



TEACHING &
LEARNING
EXCHANGE

evolvED



Artificial Intelligence for Equity

How to Use Generative AI as a Learning Technology

Brenda McDermott, PhD
University of Calgary

Mapping Today's Discussion

- Creating Common Ground.
- Considering Social Justice Perspective on Generative AI.
- Developing Artificial Intelligence Literacy.
- Self-Regulated Learning with Generative AI.



What is Generative AI?

- Uses a prompt in natural language to create an output.
- Neural networks developed through machine learning to create large language models.
- Developed through training on large amounts of data, rather than specific programming.
- Relationships are created through vector analysis.



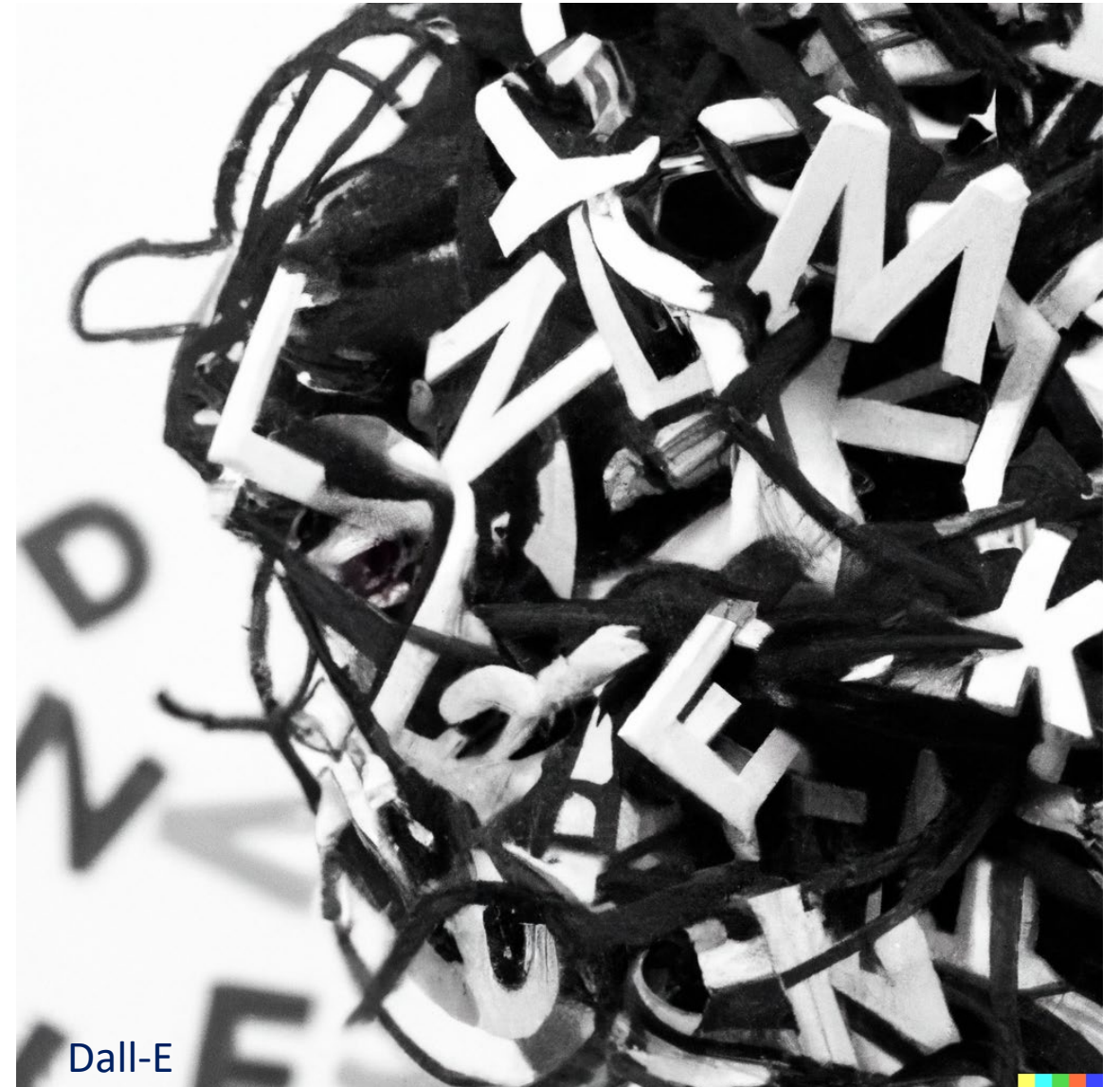
Dall-E



Learning Technology

Learning technologies, as broadly defined, to include any tools that support goal-directed learning. Learning technologies are not defined through the function of the tools, but the ways in which learners employ them.

Learning technologies can challenges educational practices, by enabling the development of ideas that would not be possible without them.



Dall-E

See Villarreal & Borba (2010) for more details defining learning technologies through use.

A Social Justice Perspective on AI

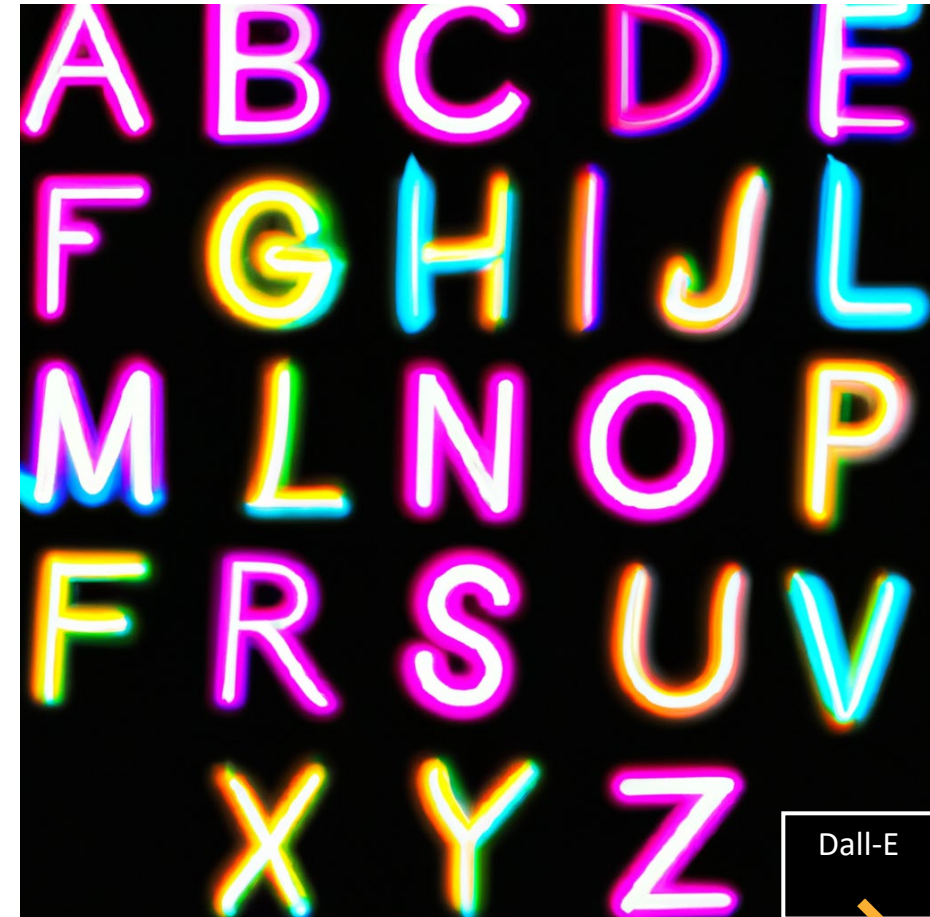


Dall-E

- Recognizing “socio-technical inequality” (Zajko, 2022, p. 4), including how existing inequities are often exacerbated through barriers to access and use.
- Acknowledging how responses to emerging technologies intersect with these inequalities.

Failure to Engage Generative AI Creates Harm

- Prohibition of AI in schools and public spaces results in Generative AI skills (such as prompt writing and algorithmic awareness) only for the socio-economically advantaged
- Biases in Generative AI become more embedded as it is trained by privileged groups using it
 - Embedded whiteness in the large language model
 - Limited diversity in training data
- Generative AI is not a neutral technology and failure to engage would perpetuate harms
 - Loss of opportunities
 - Economic loss
 - Social stigmatization



Values for Ethical AI Development and Use

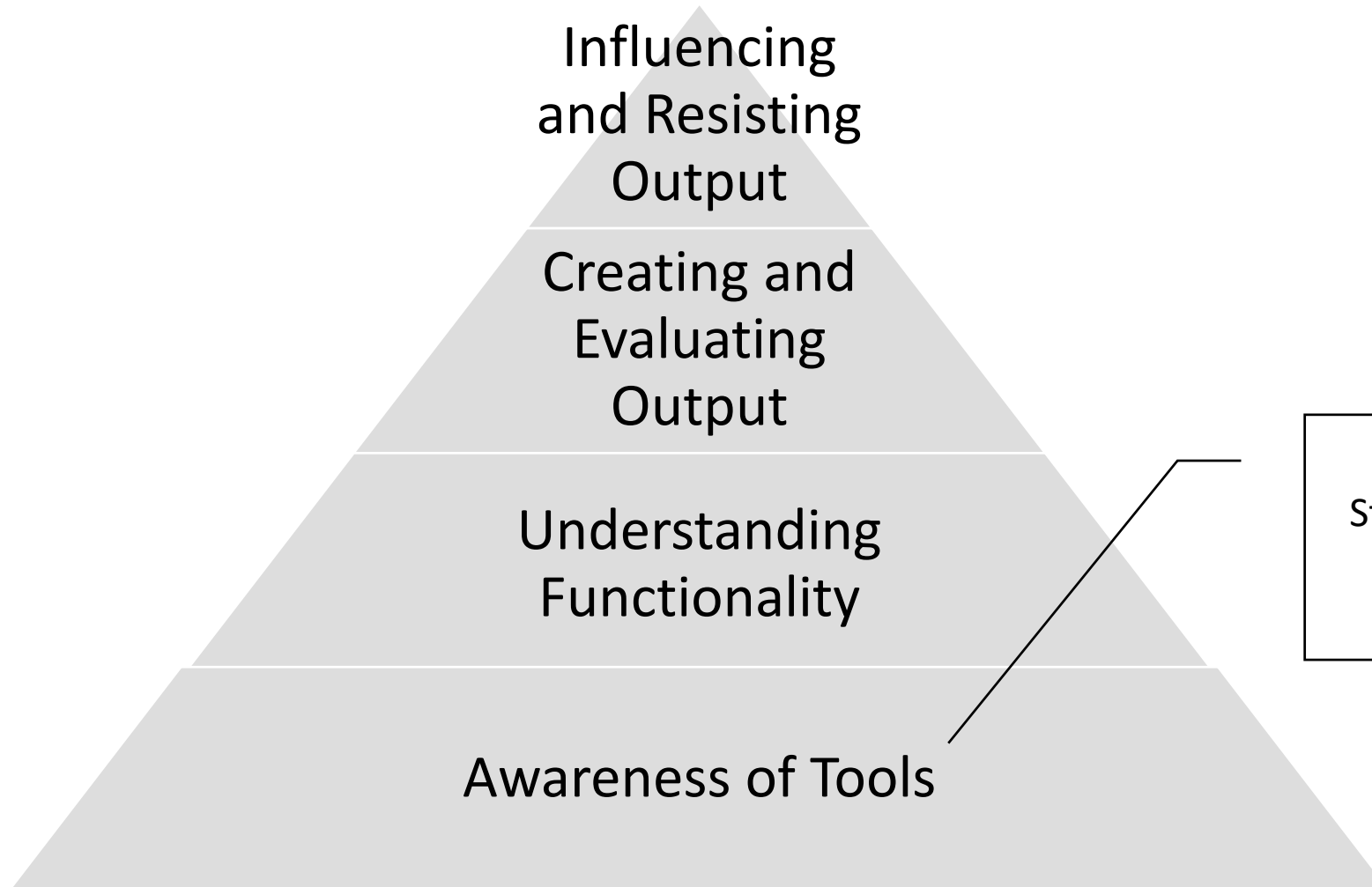
- Privacy.
- Accountability.
- Safety and Security.
- Transparency and Explainability.
- Fairness and Non-discrimination.
- Human Control of Technology.
- Professional Responsibility.
- Promotion of Human Values.



Values and image from Fjeld, J., Achten, N., Hilligoss, H., Nagy, A., & Srikumar, M. (2020).



Supporting Artificial Intelligence Literacy



Influencing
and Resisting
Output

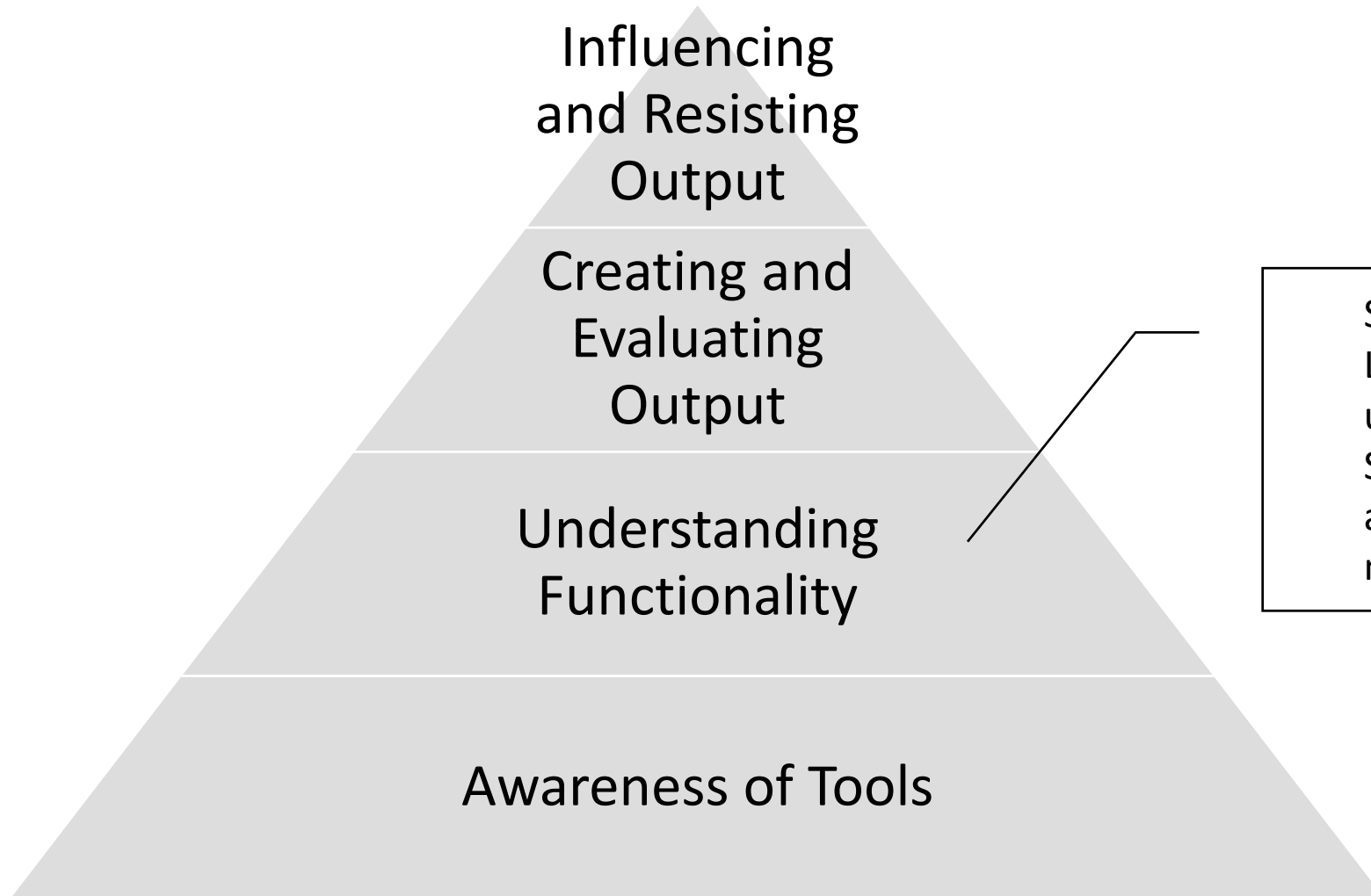
Creating and
Evaluating
Output

Understanding
Functionality

Awareness of Tools

Student can identify the tools and their
potential uses

Supporting Artificial Intelligence Literacy



Influencing
and Resisting
Output

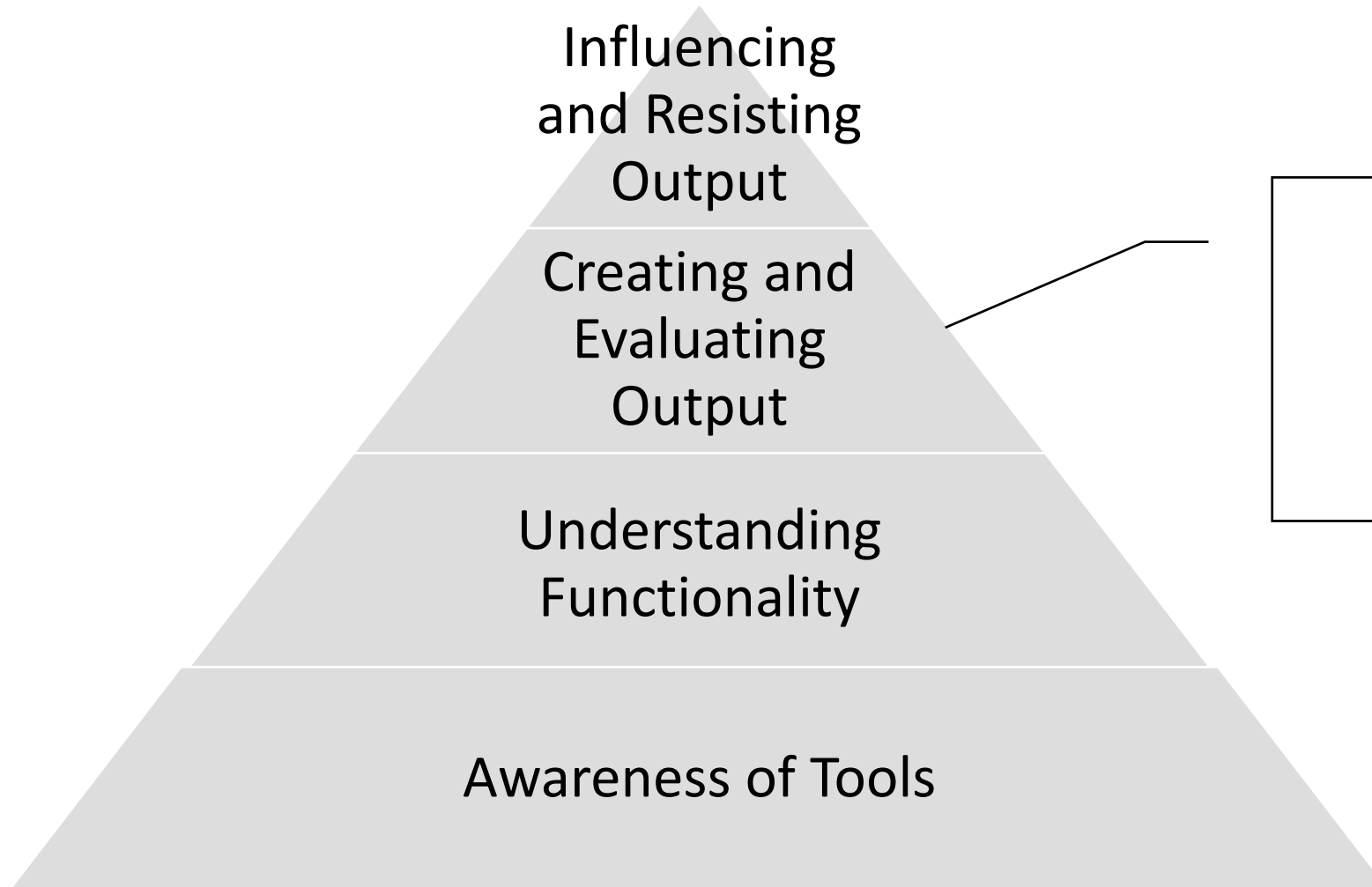
Creating and
Evaluating
Output

Understanding
Functionality

Awareness of Tools

Student understands how Natural Language Processing works and is used in Generative AI.
Student comprehends how algorithms and neural networks make decisions about data.

Supporting Artificial Intelligence Literacy



Influencing
and Resisting
Output

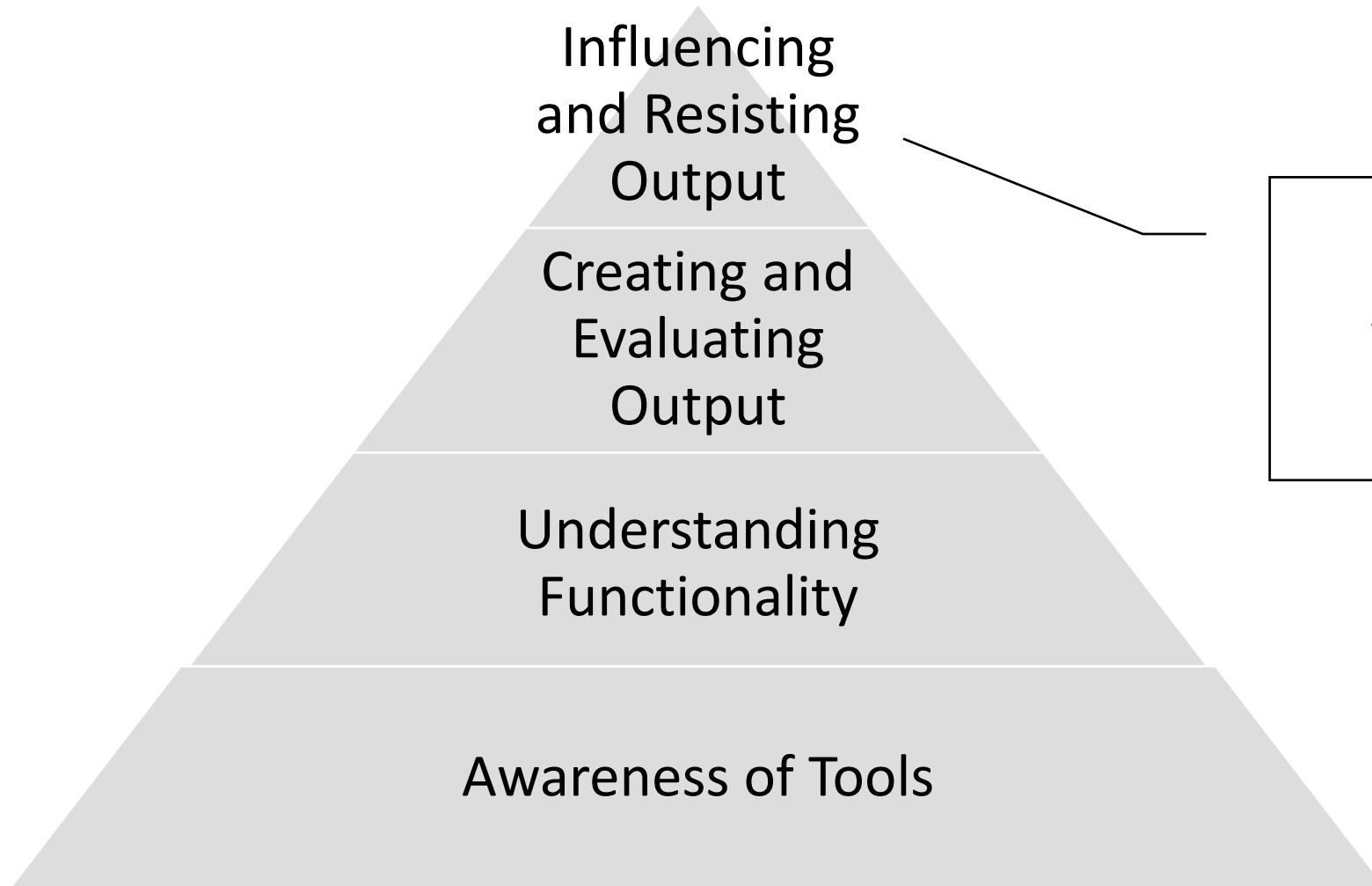
Creating and
Evaluating
Output

Understanding
Functionality

Awareness of Tools

Student evaluates prompt construction on output. Student can identify the impact of the training data on output, such as algorithmic bias.

Supporting Artificial Intelligence Literacy



Influencing
and Resisting
Output

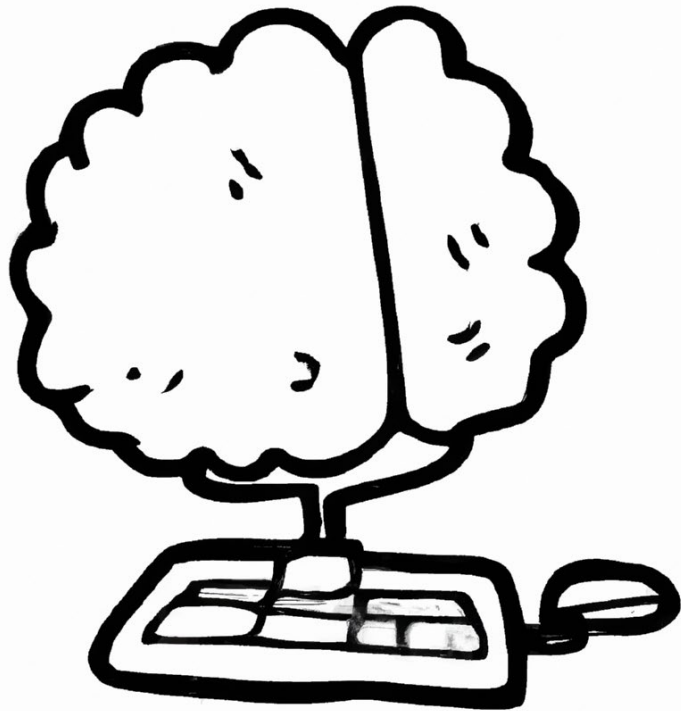
Creating and
Evaluating
Output

Understanding
Functionality

Awareness of Tools

Student challenges bias in output through changing tools or strategies of use.

Considering Gen AI as a Learning Technology



Dall-E



- Using Generative AI as a learning technology allows post-secondary institutions to increase awareness and potentially challenge the biases in the system.
- In other words, Generative AI needs to be examined not solely for its function, but the way in which learners employ them to support goal-directed learning.

See Villarreal, M. E., & Borba, M. C. (2010).

Self-Regulated Learning Cycle

Forethought Phases

- Task Analysis
- Self-Motivation



Self-Reflection Phase

- Self-evaluations
- Adaptation



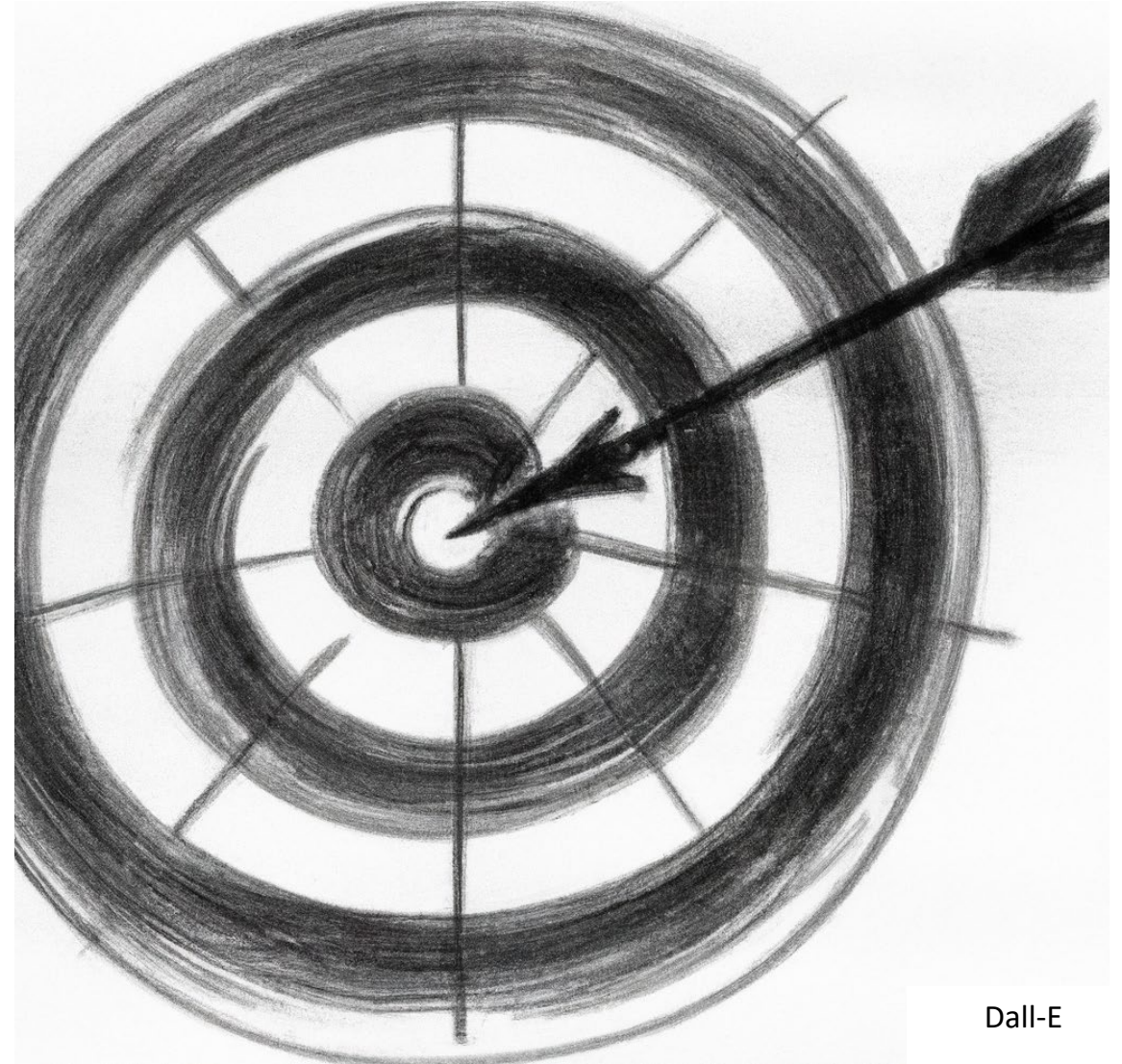
Performance Phase

- Learning Strategies
- Metacognitive Monitoring

See Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, 41(2), 64–70.

Forethought Phase

- Focuses on skill development rather than task completion
- Supports scaffolding skills development that can be developed and applied to new contexts
- Provides frameworks that support adapting to emerging technologies (Taranto & Buchanan, 2020)



Dall-E

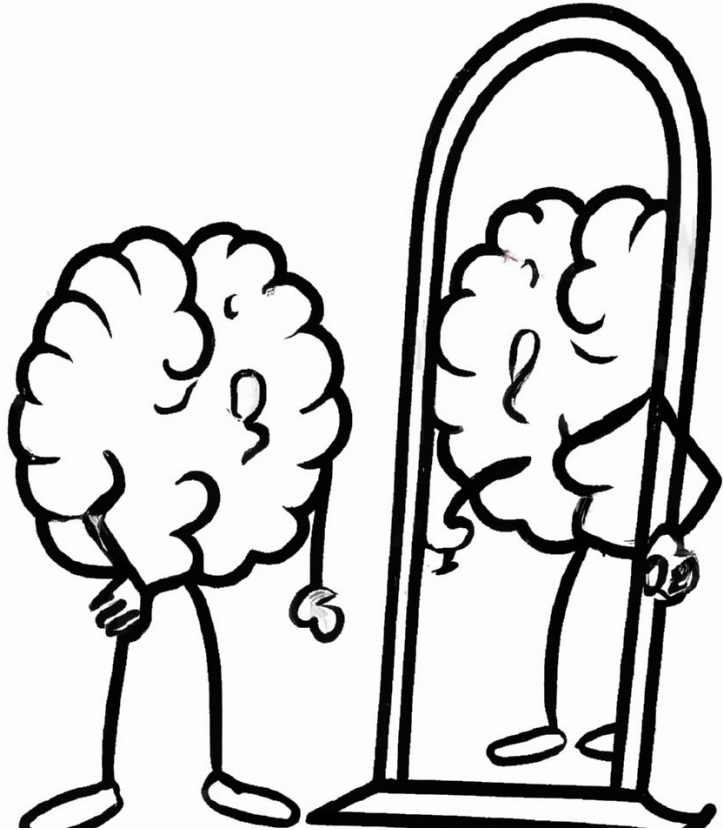
Performance Phase

- Active use of the tool to maintain student agency, such as over the choices and options presented
- Tool supplements or supports while not replacing student action
- On-going evaluation of the accuracy of the content
- Engagement helps to manage motivation and acknowledge the affective domain of learning (Ben-Eliyahu, 2019)



Dall-E





Self-Evaluation Phases

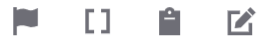


Dall-E


- Student should reflect on how the tool supports learning goals
- Student considers how the tool encourage their processing of content
- Student develops a metacognitive approach, including knowledge about self, knowledge about tool, and knowledge about context (Winne, 2018).


Understanding Assignment Requirements


1  pathlightpro 2  bigrentz 3  quickbase 4  hm-ec



RELATED

how to identify potential risks in a construction site 

what are the key components of a comprehensive safety plan for a construction site 

how to promote a safe work environment in a construction site 

Tool: Perplexity

- Identifies steps and skills required to complete the task
- Supports task analysis by providing alternative representation of information
- Offers options for related skills or knowledge

Questioning for Goal-Directed Reading

- Scaffolds active engagement with written materials
- Requires ongoing questions and engagement from student
- Locates specific sections of uploaded text for accuracy

Tool: Ask Your PDF

may have regarding the document you have uploaded. The document is about the Code of Ethics developed by the College of Dental Hygienists of Ontario, which regulates dental hygiene practice in the interest of public health and safety. The Code emphasizes the responsibility of dental hygienists to provide safe and effective care and is based on shared standards across Canada. It serves as a resource for education, reflection, self-evaluation, and peer review.

Here are three possible questions you may have about the document

1. What is the purpose of the Code of Ethics developed by the College of Dental Hygienists of Ontario
2. How does the Code of Ethics help dental hygienists provide safe and effective care

Here are some questions that you can ask yourself to ensure that you are upholding the code of ethics for dental hygienists

1. Am I providing safe, effective dental hygiene services to every client, every day
2. Am I maintaining a standard of practice of the profession and abiding by the

What are the DineSafe Infractions?



DineSafe is a program that inspects and rates food establishments in Toronto

The program is run by the City of Toronto and is designed to ensure that food establishments are following health and safety regulations



DineSafe infractions are violations of the health and safety regulations

These infractions can range from minor to serious and can result in fines or closure of the establishment



The public can view DineSafe infractions online

The website provides information on the infractions, the date they occurred, and the status of the establishment

DineSafe is an important program that helps to ensure that food establishments in Toronto are following health and safety regulations. The public can access information on DineSafe infractions online.

Keeping Employees and Guests Safe: Washing Hands to Meet DineSafe Standards

Wet Hands

Run hands under warm water for at least 20 seconds.

Apply Soap

Apply soap to hands and rub together for at least 20 seconds.

Rinse Hands

Rinse hands with warm water for at least 20 seconds.

Dry Hands

Dry hands with a clean towel or air dryer.

Developing Evaluative Judgement

- Supports the application of rubric or critical reflection
- Allows for evaluation of effective visual design and presentation
- Considers revision or adjustment to meet goals

Tool: Beautiful AI

Reflecting on Prompt Design

- Entails multiple interactions to refine content
- Examines prompt design's impact on output
- Requires reflection on output based on purpose and associated criteria

Tool: Dall-E

logo for construction company that specializes in greenhouses



black and white logo for construction company with image of greenhouse



black and white logo construction of plant house





Certainly! Here are some multiple-choice questions based on the CDHO (College of Dental Hygienists of Ontario) Code of Ethics:

Question 1:

Which principle of the CDHO Code of Ethics emphasizes the importance of acting honestly and fairly in all professional activities?

- A) Professional Competence
- B) Informed Consent
- C) Professional Integrity
- D) Privacy and Confidentiality

Sure! Here's a series of cue cards based on the CDHO (College of Dental Hygienists of Ontario) Code of Ethics:

Cue Card 1:

Code of Ethics

CDHO (College of Dental Hygienists of Ontario)

Cue Card 2:

1. Professional Integrity

- Demonstrate honesty, fairness, and ethical behavior in all professional activities.
- Act in the best interest of the client and the public.

Cue Card 3:

2. Professional Competence

Creating Self-Testing Materials

- Provides opportunities to evaluate current knowledge
- Requires students to determine the correct answers
- Works best with already simplified or evaluated materials.

Tool: Chat GPT

Working towards Gen AI Literacy in A Learning Context



Opening the Blackbox: Knowing and understanding the functions and limitations of the Gen AI



Setting Learning-Oriented Goals: Apply Gen AI to goal-directed learning with an emphasis on metacognition



Evaluating Actions and Outputs: Reflecting on the prompt writing and how it shapes outputs of Gen AI.

Final Thoughts

Technology is not neutral; however, the most critical aspect of learning technologies is their use. Our role is to support learners to develop the skills to reflect on how to use them to support their goal-direct learning.



References

- Ben-Eliyahu, A. (2019). Academic Emotional Learning: A Critical Component of Self-Regulated Learning in the Emotional Learning Cycle. *Educational Psychologist, 54*(2), 84–105. <https://doi.org/10.1080/00461520.2019.1582345>
- Cheuk, T. (2021). Can AI be racist? Color-evasiveness in the application of machine learning to science assessments. *Science Education, 105*(5), 825–836. <https://doi.org/10.1002/sce.21671>
- Fjeld, J., Achten, N., Hilligoss, H., Nagy, A., & Srikumar, M. (2020). *Principles Artificial Intelligence: Mapping Consensus in Ethical and Rights-Based Approach to Principles for AI*. <https://cyber.harvard.edu/publication/2020/principle-ai>
- Foltynek, T., Bjelobaba, S., Glendinning, I., Khan, Z. R., Santos, R., Pavletic, P., & Kravjar, J. (2023). ENAI Recommendations on the ethical use of Artificial Intelligence in Education. *International Journal for Educational Integrity, 19*(1), 12. <https://doi.org/10.1007/s40979-023-00133-4>
- Laupichler, M. C., Aster, A., Schirch, J., & Raupach, T. (2022). Artificial intelligence literacy in higher and adult education: A scoping literature review. *Computers and Education: Artificial Intelligence, 3*, 100101. <https://doi.org/10.1016/j.caeai.2022.100101>
- Taranto, D., & Buchanan, M. T. (2020). Sustaining Lifelong Learning: A Self-Regulated Learning (SRL) Approach. *Discourse and Communication for Sustainable Education, 11*(1), 5–15. <https://doi.org/10.2478/dcse-2020-0002>
- Villarreal, M. E., & Borba, M. C. (2010). Collectives of humans-with-media in mathematics education: notebooks, blackboards, calculators, computers and ... notebooks throughout 100 years of ICMI. *ZDM, 42*(1), 49–62. <https://doi.org/10.1007/s11858-009-0207-3>
- Winne, P. H. (2015). A Cognitive and Metacognitive Analysis of Self-Regulated Learning. *Handbook of Self-Regulation of Learning and Performance, 15–32*. <https://doi.org/10.4324/9780203839010.ch2>
- Zajko, M. (2022). Artificial intelligence, algorithms, and social inequality: Sociological contributions to contemporary debates. *Sociology Compass, 16*(3). <https://doi.org/10.1111/soc4.12962>
- See Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice, 41*(2), 64–70.

Technologies

- Beautiful AI (n.d.). <https://www.beautiful.ai/>
- Open AI (2022). *Chat GPT*. <https://chat.openai.com/>
- Open AI (2022). *Dall-E*. <https://labs.openai.com//>
- PDF Chatbot (n.d.). *Ask your PDF* <https://askyourpdf.com>
- *Perplexity* (n.d.). <https://www.perplexity.ai/>



**TEACHING &
LEARNING
EXCHANGE**



THANK YOU!

Conference Agenda

START	END	DESCRIPTION	LOCATION
8:00 AM	8:55 AM	Registration & Breakfast	Atrium
9:00 AM	9:30 AM	Land Acknowledgement, Hand Drum and Opening Remarks with Dr.Gervan Fearon	SJC 406 with online option
9:30 AM	10:45 AM	Keynote Speaker: Brenda McDermott	SJC 406 with online option
10:45 AM	11:00 AM	Music and Move to Session 1	
11:00 AM	11:45 AM	Concurrent Session Block 1	On-campus with online option
11:45 AM	12:50 AM	Luncheon	
1:00 PM	2:00 PM	Plenary Conversation with John Weigelt	SJC 406 with online option
2:00 PM	2:15 PM	Music and Move to Session 2	
2:15 PM	3:00 PM	Concurrent Session Block 2	On-campus with online option
3:00 PM	3:30 PM	Wine & Cheese Social	Atrium
3:30 PM	4:00 PM	President Awards & Concluding Remarks	Atrium

