issues, and risks associated with the use of these tools. These may include ethical, scholarly, and academic integrity issues around the use of generative AI tools such as

- Plagiarism, cheating, misrepresentation of data and authorship
- Data and algorithmic biases: discriminatory, inaccurate outputs
- Incomplete data and quality of generated text
- Data and citation fabrication and hallucination
- Data privacy and confidentiality
- Difficulty in replication of results
- Lack of transparency around the underlying data used for training the underlying language models
- Inability to handle ambiguous and controversial topics and queries
- Equity: Students who have money can access better AI than those who cannot

Graduate admission and postdoctoral research and writing may include a broad range of assessments and activities that have implications for the use and impact of generative AI, including but not limited to:

- Graduate admissions (statement of purpose/intent)
- Postdoctoral appointment (research proposal writing)
- Writing comprehensive exam
- Candidacy proposal
- Manuscripts for publication
- Thesis writing
- Citations and references
- Scholarships and awards proposals

Working Group Membership

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Meetings

The Working Group will meet on a biweekly basis starting in late July 2023 to develop a set of proposed recommendations to be presented at the Canadian Association for Graduate Studies Annual Conference in November 2023 in Victoria.

Deliverables

- A set of recommended practices for graduate deans, associate deans, and supervisors to advise graduate students on the use of generative AI in graduate research and writing, including possible references in policy documents such as student code of conduct, research, and scholarly integrity Policy.
- Suggestions for the ways in which graduate supervisors and students can develop AI literacy (academic integrity and ethics courses, postdoctoral PD, graduate teaching and learning courses etc.)

Deliverable 1: A set of recommended practices for graduate deans, associate deans, and supervisors to advise graduate students on the use of generative AI in graduate research and writing, including possible references in policy documents such as student code of conduct, research, and scholarly integrity policy.

RECOMMENDATIONS

The increasing role of generative artificial intelligence (AI) for university users opens opportunities for creativity and innovation that require our careful attention. This document provides a starting point, offering recommendations of how we can collaboratively move forward with shared goals in mind.

1. University-wide Responsibilities and Considerations.

As universities navigate the complexities of AI, they will need to ensure that its use allies with its academic goals, ethical commitments, and legal requirements. This process goes beyond learning what AI tools can create and includes an active commitment from faculties, departments, and units.

Recommendations:

- Establish unit-level expectations/regulations about when it is appropriate, or not, to utilize AI in academic writing for graduate program requirements. These expectations and regulations should be iterative, inviting feedback from all stakeholders.
- University administrators should identify the multiple institutional policies that are impacted by the use of AI and revise/enhance those policies to adapt to the emergence of generative AI tools where necessary, or identify how policies are interpreted/applied within the context of AI
 - Institutional applications will vary; for instance, the University of Manitoba instructs students that unless their instructor advises otherwise, they are not allowed to use generative AI (University of Manitoba, News Today, 2023). Vancouver Island University Faculty of Science and Technology has guidelines for instructors to communicate their stance on AI by creating clear expectations (Vancouver Island University, Faculty of Science and Technology, 2023). There's no one-size-fits-all approach but, rather, a need for ongoing discussions to craft approaches.
- Prioritize developing clear yet flexible university guidelines acknowledging diverse opinions and stances across all organizational levels. The goal is to strike a balance between something broadly applicable across the institution and uniquely adaptable where possible.

- Prioritize accessibility by leveraging AI to support those with disabilities. This can include developing text-to-speech tools, language modification, and assistive writing, to name only a few of the many possibilities.
 - As one of many potential applications, one example might be how generative AI could significantly aid individuals with autism by offering more tailored communication and learning solutions. These include augmentative and alternative communication tools, and individually customized educational resources.
- Include the voices of marginalized communities in the development of AI policies and usage. This involves ensuring informed consent, safeguarding privacy, and diligently working to eliminate biases in AI systems. Collaborations across intersectional groups are essential to developing beneficial, respectful, and responsive AI uses that respect everyone's unique needs and perspectives.
- Gain clarity on universities' legal requirements in the context of AI, particularly regarding data privacy and intellectual property.
- Develop guidelines on the intellectual property implications of the use of generative AI, including copyright and patents with regards to thesis research and publications.
- Stay informed about changing expectations for items such as grants, funding applications, and other academic tasks. For example, the Canadian Institutes of Health Research have updated their [Fall 2023 Project Grant Competition](#), clarifying questions about authorship, peer review, and the need for ongoing adaptations as technology evolves.

2. Academic Writing: Theses, Dissertations, Course assignments, Candidacy and Research Papers

Generative AI can significantly streamline academic writing, particularly when drafting and revising multiple versions of complex texts. However, its use raises important questions about academic integrity and the originality of scholarly work. Individual academic programs and units may address these questions using the following recommendations.

Recommendations:

- Users of AI tools must be aware that they are, ultimately, responsible for the academic integrity of the scholarly work, as well as the accuracy of citations listed in their writing.
- Users who use AI-powered tools for writing must provide a Transparency Statement explaining how AI algorithms, tools, or applications were utilized in their process.
- Hold skill-building workshops: Arrange workshops that train both supervisors and students/postdoctoral fellows to integrate AI tools responsibly and effectively into their academic careers, highlighting where people can learn different aspects from one another. These workshops are excellent examples of co-learning and developing AI strategies collaboratively.
- Provide ethics seminars or similar opportunities: Offer seminars focusing on the ethical considerations of using AI in academic writing or put it in your ethics courses students take when entering the university.
- Acknowledge limitations: Have users acknowledge the limitations of using AI in their writing process, including biased, discriminatory, incomplete, and inaccurate information.

- Use peer reviews: Incorporate peer review sessions focused on AI tools' ethical and practical use. These reviews could be a part of existing courses or standalone events.
- Provide educational opportunities for students, postdoctoral researchers, and thesis supervisors regarding the editorial policies and author guidelines of scholarly and academic journals and publishers when they prepare a manuscript for publications. Different scholarly disciplines may have specific requirements for authors to transparently disclose the use of generative AI in the methodology or materials and methods sections.

3. Research (Idea Generation, Literature Reviews, Data Analysis)

Generative AI can be valuable in the ideation, literature review, and data analysis stages. However, there is the risk of producing work that lacks the thoughtfulness of traditional scholarly work or hasn't undergone the usual human checks for quality and validity. Therefore, scrutiny is required to harness the benefits without compromising academic and ethical standards.

Recommendations:

- Make it clear that it is the user's responsibility to manage and ensure the accuracy of citations.
- Collaborate between users: Embrace the research process as a shared journey between student and supervisor. Using generative AI can become an educational experience for both, evolving their understanding of AI's role in academia.
- Set boundaries: Ensure everyone knows the ethical guidelines and limitations surrounding using AI in academic research. This should be a shared responsibility to ensure no boundaries are crossed.
- Model how to analyze data: Human researchers should conduct a parallel assessment of all AI work to identify AI limitations or biases as the algorithm analyzes the data.
- Acknowledge that AI tools are shaped by the knowledge bases behind their algorithms, which have historically underrepresented Indigenous epistemologies compared to Western ones. This imbalance calls for a mindful approach to the ethical and socially responsible use of AI, considering the colonial influence on generative AI and its impact on Indigenous Peoples. Addressing how Indigenous knowledge and perspectives are integrated into AI, especially regarding data acquisition, ownership, sovereignty, and consent, is essential.
- Remain aware that Large Language Models (LLMs) can perpetuate biases present in their training data, often impacting marginalized groups. For developing and using LLMs, it is essential to recognize and mitigate these biases by using diverse, inclusive data sets and maintaining transparency in processes. Such measures are vital for creating and using AI technologies that are fair and equitable, representing all societal segments, especially historically underrepresented or misrepresented groups.
- Continue to focus on developing critical thinking skills: Use the collaborative research process as a learning opportunity to teach critical skills like data verification, ethical consideration, and algorithmic understanding.
- Build institutional memory: Document recommended practices and lessons learned to contribute to institutional memory and guide future student-supervisor collaborations.
- Ensure data security: Establish secure methods for storing AI-generated data.

- Develop frameworks: Create appropriate documents (guidelines, policies etc.) to govern the secondary usage of data in AI tools. These policies might look at how consent, equity, and transparency can guide responsible data reuse.
- Educate researchers, supervisors, PDFs, and graduate students about your institution's Responsible Conduct of Research policy and its intersection with AI.

4. Citations and References

AI technology offers convenience in automatically generating citations, a task often seen as laborious. Yet, the technology is not foolproof and may produce inaccuracies or incorrect references. Generative AI tools such as ChatGPT are known to fabricate and hallucinate citations, references, and information such as plausible-sounding false statements and quotes from non-existent experts. As such, AI technology users should be taught to validate AI-generated citations manually to maintain the quality of academic discourse.

Recommendations:

- Shared credit: In instances where generative AI contributes significantly to the research outcome, develop guidelines for appropriately allocating credit among students, supervisors, and the AI tool.
- Allow time to make this work: Emphasize allocating time for manual verification of automated citations using credible scholarly sources.
- Verify sources: Develop guidelines for verifying the reliability of sources cited by AI tools.
- Train users on how to use tools: Offer training sessions on recommended practices for citation management with AI tools.
- Explanations of how to cite AI in various citation styles, including examples, are often found on the institution's library website ([example](#)).

5. Graduate and Postdoc Application Proposals

Generative AI in academic applications offers both efficiency and challenges, particularly in retaining the human touch that distinguishes each applicant. The balance between efficiency and authenticity is mostly uncharted territory in academia, creating institutional blind spots. Conversations among educators, students, and administrators about what an "honest" representation of academic work looks like in the era of AI are, therefore, critically needed.

Recommendations:

- Set clear goals: Develop and disseminate guidelines that clarify how AI-generated application materials should align with the ethos and expectations of the institution. Include these guidelines in admissions documents.
- Institutions must clearly articulate their expectations about the use of AI tools in the creation of Graduate and Postdoc applications within their Graduate and Postdoc application pathways.
- It is the student or postdoctoral fellow's responsibility to be aware of, and adhere to, institutional expectations about the use of AI tools in the creation of Graduate and Postdoc applications.

- Maintain unique voices: Reinforce the importance of users maintaining their own voice in AI-assisted drafts. Offer workshops or guidelines on integrating AI tools without compromising individuality.
- Identify current gaps: Conduct institutional audits to pinpoint blind spots in current policies and practices concerning the use of AI in academic applications.

6. Scholarships and Awards Application Proposals

From a university's perspective, generative AI in scholarship applications introduces practical and ethical hurdles. The use of AI can result in applications that look too similar, making it difficult to identify uniquely deserving scholarship candidates. On the ethical side, AI could carry unnoticed biases, raising concerns about fair evaluations. These complexities make it clear there is need for open discussions among university staff, students, and decision-makers to navigate the ethical implications effectively.

Recommendations:

- Figure out how to evaluate distinctive merit: Implement measures to identify the unique qualities of each scholarship applicant, even when AI tools have been used. This could involve supplementing the application with human-reviewed essays or interviews that allow the candidate's unique attributes to shine through.
- Create transparent standards: Create a set of ethical standards that specifically address the potential biases and pitfalls of using generative AI in scholarship applications. Incorporate these into existing scholarship criteria to ensure fair evaluations.
- Have dialogues: Host regular discussions among scholarship committees, faculty, and students to explore the ethical implications of generative AI in scholarship applications. These conversations should define what constitutes an authentic and ethical scholarship application.
- Share recommended practices: Publicly release a well-documented guide on recommended practices for using AI in scholarship applications. Make this document accessible to all educational institutions for adaptation and use.

Transparency Statement

This document was created through a synergy between human skills and AI algorithms. Specifically, Perplexity.ai was used to find relevant material and suggest high-level categories for analysis. Additionally, prompts on specific topics were given to ChatGPT to generate ideas. The final document was comprehensively reviewed and edited by our team. Each element was written by our team, with copy-editing and phrasing help through Grammarly. The use of AI in this manner is consistent with the guidelines and recommendations presented in this document, embodying a balanced approach to incorporating emerging technologies in academic settings.

Other examples of disclosure statements have been created in places like [Elsevier](#), [Nature](#), and the [Proceedings of the National Academy of Sciences](#).

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Deliverable 2: Suggestions for the ways in which graduate supervisors and students can develop AI literacy (academic integrity and ethics courses, postdoctoral PD, graduate teaching and learning courses etc.)

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DEVELOPING AI LITERACY

The following list is adapted from an upcoming article in *University Affairs*:

Friesen, J. & Polziehn, R. Embracing the Unknown: AI, Higher Education, and the Future of Academic Supervision, *University Affairs* (in press).

- Co-learning AI proficiencies: In our roles, AI fluency is not just beneficial; it's necessary. This fluency isn't about outpacing one another in mastering the technology but instead engaging in a shared learning experience to foster dialogue. Take time for professional development with your graduate students and then reflect on those learnings.
- Promoting ethical uses of AI: We should strive for collaboration that includes creating transparent guidelines for AI usage in academic endeavours. More than just advising students to cite AI tools and specific prompts, initiating collective dialogues on ethical considerations is foundational.

- Nurturing critical thinking with AI proficiency: Cultivating a questioning mindset in students is essential, but it's also something supervisors can actively encourage. The focus should be on nurturing skills for critically evaluating AI applications, data literacy, and the nuances of AI tools like ChatGPT. This endeavour stresses the importance of continual engagement with the subject matter.
- Addressing the AI access divide: With AI becoming a staple in academic research, tackling economic and technical access disparities is crucial. Allocating targeted resources such as free tool subscriptions can make a significant difference, but this should be across all universities to ensure an equitable and inclusive academic landscape.
- Engaging students in decisions that affect them: Since students are often the early adopters of AI in academia, their perspectives are invaluable in forming institutional AI policies. Encouraging their voices in decision-making and curriculum adjustments can engender a more comprehensive understanding and responsible engagement with AI's ethical considerations.
- Encouraging student involvement in research planning: As both students and supervisors become increasingly adept at using AI tools, active participation from both parties in crafting the research agenda is beneficial.
- Fostering Interdisciplinary Conversations: Given AI's vast applications across disciplines, creating spaces for cross-disciplinary discussions among students and supervisors can yield unique insights and foster innovation.
- Ensuring Mental Wellness in the AI Era: The pressure to keep up with rapidly evolving AI technologies can overwhelm students and supervisors. Encouraging open dialogues about the stressors associated with AI adaptation and offering mental health resources tailored to these specific challenges can support well-being in the academic community.

Below is a list of tools that people can explore to better understand the ways you can use AI:

Chatbots

Chatbots utilize artificial intelligence for diverse interactions, making them suitable for queries, support, or even storytelling exercises in the classroom.

1. ChatGPT
 - a. Offers conversations based on OpenAI's GPT technology. (<https://chat.openai.com/>)
2. Bing Chat
 - a. Microsoft's chatbot through the Bing search engine. It's helpful for quickly clarifying academic search queries. (<https://www.bing.com/chat>)
3. Poe AI
 - a. Multiple AI chatbots all in one place, including ChatGPT and GPT-4. (<https://poe.com/login>)

Text-to-Image Tools

These platforms offer creative image generation from textual input, allowing for compelling visual presentations and course materials.

4. Adobe Firefly
 - a. Text-to-image AI from Adobe. (<https://firefly.adobe.com/inspire/images>)

5. Bing Image
 - a. Microsoft's text-to-image tool. (<https://www.bing.com/create>)
6. Stable Diffusion
 - a. Deep learning-based text-to-image platform. (<https://clipdrop.co/stable-diffusion>)
7. Recraft AI
 - a. Generates vector art and 3D images. (<https://app.recraft.ai/projects>)

Other Tools

Diverse platforms that capitalize on AI for various creative and efficiency-driven tasks. Great for extending the capabilities of traditional academic tools.

8. D-ID
 - a. Transforms photos into video presenters and avatars. (<https://studio.d-id.com/>)
9. Synthesia
 - a. Generates videos from text or voice inputs. (<https://www.synthesia.io/>)
10. Perplexity AI
 - a. Specializes in AI-driven data analysis, reviewing research and literature, and visualizations. (<https://www.perplexity.ai/>)