



UNIVERSITY OF
CALGARY

Blurred Lines: Rethinking Artificial Intelligence Tools through Assistive Technology

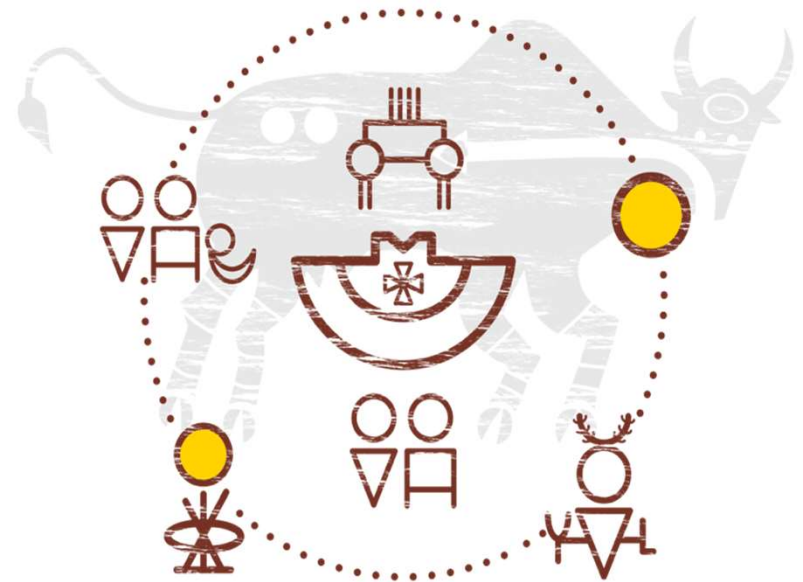
Brenda McDermott PhD
Student Accessibility Services
University of Calgary

March 29, 2023

Contact: bemcderm@ucalgary.ca

Land Acknowledgement

I would like to take this opportunity 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 Goodstoney First Nations). The City of Calgary is also home to Métis Nation of Alberta, Region 3.



Key Points



<https://osf.io/4cnvp/>

Challenging the panic narrative about generative AI

“Assistive” technology and the socio-materiality of technology

Unfulfilled promises of past “assistive” technologies

Social justice concerns with generative AI



Generative Artificial Intelligence

Generative Artificial Intelligence refers to machine learning programs (including algorithms) that can generate new output based on training. Most prominently, this included pre-trained natural language processors, such as Chat GPT.

Challenging Panic Narrative

“Today we are facing a new sort of plague, one that threatens our minds more than our bodies. ChatGPT, the artificial intelligence chat bot that can write college-level essays, is going viral” (Weissman, 2023).



Weissman, J. (2023, February 9). ChatGPT Is a plague upon education. *Inside Higher Ed*.
<https://www.insidehighered.com/views/2023/02/09/chatgpt-plague-upon-education-opinion>



Lessons from Previous Ed. Tech Crises

- Many various technologies have destabilized educational practices.
 - Cognitive offloading tools continually emerge – such as notebooks, calculators, and ICTs
 - These tools challenge existing ways of teaching and learning and required new literacies – such as digital literacy
 - Educators may resist new tools by creating more restricting learning environments – such as online proctoring or handwritten essays
 - These restrictions disproportionately impact diverse learners.

Villarreal, M. E., & Borba, M. C. (2010). Collectives of humans-with-media in mathematics education: Notebooks, blackboards, calculators, computers throughout 100 years of ICMI, *ZDM*, 42(1), 49–62.
<https://doi.org/10.1007/s11858-009-0207-3>

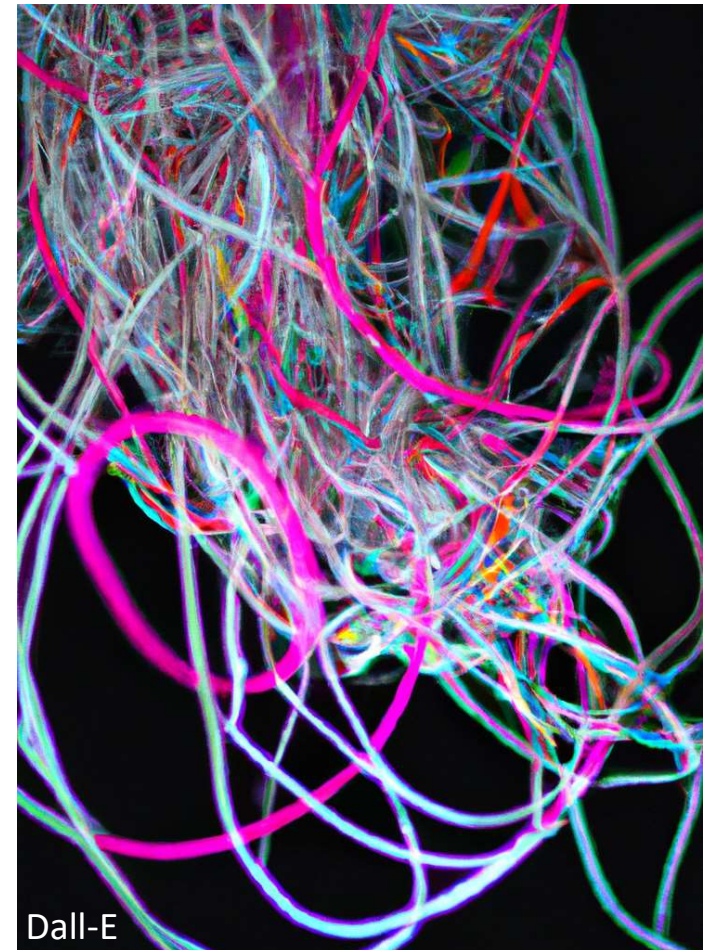
“Assistive” Technologies

- All technologies assist, but some types of assistance are normalized and accounted for within teaching environments.
- Labeling tools as assistive technology evokes a problematic otherness.
- Restrictions around technologies create barriers for learners, resulting in common tools being reclassified as assistive technologies.



Existing Technologies that Integrate Elements of AI

- Common Natural Language Processing applications
 - Captioning and transcription tools
 - Word prediction functions
 - Grammarly and other proofreading tools
- Emerging AI education tools
 - Automatic grading and feedback programs
 - Chatbot learning assistants
 - Improved descriptive images and text summaries





Unfulfilled Promises of “Assistive” Technology

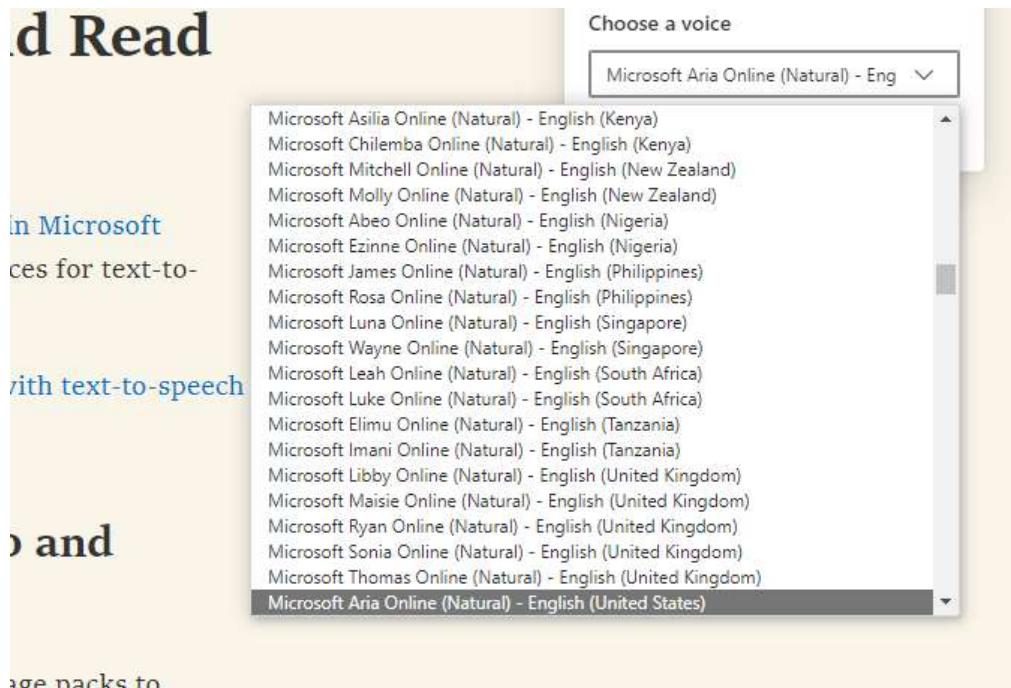
Emerging technologies often highlight their emancipatory potential for individuals with disabilities to counteract the panic narrative.

This virtual signally rarely results in tangible tools for these individuals.

- Lack of interoperability
- Complicated settings and customizations
- Limited training/development on non-dominant voices

Voices: Who speaks?

The implications of Text-to-Speech on World Englishes



Screenshot of voice options in Microsoft Edge Browser

English (Australia)	James	Cath
English (Canada)	Richard	Linda
English (Great Britain)	George	Hazel
English (India)	Ravi	Heer
English (Ireland)	Sean	Not
English (United States)	David, Mark	Zira

Screenshot of voice options in Windows 10

- Simplified Chinese
- English (Australia, Canada, India, United Kingdom)
- French (France, Canada)
- German (Germany)
- Italian (Italy)
- Portuguese (Brazil)
- Spanish (Mexico, Spain)

Languages supports in Windows 10

Error message	W
Voice typing needs access to your microphone. You'll need to turn this on in settings to use speech to text.	Si M tu
Voice typing isn't available in the current language.	C o

Error Messages for Windows 10 dictation

Voices: Who is heard?

- Speech-to-text and voice recognition



Dall-E

Moving beyond panic or praise

- Considering Generative AI as learning technology requires that it works for well for all learners.
- Post-secondary educational institutions need to move beyond the ability to access (Equality) to ensure a tool that works for all users (Equity).

Social Justice Concerns with Generative AI

Creating Fair Generative AI

- AI tools learn from the present state, including existing biases.
- Fairness in AI typically involves making fairness a mathematical construct.
- Fairness in AI often means maintaining rather than challenging efficacy of educational practices.

Including Minority Experiences

- Currently AI tools are not as effective for minorities because of limited training data.
- Non-dominant user experiences aren't considered when considering operational effectiveness.

Challenging "Standard" English

- Generative AI tools are pretraining on standard English texts (available in the public domain).
- Dialects, regional experiences and other linguistic markers of identity aren't included.





References

Johri, A. (2022). Augmented sociomateriality: Implications of artificial intelligence for the field of learning technology. *Research in Learning Technology*, 30. <https://doi.org/10.25304/rlt.v30.264>

Polgar, J. M. (2011). The myth of neutral technology. In *Design and Use of Assistive Technology* (pp. 17–23). Springer New York. https://doi.org/10.1007/978-1-4419-7031-2_2

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>

Villarreal, M. E., & Borba, M. C. (2010). Collectives of humans-with-media in mathematics education: Notebooks, blackboards, calculators, computers throughout 100 years of ICMI, *ZDM*, 42(1), 49–62. <https://doi.org/10.1007/s11858-009-0207-3>

Weissman, J. (2023, February 9). ChatGPT Is a plague upon education. *Inside Higher Ed*. <https://www.insidehighered.com/views/2023/02/09/chatgpt-plague-upon-education-opinion>