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HIGHER EDUCATION

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Generative AI and higher education

Anticipating, creating, and shaping
a better post-secondary system

Colleges and universities

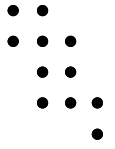
Canada's higher education institutions play a crucial role in fostering innovation, serving as hubs of knowledge creation and dissemination. Through their research initiatives and collaboration with industry partners, new ideas, technologies, and solutions are generated that have the potential to transform industries and drive economic growth. To further enhance their research capabilities and create a new wave of Canadian entrepreneurs, professionals, and researchers, post-secondary institutions should be looking to embrace the latest artificial intelligence (AI) tools.

Generative AI (GenAI) refers to a class of AI systems that can create new and original content across different modalities. Already having an impact in almost every industry and profession, its scope of influence is unlike anything we've ever seen. As large language models (LLMs) are trained on more data and graphical processing units become more affordable, the potential for improvement in model performance (the ability to deliver the desired natural language response) appears limitless.

On top of improving research, GenAI presents many opportunities to create value for students, faculty, and administrators. It can make learning more accessible and tailored to a student's specific needs. It can help educators generate high-quality educational content more efficiently. GenAI can also help administrators run more sustainable and efficient campuses by improving course scheduling, staff workloads, and facility usage.

Infusing GenAI into research, teaching, and operations isn't just a good idea—it's also imperative for the survival of Canada's higher education organizations. Responsible for providing high-quality education, they need to foster intellectual development, design relevant academic courses, and transfer knowledge in ways that contribute to societal progress and economic development.¹ Universities and colleges can't resist this change; instead, they must embrace the AI wave and learn the best ways to use it to educate students, teach them relevant skills, and shape their developing minds as the next generation of leaders.

FOSTERING INNOVATION



Generative AI for students



Students are already adopting GenAI and have an overall positive view of it. Deloitte surveyed 2,000 of our current employees and 550 students worldwide to assess their perceptions. **Despite some concerns around accuracy, reliability, privacy, and ethics, 68% of the respondents believe GenAI tools have improved their ability to understand new information.**²

Post-secondary students are almost twice as likely as employees to be using GenAI, and younger employees right out of school are three times more likely than people in the middle of their careers. Similar findings were discovered in a survey of 399 undergraduate and post-graduate students at the University of Hong Kong. Despite modest concerns, those students see GenAI as a means to elevate the human experience, and they value the personalized feedback, writing and brainstorming assistance, anonymity, immediate support, and user-friendly nature that the tools have to offer.³ Since it's clear that students are already open to and appreciate the benefits of GenAI, boosting their skills and experience with it should be a top priority to optimize their transition into the workforce.

Beyond integrating GenAI into their curriculums to give students foundational skills, colleges and universities can leverage the technologies to support their students. For example, there are GenAI learning platforms, such as Knewton Alta, that analyze a student's data and preferred learning styles to provide intelligent tutoring resources and generate customized practice materials.⁴ Students can also benefit from support chatbots that use GenAI to provide instant assistance, such as with campus directions, course selection, and scheduling inquiries. Additional opportunities for students include research assistance, where GenAI can assist students in conducting research by providing relevant information, summarizing articles, and even generating citations, helping students save time and enhance the quality of research.*

The University of Michigan's U-M GPT gives faculty, instructors, and students a free, safe, and secure environment to leverage GenAI to enhance teaching, learning, and research. The base LLM is fine-tuned on university-specific data and customized to the school's requirements. Designed for internal campus use, it has

security measures to protect sensitive information—the data that's collected isn't used to train the model, ensuring data confidentiality, privacy, and security.⁵

GenAI has the potential to democratize access to education by removing some of the barriers that students can face.

It can make resources more accessible to students with disabilities, such as converting text to speech for the visually impaired. It can also help individuals from different backgrounds with language support by facilitating the translation of content into any language, which can be especially helpful for international students. Promising tools in the market include Otter, an AI-powered note-taking tool that transcribes spoken word into written text, simplifying notetaking during a lecture, discussion, or interview.⁶ Summari is a tool that summarizes long-form texts and documents, saving students time and aiding their comprehension.⁷ GenAI can tailor resources and materials based on individual learning needs, adapting the content, pace, and difficulty levels to the student's abilities.⁸ Harvard developed CS50.ai, a GenAI tool, for use in its Computer Science 50 course. It highlights areas of code that could be improved and offers a personalized learning experience that nudges students toward correct answers in a way that boosts their problem-solving and critical-thinking skills.⁹

*GenAI generated this information as a part of a response to the prompt: "How can Generative AI support students in higher education?"

Generative AI for educators and administrators

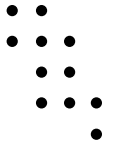


In addition to supporting students, GenAI technologies have the potential to transform the roles and responsibilities of educators and administrators. **They can help educators generate high-quality educational content, such as asynchronous learning material to be reviewed outside lecture time, and grade assessments, including scores and feedback.** Designed for educators, Gradescope is a tool that grades assignments and provides students with detailed feedback.¹⁰ Faculty, relieved of this time-consuming, labour-intensive task, can shift their focus to other meaningful activities, such as increasing their office hours to facilitate more support for their students and working on higher-impact research. GenAI has the potential to relieve administrators of burdensome back-office work and create user-friendly integrated environments. It can be used to automate many administrative tasks and processes, such as responding to applicant inquiries, helping students sign up for courses, and translating information for international staff and students.

For GenAI to be adopted successfully, faculty must be informed, educated, and motivated to understand the AI ecosystem and its broader implications.¹¹ As part of its fall 2023 report, *GenAI in Higher Education*, the consulting firm Tyton Partners surveyed more than 1,000 faculty and 1,600 students across the United States.¹² Analyzing the changes in their sentiments from spring to fall in 2023, it found that 22% of faculty members use GenAI, 50% of students are regular users, and, perhaps most importantly, 75% of the students who use GenAI intend to continue using it even if their professors or institutions ban it completely. While faculty tend to have a much less positive view than students on how GenAI tools will impact learning, the proportion of faculty believing that GenAI will have a negative impact on student learning fell from 50% in the spring to 39% in the fall, indicating that they're warming to the idea of it as a force for good in the classroom to support students. Despite this, a lack of faculty literacy and training represents one of the most significant obstacles to GenAI adoption success. It's important for higher learning institutions to make the requisite investments to drive AI literacy among educators and administrators.

TRANSFORMING ROLES





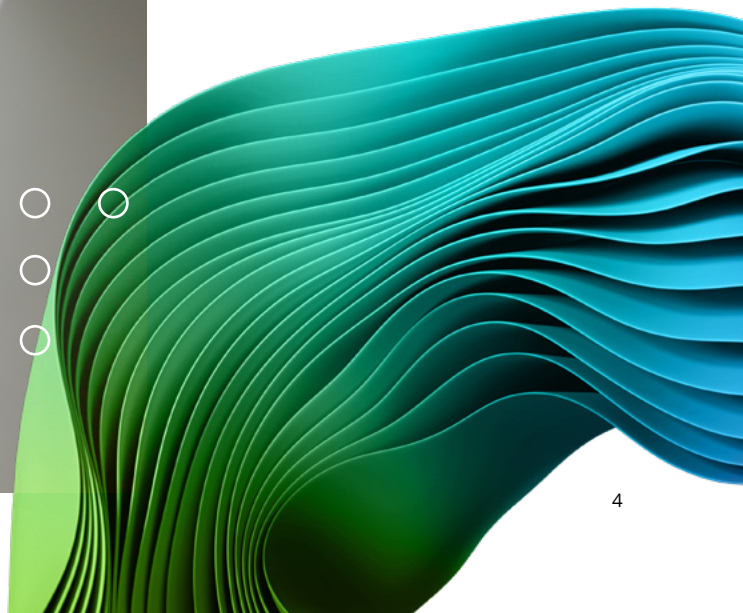
GenAI in admissions

We're already seeing AI being used in college admissions to assess applicants' personal qualities. Researchers at the University of Pennsylvania and Virginia Tech collaborated to develop RoBERTa, an LLM designed to make such assessments. This model can process thousands of essays within one minute, generating ratings for prosocial purpose, leadership, teamwork, learning, perseverance, intrinsic motivation, and goal pursuits.¹³ Despite having strong predictive validity, this AI approach warrants caution as well as optimism. For example, "I donated heroin to a children's shelter" scores high for prosocial purpose—affirming that AI is here to augment human judgment, not replace it.

AI is also being used in admissions to review letters of recommendation and transcripts, and to communicate with applicants. In a 2023 survey by educational magazine *Intelligent.com*, **eight in 10 higher education institutions expect to be using AI in admissions by 2024.**¹⁴ Half of the respondents indicated it was currently being used in their processes, more than one third planned to implement it, and the majority would allow AI to have the final say in determining an applicant's admission status—an indication of AI's importance for the future of education.

While admissions offices can use AI to increase efficiency, it's essential for them to be clear with applicants about their policies on its use. More than a third of enrolment leaders believe students' use of AI has made it harder to get an appropriate read on their true abilities.¹⁵ According to a report from the Higher Education Policy Institute for which more than 1,200 undergraduates were surveyed, 63% feel that their institution has a clear policy on students' use of AI.¹⁶ Georgia Tech, for example, has an explicit section in its undergraduate admission portal with a formal statement on AI:

*ChatGPT, Bard, and other AI-based assistance programs are powerful and valuable tools. We believe there is a place for them in helping you generate ideas, but your ultimate submission should be your own. As with all other sources, you should not copy and paste content you did not create directly into your application. Instead... we encourage you to take the same approach you would when collaborating with people. Use it to brainstorm, edit, and refine your ideas... We think AI can be a helpful collaborator, particularly when you do not have access to other assistance to help you complete your application.*¹⁷



Leaders' insights on GenAI and higher education



"The biggest risk when it comes to Generative AI is that we fail to adopt this technology quickly enough and we end up doing a disservice to the students and society we serve. If we're not actively educating them how to use it well and ethically, they will fall behind. The biggest risk is that we fail to move fast enough."

—Mark Daley, Chief AI Officer, Western University

"There is a lot to be excited about in terms of how GenAI might make higher education work better, but there are a lot of unknowns about things related to access, equity, and cognitive implications. We need to start thinking about where those cognitive gains are so we can make sure as we integrate [GenAI], we're not washing away the things that are most important in the process."

—Dylan Ruediger, Senior Program Manager, Ithaka S+R

"There's a mix of excitement, curiosity, and perhaps some usefully critical caution about Generative AI, and we are trained to apply those lenses because we want to see the world in a better place than when we first came."

—Dr. Airini, Provost and VP Academic, University of Saskatchewan

"From our Deloitte student-centric imperative report, we know that students want five things with respect to the student experience: they want it to be personalized, holistically supportive, digitally enhanced, data-informed, and designed to encompass the entire student journey. Generative AI hits on many of these, but most importantly, personalization. Generative AI has the potential to tailor student experiences unlike anything we've seen before."

—Mark DiNello, Partner and National Higher Education Leader, Deloitte Canada

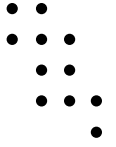
"Canada has a unique advantage in this space because we have a huge amount of talent here. Amazingly, two of the founders of deep learning are Canadian and they've trained generations of students. We have a tremendous pool of talent and institutional research expertise to lean on."

—Mark Daley, Chief AI Officer, Western University

"We're not only looking at the AI and Generative AI space right now, but as universities, we're looking ahead. We recognize how transformational this technology is and therefore we're actively asking ourselves, how can we be a part of shaping what's next?"

—Dr. Airini, Provost and VP Academic, University of Saskatchewan





Key considerations



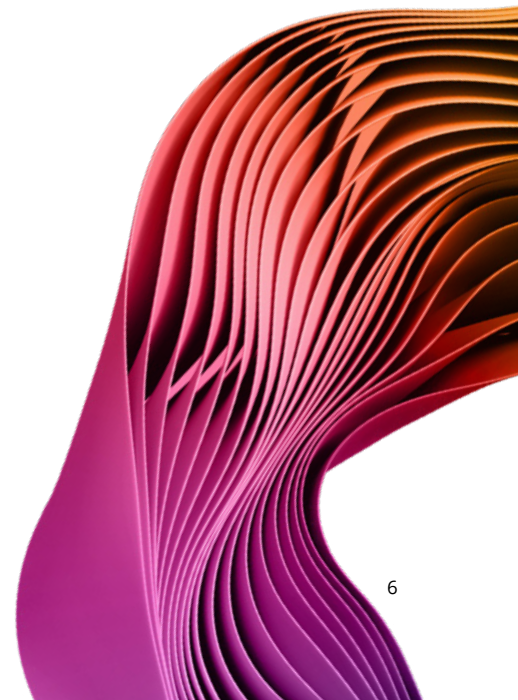
In creating an open-source model, OpenAI's ChatGPT is democratizing access to the world's information. Despite this remarkable achievement and the notable benefits for education, it's raising concerns about the validity of traditional student assessment practices.¹⁸ One of the primary emerging threats is to academic integrity. Detecting plagiarism is a considerable challenge, and many tools still identify GenAI content as original.¹⁹ With software designed specifically to identify artificially generated content, GPTZero can help mitigate this form of cheating by measuring randomness—the more random a piece of text is, the more likely it was generated by a human.²⁰ Though not without its flaws, it's still regarded as the most reliable AI detector.²¹

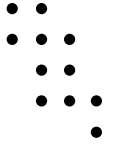
GenAI is driving the need for the thoughtful redesign of student comprehension assessments, to ensure the fair evaluation of student performance while also relieving faculty of the burden of detecting academic dishonesty. It has been suggested that the introduction of calculators into the classroom forced academic institutions to rethink student assessments and that GenAI is pushing them to another such inflection point.²²

This paradigm shift calls for educators to ask complex questions, such as:

- What is the role of knowledge when all knowledge is immediately available?
- When all information is accessible, how can an honest assessment be made?
- What are acceptable uses of GenAI? What defines unacceptable usage?
- How will the dynamics between students and teachers change, as well as their expectations both in and out of the classroom?
- How will the classroom evolve in the digital age?

The evolution of GenAI is happening rapidly and in real time. While questions remain about its use, one thing is certain: GenAI presents a host of positive opportunities to create value for students, faculty, and administrators as well as the general public, which will benefit from its vibrant innovation ecosystem.





Complacency isn't an option



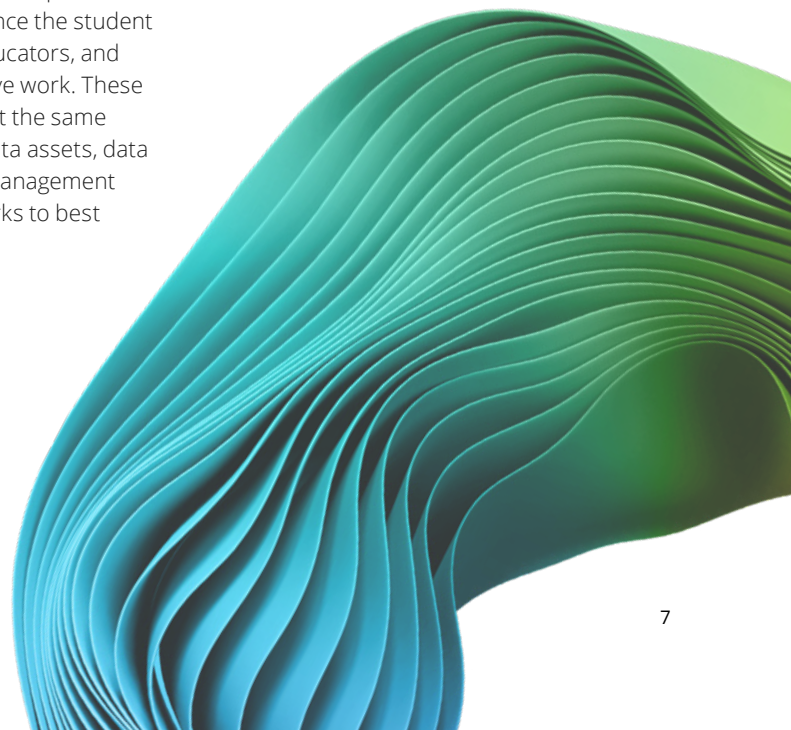
Educational institutions across North America are responding:

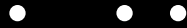
- Wilfrid Laurier University and Carleton University are actively redesigning their curriculums and assessments.²³
- The University of Montreal is revising its academic integrity policies.²⁴
- Western University appointed its inaugural chief AI officer, Mark Daley, to implement a university-wide AI strategy.²⁵
- The University of Regina is developing guidelines for the use of GenAI.²⁶
- McMaster University is testing a range of AI-detection tools.²⁷
- The University of Illinois has created a Generative AI Center of Expertise to support innovation.²⁸
- With US\$10 million in funding, the University of Southern California announced the launch of the Center for Generative AI and Society to study the impact of AI on culture, education, media, and society.²⁹
- UCLA Anderson School of Management initiated a cross-campus GenAI innovation competition, challenging students to leverage its potential for addressing societal problems.³⁰

- Concordia University and Queen's University are among the 19 North American institutions involved in a study exploring the emerging AI applications most likely to impact teaching, learning, and research.³¹

Post-secondary institutions are notoriously data-rich but information poor—it's time for them to capitalize on their massive data repositories.

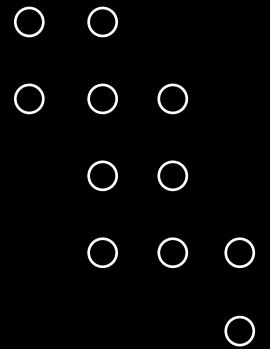
Every interaction with a learner at every stage along the educational journey represents potential data points that can be used to train LLMs.³² There's tremendous potential to leverage GenAI to enhance the student experience, support educators, and streamline administrative work. These journeys should begin at the same place: understanding data assets, data governance, and data management protocols and frameworks to best deploy AI solutions.

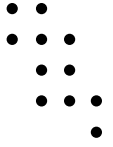




Generative AI presents a complex interplay of opportunities and challenges. In response, Canada's policymakers and educators must collaborate to rethink the future of higher education. Integrating these technologies in a safe and responsible way calls for a balanced approach that prioritizes ethical AI usage, enriches the educational ecosystem, and drives a brighter future for students and their institutions across the country.

OPPORTUNITIES AND CHALLENGES





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