



# **On the Precipice of Change**

**How eLearning continues to survive, and even thrive as it harnesses the principles of Learning Engineering and the power of Artificial Intelligence**



# Outline

- This presentation will discuss C-ADL eLearning initiatives in terms of:
  - Instructional Design (ID) and Learning Engineering (LE) and Generative Artificial Intelligence (GAI)
- And how AI is being approached by:
  - The Canadian Government, National Defence, and the C-ADL.

# A Particular Lens

- Our team is Canadian Advanced Distributed Learning Centre (C-ADL) within the Canadian Defence Academy (CDA)
- My background:
  - Manager of the Project Management & Innovation Office (PMIO)
  - PhD and Master Degree in Education
  - Serve on the NATO Learning & Technology Interoperability Group (NL&TIG) and the FVEY Technology Cooperation Program (TTCP HUM) 23 **Working Group**





# **The Transformation of eLearning**

**A Journey**



# Transformation of eLearning

A man with a backpack and glasses is looking at a laptop screen. The background is a blurred image of a person sitting at a desk with a laptop, suggesting a learning or work environment.

- **The situation:**
- Standing at the precipice of a revolutionary shift, eLearning is undergoing a remarkable transformation.
- As a learning strategy, eLearning has remained relevant with Instructional Design (ID) supporting development with mobile learning, gamification, and micro-learning.
- As eLearning engages with Learning Engineering (LE) and Generative Artificial Intelligence (GAI), more and better is possible.



# Transformation of eLearning

A man with a backpack and glasses is looking out over a mountain range. The image is overlaid with a semi-transparent purple filter.

- Or is it?
  - Is more and *better* actually possible?
  - Or are we just heading towards more and *more*?
  - Is eLearning thriving or barely surviving?





# Instructional Design



# Instructional Design

- **ID has evolved:** Over recent decades, ID has undergone a significant transformation. Originally centred on skill and knowledge, **the field has evolved towards prioritizing the personal construction of meaning and enhancing user experience.**
- **In the past:** ID followed behaviourism theories. Today, it's more about adapting to context, being flexible, and focusing on the **learner's experience.**
- **ID trends are shaped by technology:** social media, cloud services, big data, mobile devices, and now, artificial intelligence.



# Aspects of ID

- **Rooted in Educational Theory:** Robert Gagne's Nine Events of Instruction, Benjamin Bloom's Taxonomy, and Malcolm Knowles' Principles of Adult Learning.
- **Structured with Frameworks / Standards:** Web Content Accessibility Guidelines (WCAG), Universal Design for Learning (UDL), and Analyze, Design, Develop, Implement, Evaluate/Validate (ADDIE+V).
- **Designed following Best Practices:** Chunked content, content variety, ease of navigation, employ Contrast, Repetition, Alignment, and Proximity (C.R.A.P.)!
- **Delivered with Appropriate Technology:** Using high quality and appropriate choices in Technology Enabled Learning (TEL) to achieve learning objectives and meaningful learner experiences [instructionaldesigncentral.com/instructional-design-history](http://instructionaldesigncentral.com/instructional-design-history)

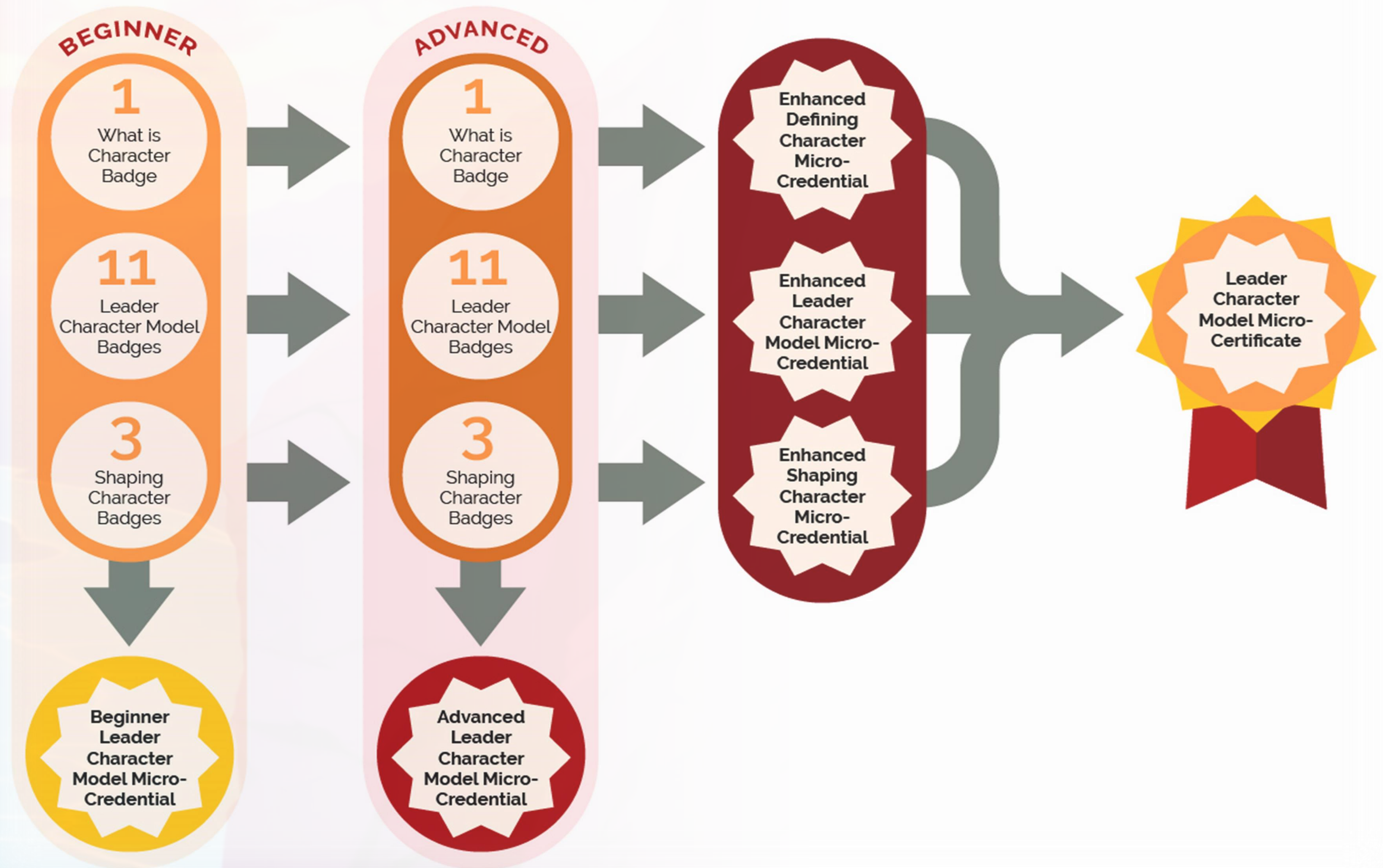


# Leader Character Micro-Learning

- **About:** A series of micro-learning courses designed to teach leadership concepts: (1) CAF Ethos (2) Leader Character and (3) The Seven Grandfather Teachings, a set of Indigenous peoples' guiding principles.
- **Rooted in Educational Theory:** Garrison's theory of Self-Directed Learning (SLD) whereby adult learners are benefited by being able to **access and select appropriate learning programs for themselves** (open to all, micro-format, test out)
- **Structured with Frameworks / Standards:** Plain language as outlined by Web Content Accessibility Guidelines (WCAG)
- **Designed following Best Practices:** Mixed media
- **Delivered with Appropriate Technology:** Articulate Rise SCORM on LMS with embedded videos of CAF members sharing their experiences.



# LEADER CHARACTER CREDENTIALS





# ID Challenges: It's a lot to manage

- **What *about* theory?** Some good theory gets skipped because it's not known or not understood, perceived as too complex, or a poor fit for the population.
- **What about learning from our mistakes and successes?**
  - **"Intuition is not our best guide"** A Transformation to LE, CMU with Dr. Saxburg
  - The "E" in ADDIE is often left to the side.
  - Adding the "V" for Validation is rare.
- **What about learner experience?** We talk about ending "Death by eLearning" but are still challenged to do different.





# Learning Engineering



# Learning Engineering

- "Some believe that learning engineering is the same as saying “**data-driven instructional design.**” Others believe that it deserves particularized attention.” *The Learning Agency*
- According to **ICICLE**, the IEEE International Consortium for Innovation and Collaboration in Learning Engineering:
  - “Learning Engineering is a process and practice that:
    - Applies the learning sciences,
    - Using human-centred design and engineering methodologies, and
    - Data-informed decision making to support learners and their development.”



# Aspects of LE

- **More than Educational Theory:** It's "often a team sport" that includes learning science, neuroscience, anthropology, data science, plus.
- **Structured with Frameworks / Standards:** International Standard for user-centred design (ISO 9241-210), Evidence Based ID
- **Utilizes Best Practices:** The "E" (and V) in ADDIE, A/B testing, spaced repetition (rather than 'cramming') and lag effect
- **Delivered with Appropriate Technology:** Enabling of data analytics, rapid testing, scalability of successful strategies, all the data!



# CAF QUIZ

- **About:** CAF Quiz is an online game-based learning platform featuring user-generated learning games, including multiple-choice quizzes accessible via a web browser from a phone or computer. It offers various media and question types.
- **Rooted in Educational Theory:** Albert Bandura's Theory of Social Learning, individuals learn from one another + Dewey/Kolb's Experiential Learning (supporting gamification)
- **Structured with Frameworks / Standards:** Tracks quiz usage, start/stop, average scores, which quizzes were most popular. Next iteration will track individual learners.
- **Designed following Best Practices:** Pre-set and user customizable dashboards.
- **Delivered with Appropriate Technology:** Back-end system for tracking and learning analytics.



## Quiz Selection:

Filters



Combat General Training

Tank Maneuvers



Combat General Training

Firearms Safety



Combat General Training

Landing a Helicopter



Combat General Training

Naval Ships 101



Scroll



Looking to be involved in quiz creation?

[Request SME Access](#)

Combat training for the Joint Task Force 2 takes place at which base?



A. CFB Kingston

B. CFB Gagetown

C. CFB Petawawa



# LE Challenges: It's still a lot

- **What about learning?** On the ground, are we doing Evidence Based ID? Or are we moving back to behaviourism and further away from constructivism?
- **What about the learner?** The learner is sending data but are they co-creating, adapting to context, able to be flexible, and focusing on their own experience?
- **What about inclusivity?** LE combines science, technology, and pedagogy. Are we factoring in intersectionality analysis?
- **What about benchmarking?** We can get more data but what are we comparing to? Or do we need to first make things for comparison?





# What about the Tsunami of Data?



# Artificial Intelligence

- According to Chat GPT:
- “Artificial Intelligence (AI) refers to the simulation of human intelligence processes by computer systems.
- These processes include:
  - **Learning** (the acquisition of information and rules for using it),
  - **Reasoning** (using rules to reach approximate or definite conclusions), and
  - **Self-correction.**

Chat GPT prompt, *What is artificial intelligence?*





# **Generative Artificial Intelligence**



# Generative Artificial Intelligence

- According to Chat GPT:
- “Generative AI is a subset of artificial intelligence (AI) that focuses specifically on generating:
  - new data,
  - content, or
  - outputs that **mimic human-like creativity.**”

*Chat GPT prompt, How is Generative AI different from AI?*



# Generative Artificial Intelligence

- **It creates:** GAI *gathers* and then generates ““new” artefacts by uncovering and remixing patterns of old, human-created (for now) things.” It creates narratives, music, images, and even code to build the video game. “It's like magic...”

Engines of Engagement by Julian Stodd, Sae Schatz, and Geoff Stead

- “Suppose you had a friend who loves telling stories. But, instead of a human friend, you have AI. You give AI a starting line, say...”

~ **Once upon a time, there was an instructional designer on a precipice...** ~

The Difference Between Generative AI and Traditional AI by Bernard Narr [forbes.com](https://www.forbes.com)







# Aspects of AI & GAI

- So, it gathers and creates, it helps us, but what about:
  - Educational Theory? Science? Learning Engineering?
  - Frameworks / Standards?
  - Best Practices?
  - Appropriate Technology?

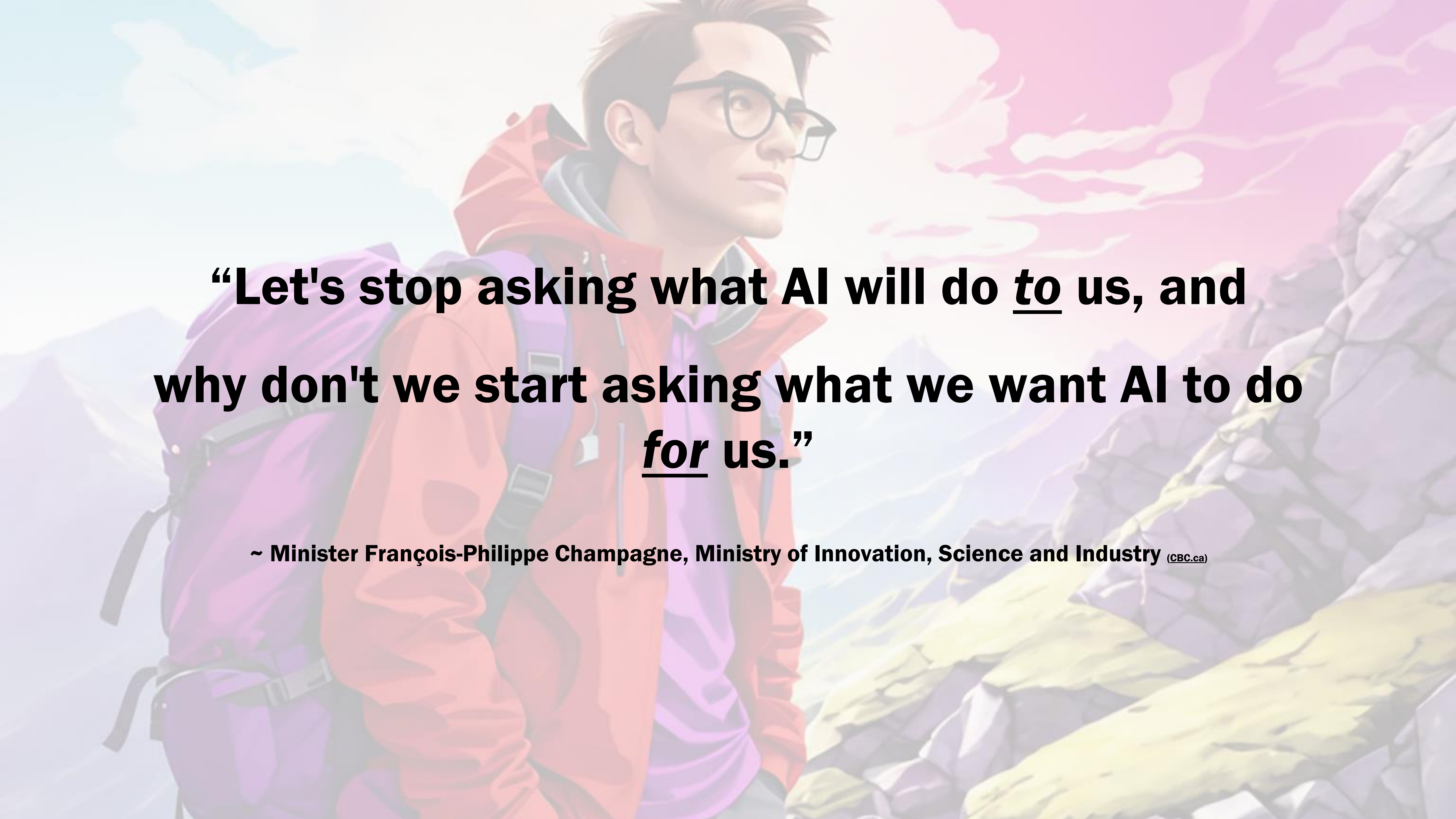
Chat GPT prompt, *How is Generative AI different from AI?*



# Government of Canada

- **In place:** The **Voluntary Code of Conduct on the Responsible Development and Management of Advanced Generative AI Systems**.
- **Federal Funding Just Announced:** On April 7th - Canadian Prime Minister Justin Trudeau announced \$2.4B of federal budget to go towards Canada's AI sector, including \$50-million towards an AI safety institute to protect against "advanced or nefarious AI systems" ([CBC.ca](https://www.cbc.ca)).
- **Proposed Artificial Intelligence and Data Act:** Canada is one of the first countries in the world to propose a law to regulate AI. The **AIDA** will introduce new requirements to ensure the safety and fairness of high-impact AI systems.





**“Let's stop asking what AI will do to us, and why don't we start asking what we want AI to do for us.”**


~ Minister François-Philippe Champagne, Ministry of Innovation, Science and Industry (CBC.ca)



# National Defence

- **Published:** This year saw the release of **The Department of National Defence and Canadian Armed Forces Artificial Intelligence Strategy**.
- **Focusing on Digital Transformation:** The strategy commits the Defence Team to becoming AI enabled by 2030, in line with our goals for an overall digital transformation by that date.



An illustration of a man with dark hair and glasses, wearing a red jacket and a purple backpack, sitting on a green park bench. He is looking at a laptop computer. The background shows a park with trees and a street lamp.

**“We must move  
—and move now—  
to become an AI-enabled organization.”**

**~ General Wayne Eyre, Chief of the Defence Staff and Bill Matthews, Deputy Minister National Defence**

(DND CAF AI Strategy 2024)



# CDA

## C-ADL AI LAB

- Funding will focus on Total Learning Architecture (TLA) and Military Life-Long Learning (ML3) for all military personnel
- The Lab will **enable ID and LE** by focusing on:
  - Personalized and Adaptive Training
  - Simulation and VR
  - Assessment Automation
  - Resource Recommendations
  - Generation of Learning Content



# AI & GAI Challenge - the hype?

“Given the related publicity and hype,  
one might be forgiven for believing that artificial intelligence is on a verge of surpassing  
human intelligence –  
or even taking over the world.

**However, the reality is that current AI falls short of true intelligence.”**

~ Quote and paraphrased points: Artificial Intelligence: Can AI Overcome its Limitations? Curation: Desautels Faculty of Management, McGill University [intelligence.weforum.org](https://intelligence.weforum.org))





**True  
Intelligence**

**Artificial  
General  
Intelligence**



# Artificial General Intelligence

- **Hypothetical:** “Artificial General Intelligence (AGI) refers to the **hypothetical** ability of an artificial intelligence (AI) system to understand, learn, and apply its intelligence **across a wide range of tasks** that are comparable to the cognitive capabilities of human beings...[It would include:]
  - **Generalization:** AGI would be able to **transfer knowledge and skills** learned in one domain to perform tasks in entirely different domains, similar to how humans can apply their learning across various areas.
  - **Common sense reasoning:** AGI would possess a level of common-sense reasoning, enabling it to **understand context, infer implicit information, and make judgments based on incomplete or ambiguous data.**” Chat GPT prompt, *What is Artificial General Intelligence?*



# Artificial *General* Intelligence

- **Generative Artificial Intelligence is not Artificial General Intelligence.**

For example, a human child can see a few pictures of dogs and **generalize their understanding** into other dogs, other situations.

- **Generative AI currently cannot. “Perhaps in 10-years, or **maybe never.**”**

~ Quote and paraphrased points: Artificial Intelligence: Can AI Overcome its Limitations? Curation: Desautels Faculty of Management, McGill University [intelligence.weforum.org](https://intelligence.weforum.org))





# **The Transformation of eLearning**



# Transformation of eLearning

A man with a backpack and glasses walking on a rocky path. The image is overlaid with a semi-transparent purple filter.

- The question we began with:

As eLearning engages with

Learning Engineering (LE) and Generative Artificial Intelligence (GAI),

is more *and* better possible?

- So, where do we stand now?



# Transformation of eLearning

A man with a backpack and glasses looking out over a mountain range. The image is overlaid with a semi-transparent purple filter.

- Perhaps a revised question:

In what ways can we, as humans,  
continue to use *our unique form of intelligence*,  
placing *ourselves* at the centre, to develop and  
advance eLearning with the tools we have created (ID, LE, AI and GAI)?





# **Next Steps On the Trek**



# Next Steps on the Trek

- **Get inspired:** Read *Engines of Engagement: A Curious Book About Generative AI* by Stodd, Schatz, and Stead.
  - Their recommendation → **get into dialogue** with their work, the topics, and the “Engines”.
- **Engage in the journey:** Read *How does AI support military education, training, exercises, and evaluation* by the PfPC ADL WG.
  - Their recommendation → **participate** in international groups working in AI and learning, take steps to build your team’s knowledge and skills, and “**say ‘yes’** to pilot projects”.



A hiker with a backpack stands on a rocky trail, looking out over a vast, hazy landscape. The scene is dimly lit, suggesting dawn or dusk, with a soft glow on the horizon. The hiker is wearing a brown jacket and dark pants, and the backpack is a light color. The text is overlaid on the right side of the image.

# Next Steps

**Keep asking along the way:**

**What can ID, LE, and AI do for us and our eLearning needs?**



A person with a backpack stands on a rocky mountain peak, looking out over a vast, hazy landscape under a sunset sky. The scene is silhouetted against the warm, orange and yellow light of the setting sun.

# Thank You

**With Special Thanks To:**

**Sheldon Hatch, AI Illustration and Video Artist**

Tool set: Leonardo AI, MidJourney, Firefly in Adobe design products

**The Community of Practice, including the C-ADL Team**

**Our helpful assistants ChatGPT and MS Copilot (who argued!)**



# Resources

- **AI Voluntary Code of Conduct:** <https://ised-isde.canada.ca/site/ised/en/voluntary-code-conduct-responsible-development-and-management-advanced-generative-ai-systems>
- **AI Data Act:** <https://ised-isde.canada.ca/site/innovation-better-canada/en/artificial-intelligence-and-data-act> & [https://www.justice.gc.ca/eng/csj-sjc/pl/charter-charte/c27\\_1.html](https://www.justice.gc.ca/eng/csj-sjc/pl/charter-charte/c27_1.html)
- **DND CAF AI Strategy:** <https://www.canada.ca/en/department-national-defence/corporate/reports-publications/dnd-caf-artificial-intelligence-strategy.html>
- **Trudeau announces \$2.4B in AI investment:** <https://www.cbc.ca/news/politics/federal-government-ai-investment-1.7166234>
- **Learning Engineering:** <https://the-learning-agency.com/insights/a-game-changer-lets-talk-about-learning-engineering/>
- **What is Learning Engineering:** <https://www.linkedin.com/pulse/what-learning-engineering-jim-goodell/>
- **Learning Engineering Toolkit:** <https://www.taylorfrancis.com/chapters/oa-edit/10.4324/9781003276579-3/introduction-jim-goodell>
- **Intersectionality Analysis:** <https://women-gender-equality.canada.ca/en/gender-based-analysis-plus.html>
- **A Transformation of Learning Engineering with Dr. Bror Saxburg:** <https://youtu.be/FajOrOQocEM?si=17rv0syqAau2KcS3>
- **Engines of Engagement: A Curious Book About Generative AI** by Julian Stodd, Sae Schatz, and Geoff Stead
- **PfPC Info Paper: How does AI support military education, training, exercises, and evaluation** (November 2023)
- **Artificial General Intelligence:** <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-artificial-general-intelligence-agi#/>