Artificial Intelligence and Academic Integrity:

The Ethics of Teaching and Learning with Algorithmic Writing Technologies

Sarah Elaine Eaton
Robert Brennan
Jason Wiens
Brenda McDermott

January 25, 2023

Invited talk for Bournemouth University

UNIVERSITY OF CALGARY

Land Acknowledgement

UNIVERSITY OF CALGARY

We would like to acknowledge the traditional territories of the people of the Treaty 7 region in Southern Alberta, which includes the Blackfoot Confederacy (comprising the Siksika, Piikani, and Kainai First Nations), as well as the Tsuut'ina First Nation, and the Stoney Nakoda (including the Chiniki, Bearspaw, and Wesley First Nations). The City of Calgary is also home to Métis Nation of Alberta, Region 3.

Research Team (University of Calgary)

UNIVERSITY OF CALGARY

Schulich School of Engineering

- CI: Robert Brennan
- RA: Jonathan Lesage

Arts

- CI: Jason Wiens

Werklund School of Education

- PI: Sarah Elaine Eaton
- PM: Helen Pethrick
- RA: Beatriz Moya

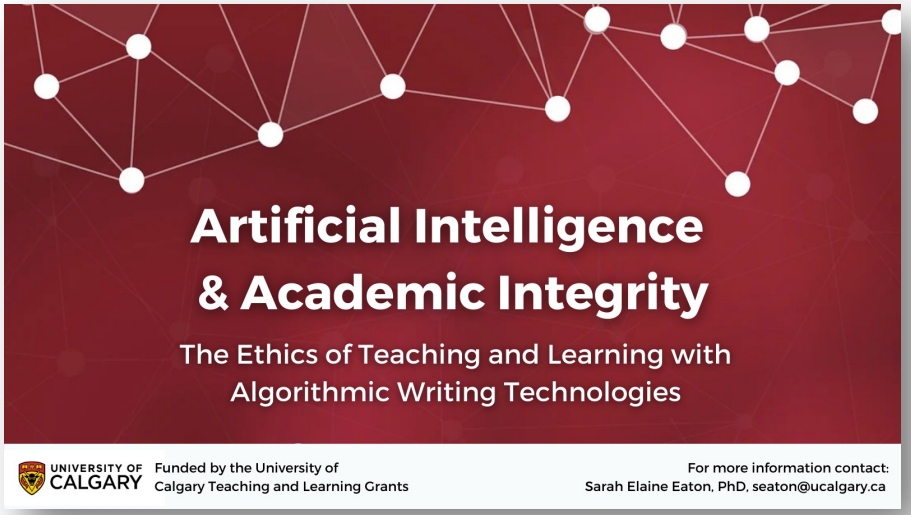
Research Team

Student Accessibility Services

- CI: Brenda McDermott

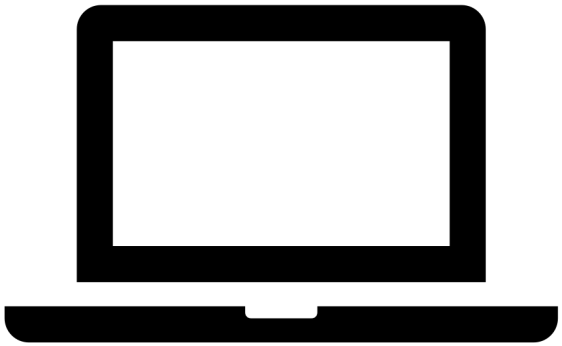
Topics

1. Research Team
2. Project Beginnings
3. Gaps in Research
4. Main Research Question
5. Key Terms
6. Key Consideration
7. Projects Involved
8. Expected Impacts and Outcomes



Find us on the web: https://osf.io/4cnvp/

Chat GPT-3 Generated Poem



There once was a robot so smart

It could ace any course right from the start

But it raised some concern
When it couldn't learn

That academic honesty was an art

Created with ChatGPT3 from OpenAI

Project Beginnings

UNIVERSITY OF CALGARY

Emerging questions concerning **algorithmic writing technologies** and their related **ethical complexities**

Interest in developing **evidence-based recommendations** in contexts impacted by **AI text-generating technologies**

Informed by a perspective on academic integrity as a **teaching and learning imperative** (Bertram Gallant, 2008) and as a **transdisciplinary research area** (Eaton, 2021)

Key Terms

Dall e generated image

Artificial Intelligence

- "Computing systems that are able to engage in human-like processes such as learning, adapting, synthesizing, self-correction and use of data for complex processing tasks" (Popenici & Kerr, 2017, p. 2)

Algorithmic text-generating software

- Writing technologies capable of creating original texts either from scratch or with user input (Dans, 2019)

Natural Language Processing

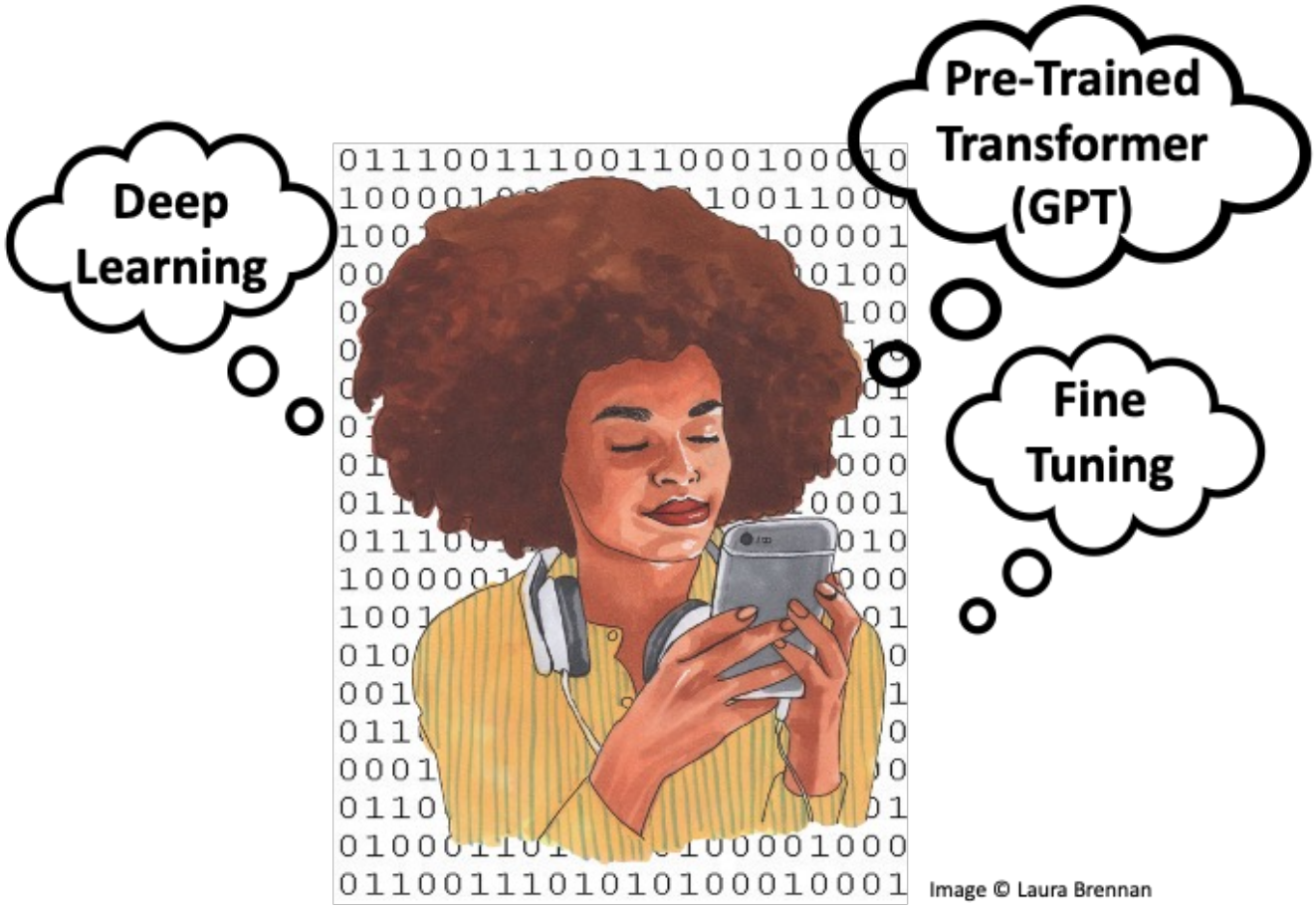


Image © Laura Brennan

Gaps in Research

UNIVERSITY OF CALGARY

- Little scholarship addressing AI tools' ethical and pedagogical implications (Zawacki-Richter et al., 2019).
- More research is needed to differentiate human and AI capabilities (Bearman & Luckin, 2020; Mindzak, 2020; Popenici & Kerr, 2017; Zawacki-Richter et al., 2019).
- Lack of clarity in differentiating students' seeking to cheat from those trying to find assistance (Dawson, 2020).
- Need to explore how new AI tools will challenge educators (Eaton et al., 2021) and raise new questions about ethics, justice, and fairness.

Main Research Question

Dall e generated image

What are the ethical implications of artificial intelligence technologies for teaching, learning, and assessment?

Key Consideration – Equity, Diversity, and Inclusion (EDI)

UNIVERSITY OF CALGARY

Benefits offered for EDI

- NLP development has increase accessibility to learning tool, such as text summarization and real-time captioning (Martínez, 2021).
- AI tools provide multiple modes of engagement, representation, and expression (Delisio & Butaki, 2019).

Drawbacks created for EDI

- NLP and other AI tools and created using unrepresentative data sets, resulting in bias or poor user experience (Smith and Smith 2021)
- NLP reproduces biases in language (Al Amin & Kabir, 2022)

Research Design

UNIVERSITY OF CALGARY

- Part 1: Modified Turing Test
  - Participants to identify if sample of writing is by Human Being, Computer/AI, or unsure
  - Write samples from a variety of disciplines (ranging from Education to Engineering)
  - Building on survey designed by Mindzak & Kumar
  - Participant demographic information includes questions about identities impact on English reading and writing skills.
- Part 2: Interviews
  - Participants ask about AI awareness, Perceived Ethical Uses of AI, AI Roles in support equity and access, and perspective on human generated text.

Early Knowledge Mobilization

UNIVERSITY OF CALGARY

- Moya Figueroa, B., Eaton, S. E., Hayden, A. K., Brennan, R., Wiens, J., McDermott, B., & Lesage, J. (Forthcoming). Academic integrity and artificial intelligence in higher education contexts: A rapid scoping review protocol. *Canadian Perspectives on Academic Integrity*.
- Brennan, R.W., Lesage, J., Eaton, S., & Herraro, K. (submitted). Exploring the implications of natural language processing on mechanical engineering education. *International Journal of Mechanical Engineering Education*.

Project Funding

- Artificial Intelligence and Academic Integrity: The Ethics of Teaching and Learning with Algorithmic Writing Technologies (2022 University of Calgary Teaching and Learning Grant)
- International Researcher Partnership Workshop Grant Awarded (2023 University of Calgary)
- Internal University of Calgary VPR Catalyst Grant – Application under review

Expected Impacts and Outcomes

UNIVERSITY OF CALGARY

Promote a deeper understanding of what text-generating software can do

Academic staff and teaching assistants can apply this understanding in the context of intended learning outcomes.

Some assumptions might lead to restricting the technology

Support faculty to reflect on their assumptions about AI tools

Help educators better focus their learning outcomes

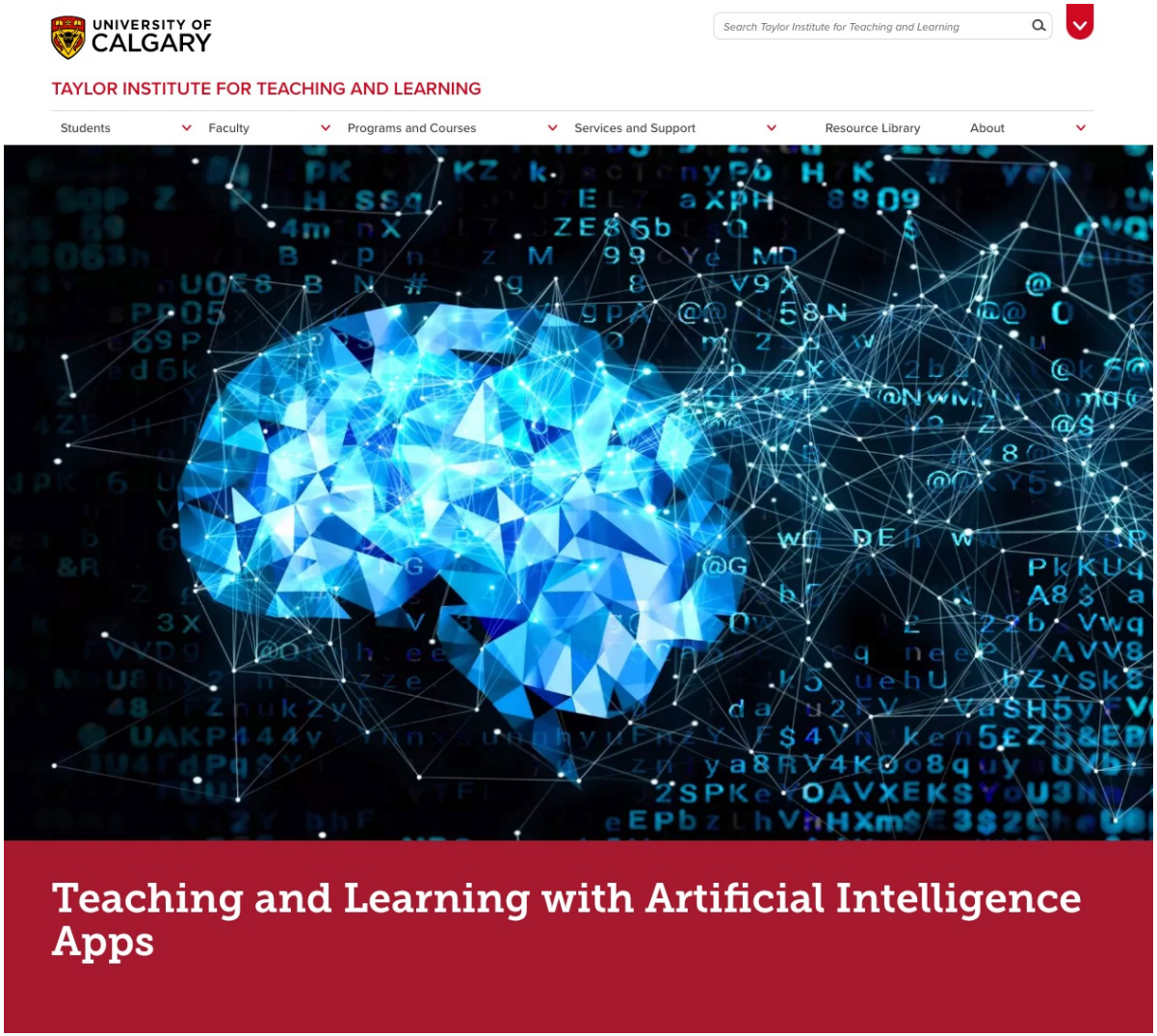
Mechanics of writing versus conceptual organization

Policy/Curriculum Considerations

UNIVERSITY OF CALGARY

- Defining learning technologies to future proof academic integrity policies for on-going advancement
- Integrating Natural Language Processing (NLP) programs into the digital literacy education to increase informed use of tool
- Building the ethical and academic integrity use of AI-based across the curriculum tools
- Consider the impact of prohibiting technology use or "beat the bot" options on a diversity of learners

Recommendations for the Classroom



https://taylorinstitute.ucalgary.ca/teaching-with-AI-apps

Wrap up

- Questions?
- Thoughts?
- Reflections?

Contact Information

UNIVERSITY OF CALGARY

- Dr. Sarah Elaine Eaton
  - Twitter: @ DrSarahEaton
  - E-mail: seaton@ucalgary.ca
  - Mastodon: @drsaraheaton@scholar.social

References

Al Amin, A. & Kabir, K. (2022). A disability lens towards biases in GPT-3 generated open-ended languages. *IJCAI 2022 Workshop on Diversity in Artificial Intelligence.* https://doi.org/10.48550/arXiv.2206.11993

Bearman, M., & Luckin, R. (2020). Preparing university assessment for a world with AI: Tasks for human intelligence. In M. Bearman, P. Dawson, R. Ajjawi, J. Tai, and D. Boud (Eds.), *Re-imagining university assessment in a digital world* (pp. 49-63). Springer. https://doi.org/10.1007/978-3-030-41956-1

Bertram Gallant, T. (2008). *Academic integrity in the twenty-first century: A teaching and learning imperative*. Hoboken, NJ: Wiley.

Dans, E. (2019, February 6). Meet Bertie, Heliograf and Cyborg, the new journalists on the block. *Forbes*. https://www.forbes.com/sites/enriquedans/2019/02/06/meet-bertie-heliograf-and-cyborg-the-new-journalists-on-the-block/?sh=669bf965138d

Dawson, P. (2020). E-Cheating, assessment security and artificial intelligence. In P. Dawson (Ed.), *Defending assessment security in a digital world* (pp. 83-97). Routledge. http://doi.org/10.4324/9780429324178

Delisio, L. A., & Butaky, C. A. (2019). UDL and assistive technology. In W. W. Murawski & K. L. Scott (Eds.), *What really works With Universal Design for Learning* (pp. 157-172): Corwin.

Eaton, S. E. (2021). *Plagiarism in higher education: Tackling tough topics in academic integrity.* Santa Barbara, CA: Libraries Unlimited.

Eaton, S. E., Mindzak, M., & Morrison, R. (2021, June 1). The impact of text-generating technologies on academic integrity: AI & AI. Paper presented at the *Canadian Association for the Study of Educational Administration (CASEA)*, University of Alberta [online]. http://hdl.handle.net/1880/113569

Martinez, C. (2021, March 5). Artificial intelligence and accessibility: Examples of a technology that serves people with disabilities. *InclusivityMaker.com*. https://www.inclusivecitymaker.com/artificial-intelligence-accessibility-examples-technology-serves-people-disabilities/

Mindzak, M. (2020, February 18). What happens when a machine can write as well as an academic? *University Affairs.* https://www.universityaffairs.ca/opinion/in-my-opinion/what-happens-when-a-machine-can-write-as-well-as-an-academic/

Smith, P., & Smith L. (2022). Artificial intelligence and disability: Too much promise, yet too little substance? *AI and Ethics, 1*, 81-86. https://doi.org/10.1007/s43681-020-00004-5

Popenici, S. A., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning, 12*(1), 1-13. https://doi.org/10.1186/s41039-017-0062-8

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education–where are the educators? *International Journal of Educational Technology in Higher Education, 16*(1), 1-27. https://doi.org/10.1186/s41239-019-0171-0

Images

- Dall-e generated images
  - an inclusive equitable diverse and technological learning environment
  - a student working with an algorithmic text-generating software