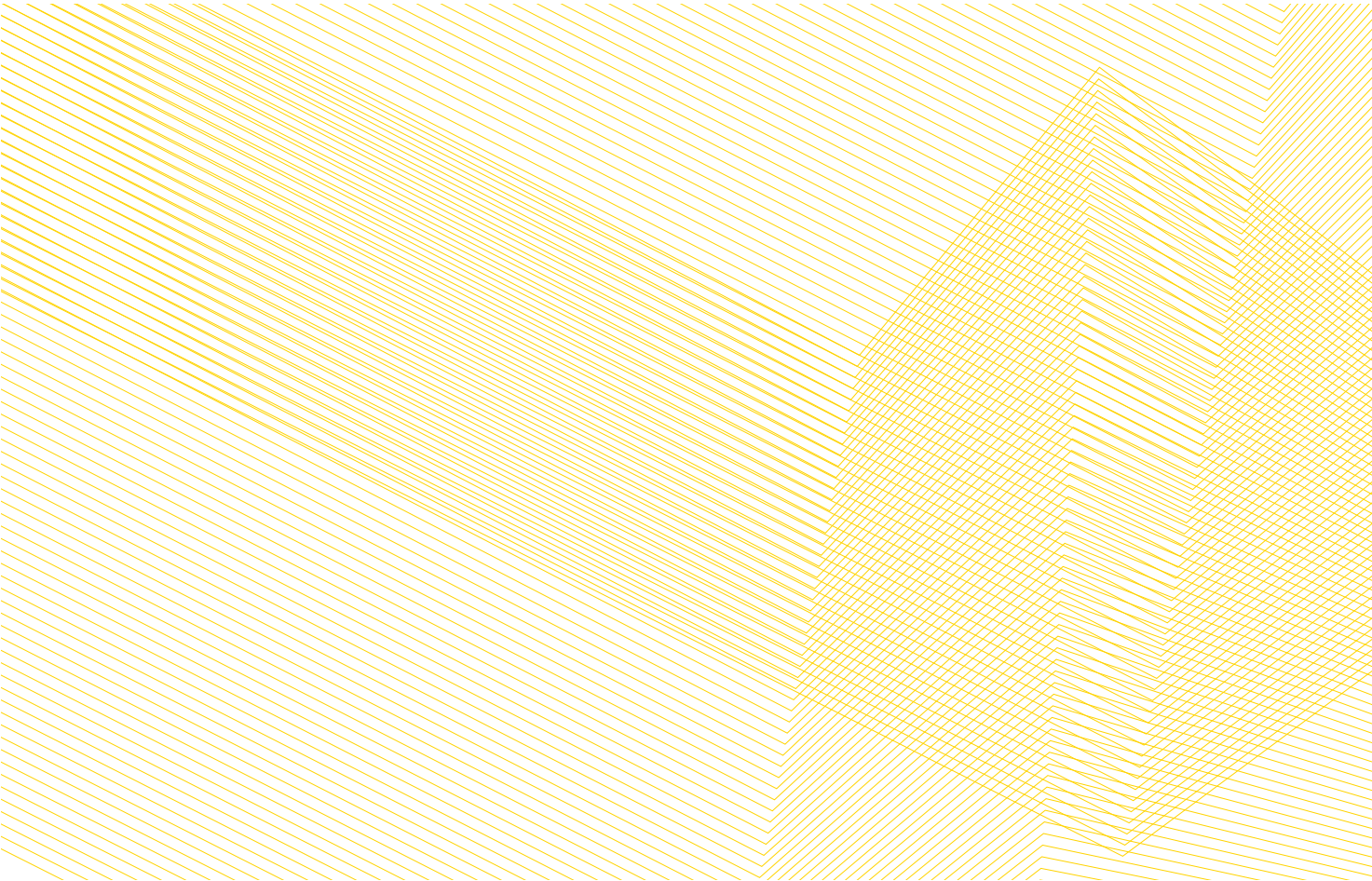




# Graduate Education

## Report

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# Generative AI in the context of graduate education

**Graduate education is core to the mission of the University of Toronto and draws on many of the areas represented by the AI Task Force Working Groups, namely Teaching & Learning, Research, and Student Services.** The recommendations of those Working Groups can generally be understood to apply to graduate programs, research, courses, and students. This document highlights considerations unique or especially relevant to graduate education to inform the interpretation and application of the AI Task Force work.

Generative AI tools have become a part of graduate work and are being used by our students. Our goal is to support students in using generative AI responsibly, and channel the positive possibilities of AI in ethical ways that enhance their learning and research. Moreover, we need to ensure that information about appropriate AI use is available to all our students. Last, we need to equip graduate programs and faculty with strategies to address the impact and opportunities of AI in their disciplinary context, with the realization that this is a rapidly evolving area.

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## Degree-level expectations and assessment

Degree-level expectations for master's and doctoral programs<sup>1</sup> describe essential skills and competencies that are contextualized by all graduate programs into specific program learning outcomes. Some of these outcomes are likely to be differentially expressed or learned in a landscape shaped by generative AI. For example, methodological competence and an understanding of ethics may shift as norms for the use of generative AI evolve within disciplines, and in the future might incorporate both development of critical AI literacy and skills that allow responsible and effective AI use. Skills in using AI effectively may become part of the core academic and transferable professional skills that graduate students develop through their programs; the ability to develop and articulate their own generative AI skills is a consideration for graduate student professional development. More generally, the skills required by a changed labour market due to AI proficiencies will modify the value of existing skills and add new skills that programs must equip their students with.

Graduate students will need guidance in determining when the use of AI is most appropriate and beneficial to their graduate studies. Fundamental to graduate students' development of AI literacy is helping them consider when and how to use these tools and when and how to use other tools that may be more appropriate. Sustainability is of key concern to the graduate community, and guidance on AI tools will assist our community in making mindful decisions about use.

Clarifying what constitutes “creation of new knowledge” and “original research” as it relates to AI-generated content and analysis across different stages and types of research will be especially important in the context of graduate education, and particularly in the doctoral thesis. The doctoral thesis must adhere to [SGS Doctoral Thesis Guidelines](#). In addition, SGS also provides [Guidance on the Appropriate Use of Generative Artificial Intelligence in Graduate Theses](#) specifically.

In addition to articulating program learning outcomes, graduate programs may also need to review whether traditional assessment types used to develop and measure student skills are still effective, given generative AI. For example, “thinking out loud” is a common form of assessment in graduate education, through oral components of comprehensive examinations and the final oral exam, as well as presentation of work at conferences and informally in team meetings or within classes/seminars. If students have relied too heavily on generative AI and thus not gained critical skills, they may be unable to demonstrate independence when required to “think out loud” at key junctures. The nature of these types of activities may naturally guard against overreliance on generative AI given they require independently answering questions, and for this reason programs are encouraged to explore using these forms of assessment early in courses and milestones.

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1 <https://www.vpacademic.utoronto.ca/wp-content/uploads/2018/11/dle-grad.pdf>

Graduate students, especially in the early years of their degree programs, may not have developed the underlying depth of knowledge to critically assess generative AI output. This can introduce risks of overuse by graduate students and potentially over reliance. Programs can consider which tasks help build depth of knowledge and may wish to limit or minimize generative AI use for these tasks to allow students to build a level of independent expertise. Peer review also plays an important role in graduate learning and assessment—both in an academic context through peer feedback in courses, and in a professional context as a peer reviewer for journals, grant proposals etc. The use of generative AI in the peer review process may be prohibited or limited by journals, granting agencies, or disciplinary norms; supervisors and programs should help students navigate these requirements and expectations, and understand the academic rationale underlying them.

In general, programs need more forms of assessment that allow skill development in the new world of generative AI use. Programs may want to think about incorporating reflection or meta-cognition about how the student approached the assignment, and their learning process into assignments, as that fosters ownership of their work and development. Programs may also want to think about conducting assessments in-person.

While considering opportunities to use different forms of assessment, programs should be respectful of individual differences in cognitive ability, mental wellness, neurodivergence, and linguistic differences, which might require alternative approaches to assessment, some informed by approved accommodations.

Graduate students have pursued further higher education to gain knowledge and skills. Appealing to students' intrinsic motivation for knowledge and skill development, which will have longer-term benefits, could be a way to channel the positive benefits of generative AI and limit overreliance.

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## Supervision

For doctoral students and students in research master's programs, the supervisor(s) and supervisory committee are critical contributors to research and thesis work and to overall professional development. Professional master's students also often benefit from guided research projects under a supervisor. In addition, the supervisor and supervisory committee are essential to identifying and communicating norms and expectations for AI use in their discipline and program to their students. Supervisors should discuss generative AI use transparently and directly with their students as a regular part of their supervisory practice.

SGS's [Guidance on the Appropriate Use of Generative Artificial Intelligence in Graduate Theses](#) addresses expectations for supervisory input on thesis work, noting that "Students who plan to use generative AI tools in researching or writing their graduate thesis must always seek and document in writing unambiguous approval for the planned uses in advance from their supervisor(s) and supervisory committee."

In the spirit of transparency, supervisors should also describe their own use of generative AI in their supervisory interactions when discussing their activities with students and colleagues.

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## Other implications of generative AI

**Beyond their academic and research work, graduate students or prospective graduate students may require additional guidance on ethical considerations or understanding existing guidelines related to the use of generative AI in:**

- Application materials, including admissions applications to graduate programs and applications completed during programs (e.g., for awards and funding, postdoc opportunities, etc.)
- Writing reference/support letters, e.g., for undergraduate students or peers
- Teaching and marking, both as a course instructor and as a Teaching Assistant

One potential challenge for graduate students is navigating expectations related to AI across their multiple roles. For example, a graduate student might simultaneously be a student in courses, a TA or course instructor, and a researcher or research assistant for one or more principal investigators. Each role will come with different norms and expectations for generative AI use, and graduate students will require support to identify appropriate uses across these different contexts.

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## Summary

**Generative AI tools may be used to enhance the aims of graduate education and graduate student skill development, and supervisors and program leadership can help ensure that graduate students:**

- Continue to meet degree-level expectations and program learning outcomes, demonstrated through meaningful assessments that also help students avoid difficulties when required to demonstrate these skills and competencies independently
- Develop the foundational skills and knowledge that will allow graduate students to provide an independent expert assessment of scholarship and/or professional activities in their field, including a critical, expert assessment of AI-generated output
- Have the opportunity to develop and articulate generative AI skills relevant to their academic and professional activities, and ensure skills gained align with any changing labour market needs
- Work closely with and transparently discuss AI with supervisors to understand norms and expectations, namely for research and peer review
- Have the information and support needed to navigate expectations and norms for generative AI use across their varied scholarly and professional roles and activities

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## Additional information

**The information discussed here is complemented by the review of AI's impact on graduate education explored in the following reports:**

- [Ontario Council on Graduate Studies \(2024\): Artificial Intelligence: Considerations for Graduate Research](#)
- [Western Canadian Deans of Graduate Studies \(2023\): Generative AI and Graduate and Postdoctoral Research and Supervision](#)

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