



# Long Learning and Generative AI: Unpacking ChatGPT's Potential

*a conversation with Ray Schroeder*

Host



**Karen Woloschuk**

Director, Business & Administration  
Division of Extended Education  
University of Manitoba



**Rod Lastra**

Acting Dean  
Division of Extended Education  
University of Manitoba



**Ray Schroeder**

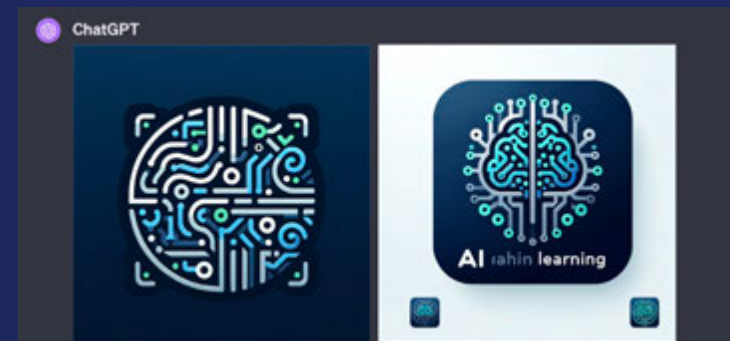
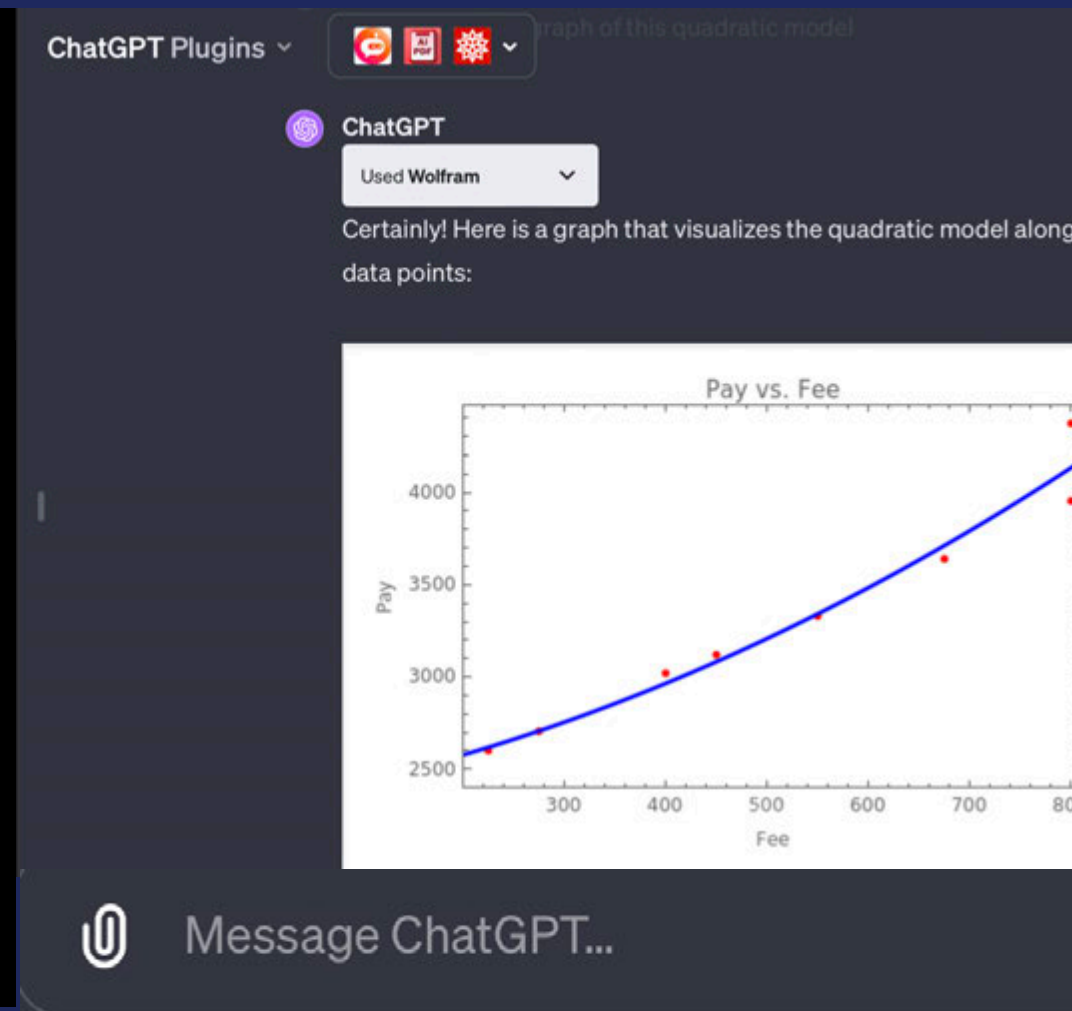
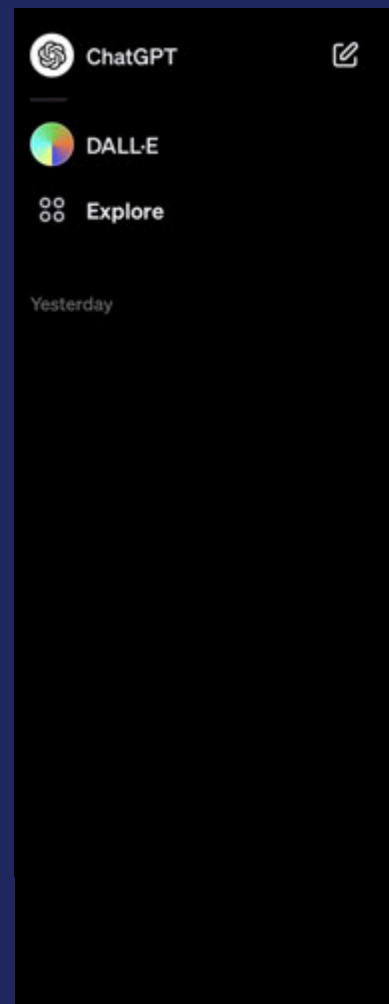
Senior Fellow at UPCEA, the Online and Professional Education Association;  
Professor Emeritus at University of Illinois Springfield



University of Manitoba | Extended Education

# OpenAI

- November 30 2022 ChatGPT
- March 2023 GPT-4
- Late Fall 2023
  - Voice & Vision
  - Dall\*E 3
  - ChatGPT Enterprise



## User updates

- GPT-4 Turbo
- Browse the web
- Auto-model picker

## Developer updates

- "Copyright Shield"
- Build custom GPT agents (GPTs)
  - Programming using Natural Language
- Share GPT agent (new **GPT store**)
- **GPT-Turbo (API)**
  - Access to Data April 2024
  - Longer inputs
- **API Assistants**
- Developer incentives

# GPT-4 Turbo



## My GPTs



Create a GPT Beta

Customize a version of ChatGPT for a specific purpose



## Recently Used



DALL-E

Let me turn your imagination into imagery

By ChatGPT

## Made by OpenAI



DALL-E

Let me turn your imagination into imagery

By ChatGPT



Data Analysis

Drop in any files and I can help analyze and visualize your data

By ChatGPT



ChatGPT Classic

The latest version of GPT-4 with no additional capabilities

By ChatGPT



Game Time

I can quickly explain board games or card games to players of any age. Let the games begin!

By ChatGPT



New GPT

Draft

Save

Create

Configure

Preview



GPT Builder

Hi! I'll help you build a new GPT. You can say something like, "make a creative who helps generate visuals for new products" or "make a software engineer who helps format my code."

What would you like to make?



Message GPT Builder...



Message GPT...



### My GPTs

**Create a GPT** Beta  
Customize a version of ChatGPT for a specific purpose

---

### Recently Used

**DALL-E**  
Let me turn your imagination into imagery  
By ChatGPT

---

### Made by OpenAI

**DALL-E**  
Let me turn your imagination into imagery  
By ChatGPT

**Data Analysis**  
Drop in any files and I can help analyze and visualize your data  
By ChatGPT

**ChatGPT Classic**  
The latest version of GPT-4 with no additional capabilities  
By ChatGPT

**Game Time**  
I can quickly explain board games or card games to players of any age. Let the games begin!  
By ChatGPT

### New GPT

Draft

Create **Configure**

**Name**  
Name your GPT

**Description**  
Add a short description about what this GPT does

**Instructions**  
What does this GPT do? How does it behave? What should it avoid doing?

**Conversation starters**

**Knowledge**  
Upload files

**Capabilities**

- Web Browsing
- DALL-E Image Generation
- Code Interpreter

**Actions**

### New GPT

Draft

### Actions

Let your GPT retrieve information or take actions outside of ChatGPT  
Learn more.

**Schema** Import from URL Examples

Enter your OpenAPI schema here

**Authentication**  
None Edit

**Privacy Policy**  
https://api.example-weather-app.com/privacy

*Convert general purpose GPT to single purpose custom GPT!!!*



ChatGPT



Alternative Cred...



DALL-E



Explore

Alternative Credential Template Automator ▾



## Alternative Credential Template Automator

Guides in filling and customizing university  
program proposals.

By rod lastra

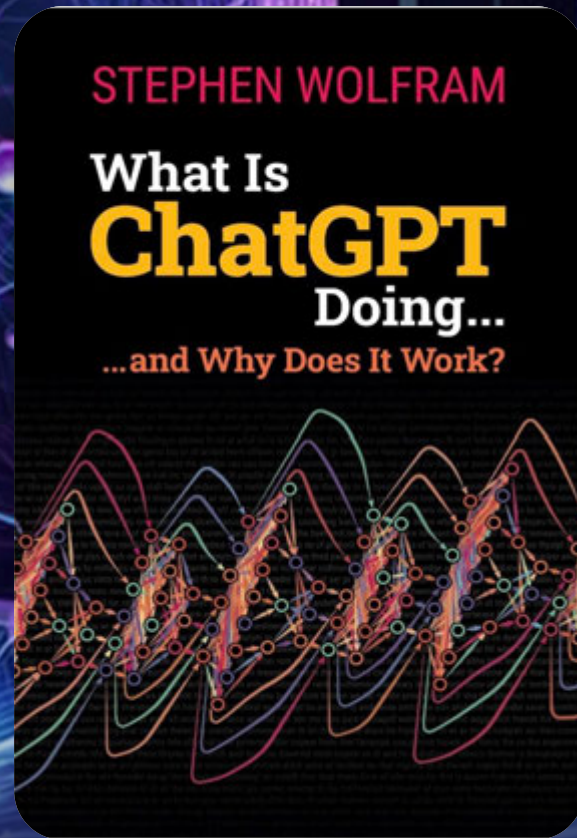
What program type are you proposing?

What are the resource requirements for your p...

Please describe the intended outcomes of you...

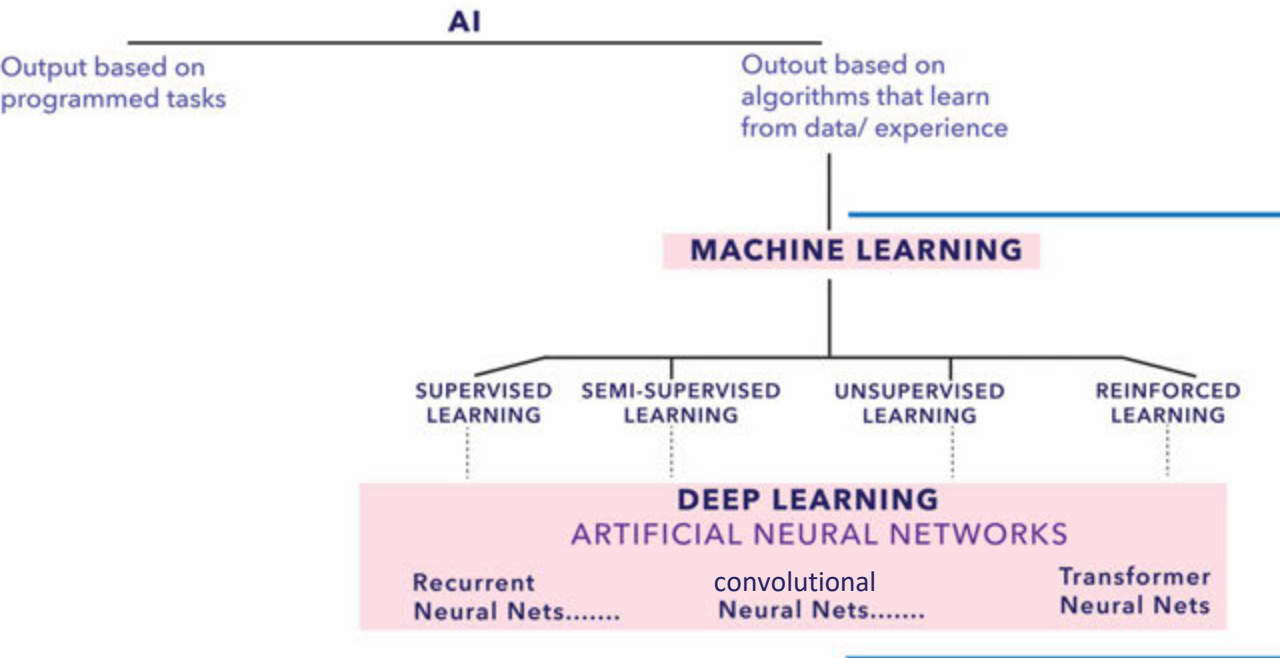
Can you provide details for the Program Overv...

# ChatGPT



# WHAT IS ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) is designed to enhance human capabilities by simulating cognitive tasks that are inherently human, such as facial recognition, adaptive learning, communication, linguistic, and reasoning (Goodfellow, Bengio, and Courville 2016)



IF the goal is to generate new content from trained data THEN

## GENERATIVE AI

IF the data is **text** THEN

### LARGE LANGUAGE MODEL

IF the vast amounts of **text** THEN

### GENERATIVE PRE-TRAINED TRANSFORMER



IF the data is **multi-model** (images, sound, video, text) THEN

### FOUNDATION MODEL

Output – generate content

- GPT - Picks out the nuanced regularity and structure of natural language (Wolfram 2023).
- Generate text: **syntactically accurate** and **contextually relevant**.
- **lacks genuine comprehension!**
- Only **statistical pattern recognition and prediction**.



# ChatGPT

**GPT (developer API)**

**GPT (user interface)**

# GPT (developer API)

## Generative Pretrained Transformer

### Data

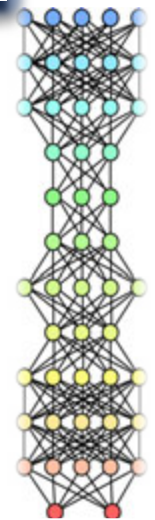
Huge corpus of text

### Data training

### Transformer model customization

- **“Attention”** of Transformer model captures contextual relationship in data critical for language understanding and essential for interpreting meaning
- (attention is all you need (2017))

#### Attention Is All You Need



# GPT (user interface)



How can I help you today?

**PRE-TRAINED TRANSFORMER NEURAL NET**

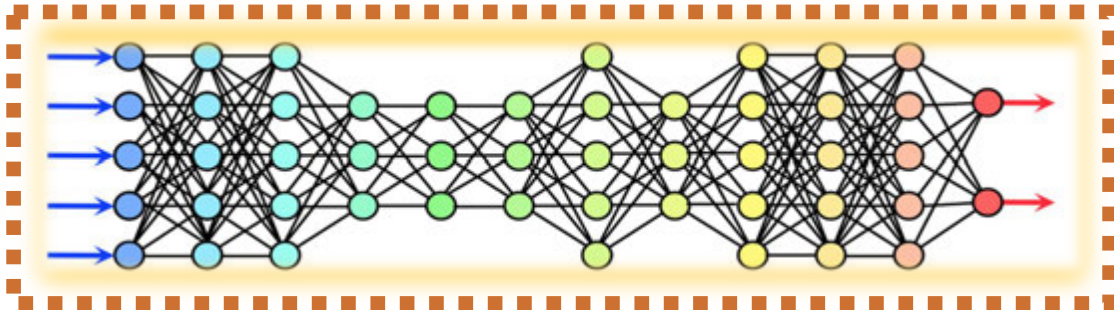
**PREPROCESS**

**POSTPROCESS**

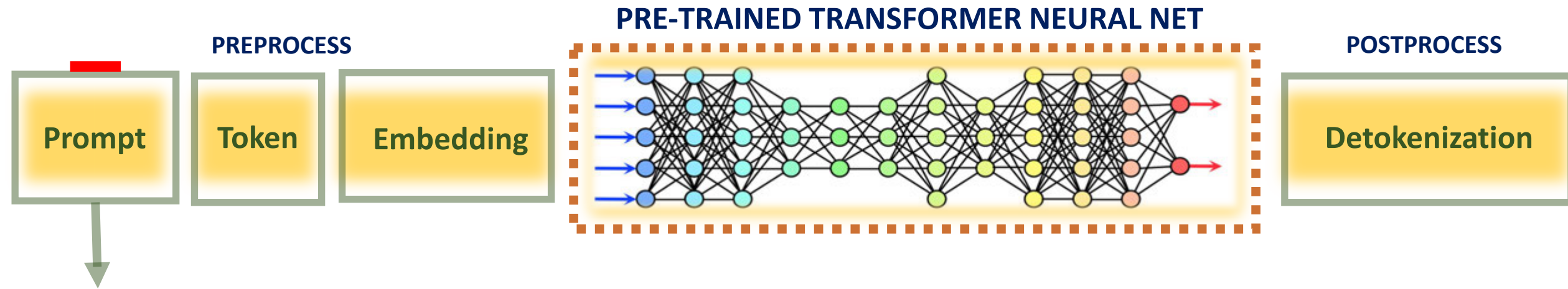
**Prompt**

**Token**

**Embedding**



**Detokenization**



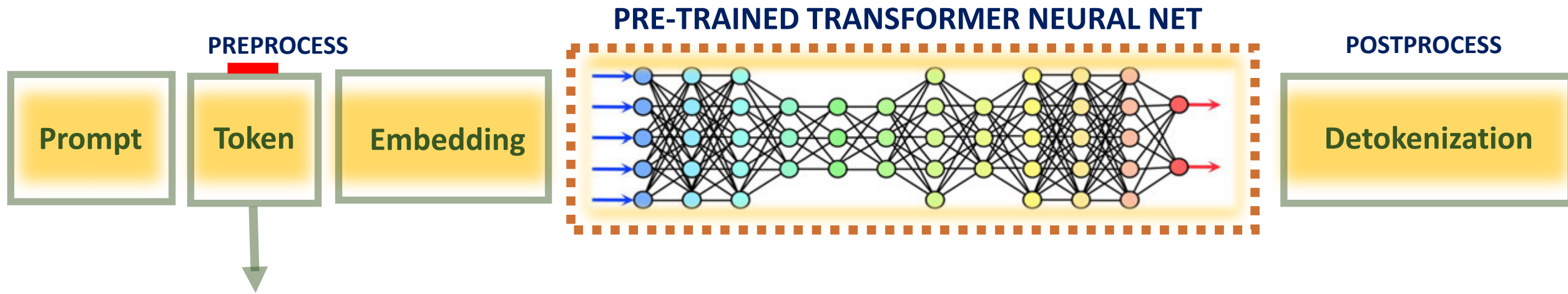
- **PROMPT = EXPOSITORY WRITING**

- **Open Prompt**.....*What is a [ ]*
- **Open Prompt** - extractive Q/A
- **Closed Prompt** - extractive Q/A

.....*Please improve/review the following text {.....}*

**PROMPT**  
**ENGINEERING**

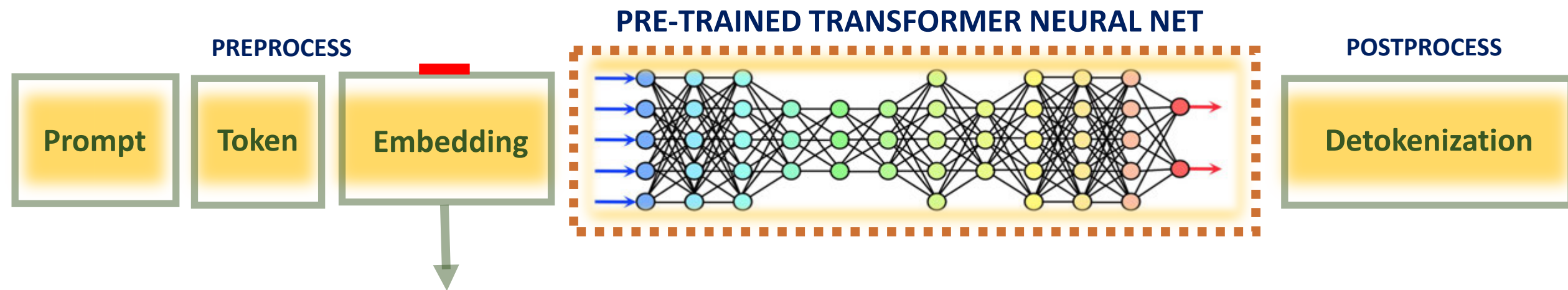
- **OPEN PROMPT: What is a black hole?**



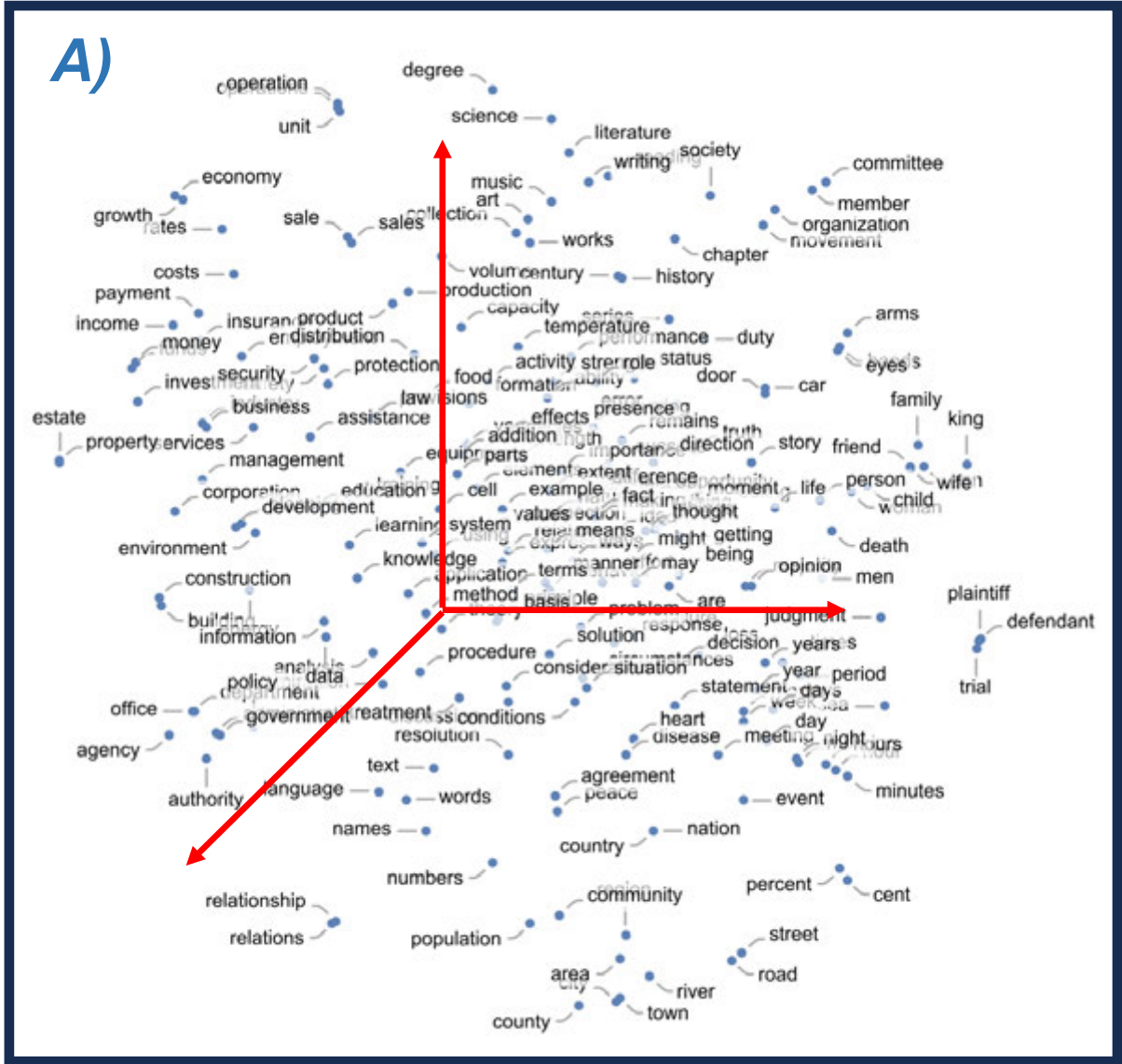
- “**What is a black hole**” is split into tokens?
- tokens = **“What”, “is”, “a”, “black”, “hole”**.

```
Print(encode("what is a black hole"))
```

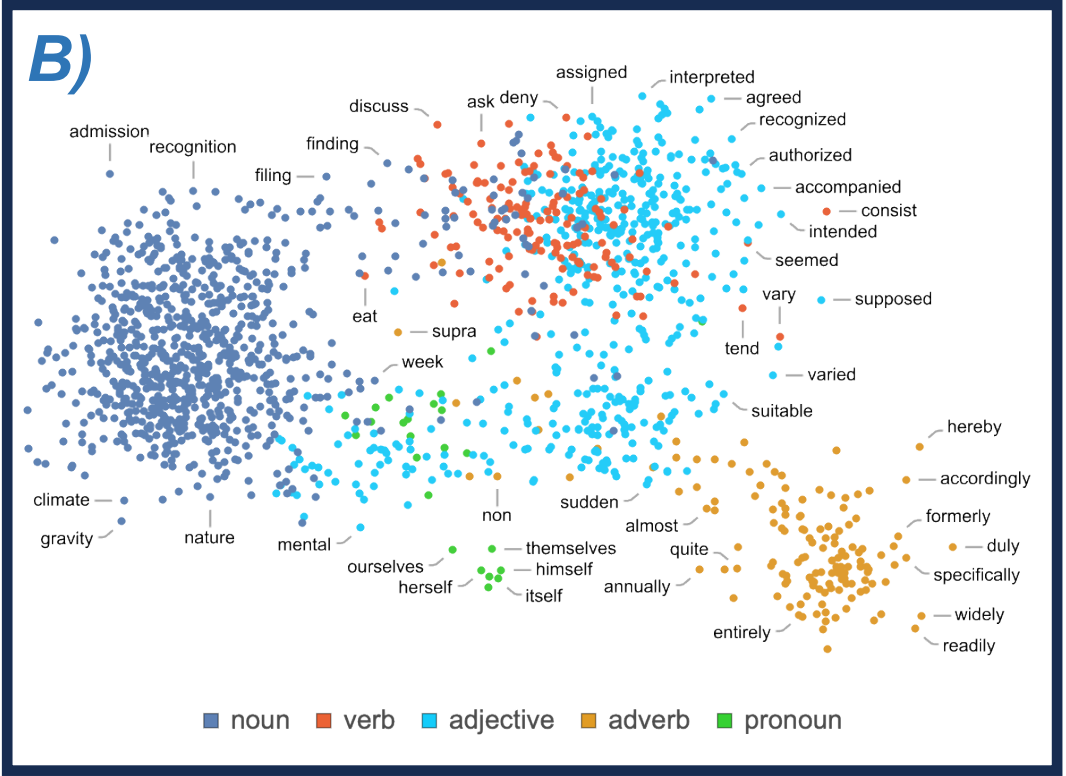
- tokens converted to integers, = **[539, 257, 262, 1579, 11234]**.
- The integers do not say anything about the relations of words or their meaning an extra step is needed.....



- Text represented by an **array of numbers (coordinates in linguistic space)**
- **"What"** -> **[539]** -> **[0.2, -0.1, ..., 0.3]**
- Encodes **identity, meaning and relationship of words** (based on data)
- e.g., Apple: type of fruit = **1**, Color red = **2**, Edible = **0.5** ... **Statistical facts of language**
- This **text-to-meaning** process is the definition of a **"Large Language Model (LLM)"**



A) Words representing relationships (e.g., plants and animals);  
ca. Wolfram(2023)

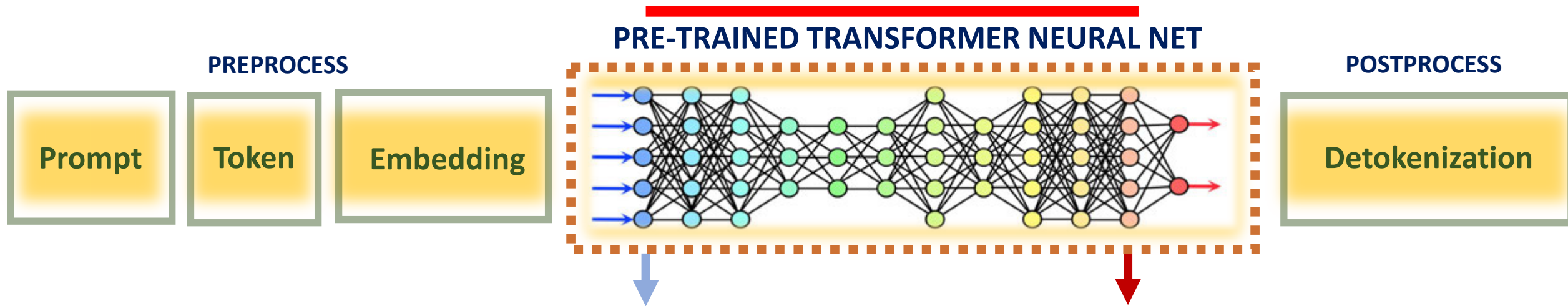


B) Words corresponding to different parts of speech;  
ca. Wolfram(2023)

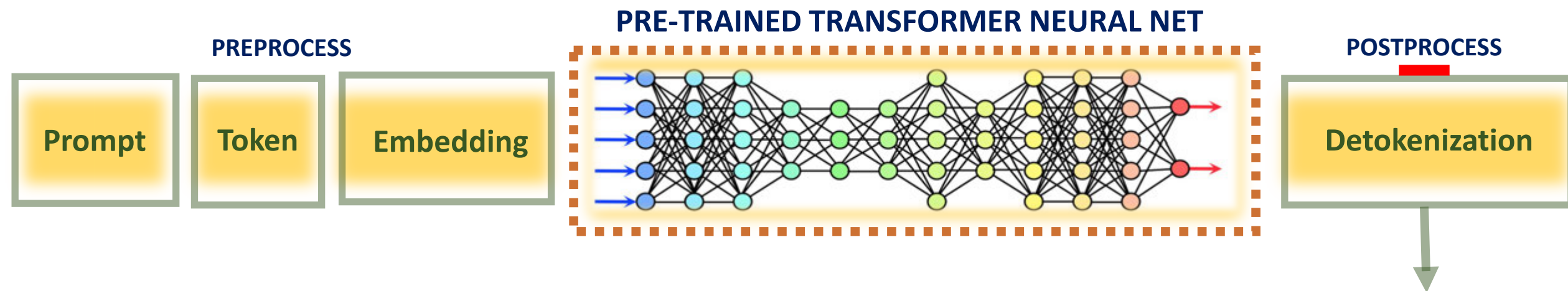
# LINGUISTIC FEATURE SPACE:

Word meaning, relationship and context  
(A) SEMANTIC; B) SYNTACTIC LAW





- **UNDERSTANDING:** the model understands that **"black hole"** is a **single concept** and gains context that the prompt is asking for a definition.
- **DECODE:**
  - Predicts the most **STATISTICALLY PROBABLE** response (*n-gram*)
  - Selects "best" response
  - *\*\* based on number of parameters (~170 trillion)\*\**
  - *The is where errors or **hallucinations** can occur*



- The generated tokens are merged back into a readable response:

## CONTENT GENERATION:

"A black hole is a region of space where gravity is so strong that nothing, not even light, can escape from it."

# Generative AI

## Practices, Policies, Perspectives

Ray Schroeder  
UPCEA Senior Fellow

<https://sites.google.com/view/raysspace/genai>



### Ray's Online: Trending Now Articles on Generative AI in Higher Ed

23 articles (1,000 words each) – with policies, practices, and perspectives on the rapidly changing nature of GenAI and emerging trends over the past 18 months.

Links to all of the Trending Now articles in Inside Higher Education

<https://www.insidehighered.com/opinion/blogs/online-trending-now>



### Ray Schroeder

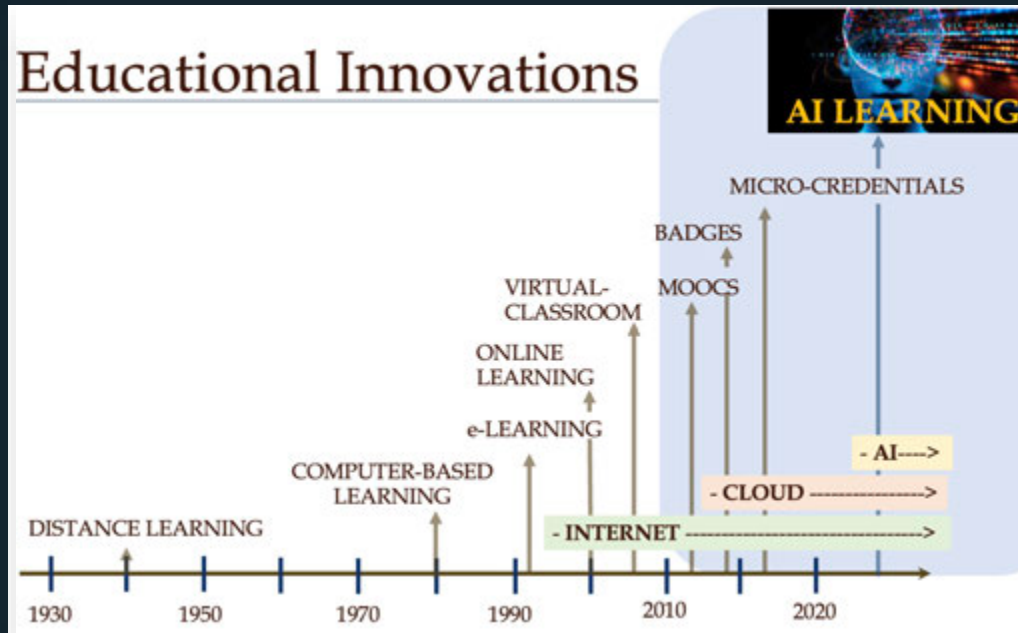
Senior Fellow at UPCEA, the Online and Professional Education Association; Professor Emeritus at University of Illinois Springfield



# Long Learning and Generative AI: Unpacking ChatGPT's Potential

*a conversation with Ray Schroeder*

**QUESTION 1:** The intersectionality of technology and education. Reflecting on the pivotal moments when technology profoundly transformed educational paradigms, as well as instances where the expectations from technological advancements overshadowed their actual impact?





# Long Learning and Generative AI: Unpacking ChatGPT's Potential

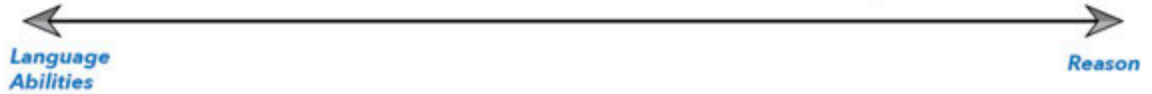
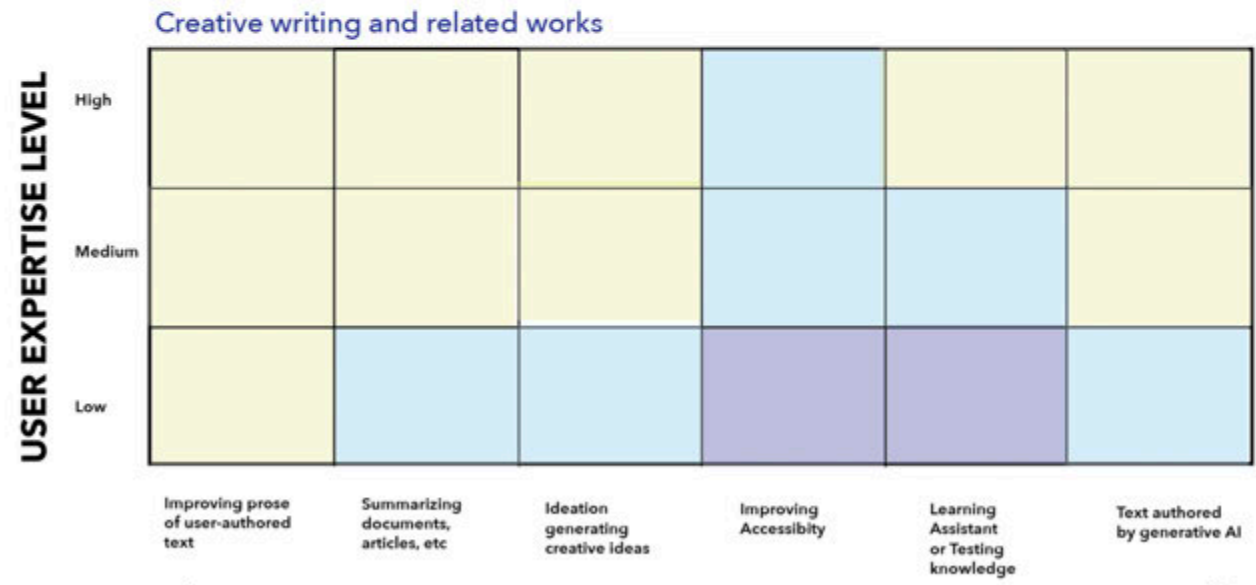
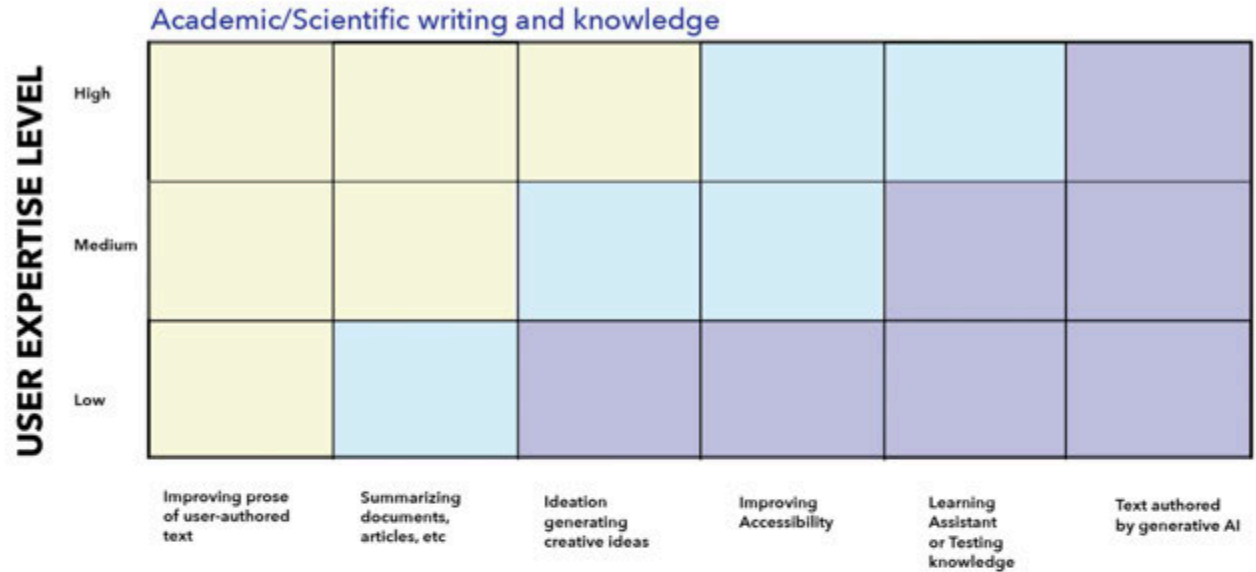
*a conversation with Ray Schroeder*

**QUESTION 2** : Let's explore some of the potential and concerns associated with the implementation of generative AI tools such as ChatGPT – specific emphasis on impacts to learners and educators.



# TRUSTWORTHINESS OF OUTPUT

High Medium Low



**LARGE LANGUAGE MODEL**



# Long Learning and Generative AI: Unpacking ChatGPT's Potential

*a conversation with Ray Schroeder*

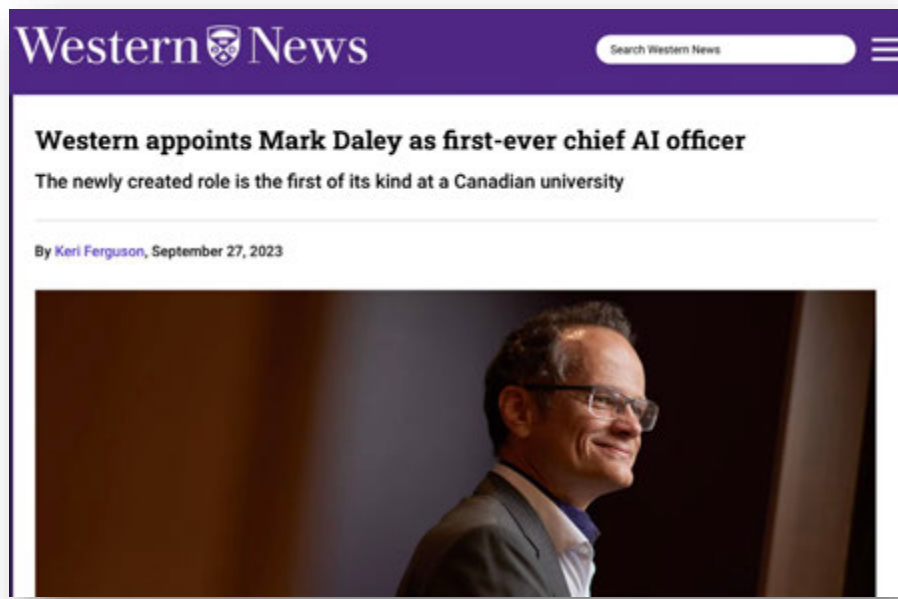
**QUESTION 2** : Let's explore some of the potential and concerns associated with the implementation of generative AI tools such as ChatGPT – specific emphasis on impacts to learners and educators.



# Long Learning and Generative AI: Unpacking ChatGPT's Potential

*a conversation with Ray Schroeder*

**QUESTION 3:** Reflecting on the innovative step taken by Western University in appointing a Chief AI Officer, Mark Daley, could you delve into the evolving regulatory frameworks that universities are beginning to adopt in embracing AI?





# AI decision tree

This document is intended to help the Ecampus Course Development Team, as well as faculty and staff, use a principles-based approach in deciding if and how to incorporate artificial intelligence (AI) into course development, research, and other work projects. After reviewing the risks identified below, consider whether the overall benefits of using the tool outweigh the risks.





## Syllabi Policies for AI Generative Tools

If you would like to **submit your course guidelines/policy** to be included here, [please submit it in this form](#).

**Update:** If you would like a more searchable version of this document, [try out this spreadsheet that allows you to sort by Course, Discipline, Institution, etc.](#)

This resource is created by [Lance Eaton](#) (contact him via [email](#), [Twitter](#), or [LinkedIn](#)) for the purposes of sharing and helping other instructors see the range of policies available by other educators to help in the development of their own for navigating AI-Generative Tools (such as ChatGPT, MidJourney, Dall-E, etc).

#	Course & Institution	Policy	Other info (name, soc media handle, link etc)
1	<b>Digital Interventions - AI &amp; Education</b> College Unbound	There are situations and contexts within this course where you will be asked to use AI tools to explore how they can be used. Outside of those circumstances, you are discouraged from using AI tools to generate content (text, video, audio, images) that will end up in any student work (assignments, activities, responses, etc) that is part of your evaluation in this course. Any student work submitted using AI tools should clearly indicate what work is the student's work and what part is generated by the AI. In such cases, no more than 25% of the student work should be generated by AI. If any part of this is confusing or uncertain, please reach out to me for a conversation before submitting your work.	<a href="#">Lance Eaton @leaton01</a> (Twitter) <a href="#">LinkedIn</a>  <a href="#">CU's Institutional Strategy for AI Generative Tools</a>
2	<b>SSU Writing In the Workplace, CU Writer's workshop/Learning From Experience NS First Year Seminar</b>  Salem State University, College Unbound, North Shore Community College	ARTIFICIAL INTELLIGENCE (AI) USE POLICY This policy covers any generative AI tool, such as ChatGp, Elicit, etc. This includes text and artwork/graphics/video/audio. 1. You are discouraged from using AI tools UNLESS under direct instruction from your instructor to do so. Please contact your instructor if you are unsure or have questions BEFORE using AI for any assignment. 2. If AI is permitted to be used, you must indicate what part of the assignment was written by AI and what was written by you. No more than 25% of an assignment should be created with AI if the instructor gives permission for its use. 3. You must sign the AI contract that you understand and agree to these policies.	Sandy Fyfe
3	<b>INSDSG 601 - Foundations of Instructional design and learning technology</b> University of Massachusetts Boston	No restrictions	Rebecca Hogue  I'm going to create an assignment around it - to see what they think and how they might use it.
4	<b>Theater courses</b> at a small liberal arts college	"All work submitted in this course must be your own. Contributions from anyone or anything else- including AI sources, must be properly quoted and cited every time they are used. Failure to do so constitutes an academic integrity violation, and I will follow the institution's policy to the letter in those instances."	Shared by <a href="#">Harmania on Reddit</a>
5	<b>N/A</b>	"any text- generating software (such as ChatGPT, iA Writer, Marmot or Botowski) is not permitted, and it will be treated as plagiarism"	Shared by <a href="#">AtheistET on Reddit</a> .
6	University of Pennsylvania	You may use AI programs e.g. ChatGPT to help generate ideas and brainstorm. However, you should note that the material generated by these programs may be inaccurate, incomplete, or otherwise problematic. Beware that use may also stifle your own independent thinking and	Holly Fernandez-Lynch shared on <a href="#">Twitter</a>



# Lifelong Learning and Generative AI: Unpacking ChatGPT's Potential

*a conversation with Ray Schroeder*

**QUESTION 4** : What insights can be shared on the potential impact of upcoming AI educational assistants such as OpenAI Academy on the future paradigms of lifelong learning and professional education?



ChatGPT 4 ▾



RL

**You**

could you explain in simple terms neural theory in ecology and how it relates to species diversity and complexity ?



ChatGPT 4 ▾



RL

You

could you explain in simple terms neural theory in ecology and how it relates to species diversity and complexity ?



ChatGPT

Neural theory in ecology is an analogy that compares ecosystems to neural networks in the brain. Just like neurons in the brain, species in an ecosystem are interconnected through a complex web of interactions. Here's a simplified explanation:

1. **Interconnectedness:** In the brain, neurons are connected to each other through synapses, where they transmit signals. Similarly, in an ecosystem, species are connected through various relationships like predation, competition, and symbiosis.
2. **Learning and Adaptation:** Neurons can strengthen or weaken their connections based on the signals they receive, which is part of how learning occurs in the brain. In ecosystems, species interactions can change over time, allowing the ecosystem to adapt to new conditions. For example, if one species becomes extinct, others may fill



RL

You

perfect. Please redo including examples



ChatGPT

Absolutely, let's delve into the neutral theory in ecology with some examples to clarify the concept:

1. **Species Equivalence:** Imagine a coral reef where many species of coral are competing for space. Neutral theory suggests that each species of coral has an equal chance of occupying space, growing, and reproducing. No species has a special advantage; their success is largely due to chance rather than superior adaptation or competitive strategies.
2. **Randomness and Drift:** Consider a forest where many different tree species coexist. If a large tree falls, it creates a gap in the canopy. Which tree species grows to fill that gap might be a random event—perhaps whichever seed happens to land there first or in the greatest number, rather than which seed is from the most "fit" species.
3. **Biodiversity Patterns:** In a grassland ecosystem, the presence of numerous grass and herb species might not be because each has found a unique niche or is better adapted to specific conditions. Neutral theory would suggest that the relative abundance of each species could be the result of random seed dispersal and survival, with no species having a distinct competitive edge over the others.



ChatGPT Plugins ▾



RL

You

could you provide a in-depth explanation of Hubbell's neutral theory, using the mathematical function for species area relationship



ChatGPT

Hubbell's Neutral Theory of Biodiversity and Biogeography is a hypothesis proposed by ecologist Stephen Hubbell in 2001. The theory suggests that the diversity of species in a community is largely a result of stochastic processes—random births, deaths, immigrations, and extinctions—rather than deterministic forces such as natural selection.

The theory is "neutral" in the sense that it assumes all individuals of all species in a community are ecologically equivalent. That is, they have equal chances of giving birth, dying, and dispersing regardless of their species. This is in contrast to traditional ecological theories, which often emphasize differences between species and the importance of niche differentiation.

### Mathematical Framework

The Neutral Theory is underpinned by several mathematical models, one of which is the Species-Area Relationship (SAR). The SAR describes how the number of species (species richness) increases with the area sampled. In Hubbell's Neutral Theory, the



The mathematical function often used to describe the SAR is a power function of the form:

$$S = cA^z$$

where:

- $S$  is the number of species,
- $A$  is the area,
- $c$  is a constant that represents the number of species (when  $A = 1$ ),
- $z$  is the slope of the line on a log-log plot ranging between 0.2 and 0.35 in empirical

You

could you explain in simple term the constant 'c' and how it impacts the model

ChatGPT

In the Species-Area Relationship (SAR) equation  $S = cA^z$ , the constant  $c$  is a coefficient that represents the expected number of species when the area  $A$  is equal to one. In simple terms, it's a scaling factor that adjusts the curve to fit the actual data. The value of  $c$  is determined empirically by fitting the SAR model to observed data on species richness and area.

Here's how  $c$  impacts the model:

- **Baseline Species Richness:** The constant  $c$  sets the baseline for species richness in the smallest area considered by the model. If  $c$  is high, even small areas will be predicted to have a relatively high number of species. Conversely, if  $c$  is low, small areas will have fewer species.
- **Scaling of Species Richness:** As you move to larger areas, the constant  $c$  helps determine how quickly the number of species increases. A larger  $c$  means a steeper initial increase in species richness with area.
- **Model Fitting:** The value of  $c$  is crucial for the model to accurately reflect the observed data. It's adjusted so that the curve generated by the SAR equation passes through the points representing the actual number of species observed in areas of different sizes.





RL

**You**

could you provide a graph of the species area function



RL

You

could you provide a graph of the species area function



ChatGPT

Used Wolfram



Used Wolfram



It seems there was an issue with the initial request for a 3D plot. The Species-Area Relationship (SAR) function is typically represented as a 2D plot with the area on the x-axis and the number of species on the y-axis. The constant  $c$  and exponent  $z$  are parameters that define the shape of the curve.



RL

You

could you provide a graph of the species area function



ChatGPT

Used Wolfram



Used Wolfram



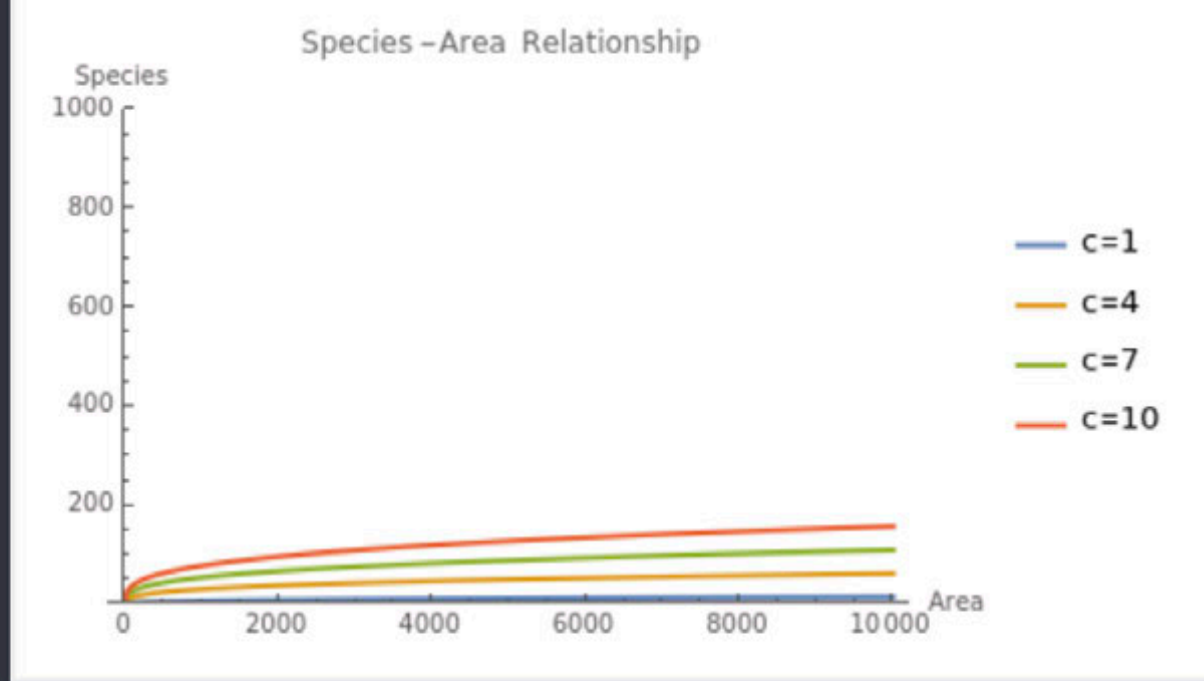
It seems there was an issue with the initial request for a 3D plot. The Species-Area Relationship (SAR) function is typically represented as a 2D plot with the area on the x-axis and the number of species on the y-axis. The constant  $c$  and exponent  $z$  are parameters that define the shape of the curve.

Let's try to generate a 2D plot of the SAR function, using a typical value for  $z$  and varying  $c$ . We'll plot the number of species  $S$  against the area  $A$  for a given range of area sizes. We'll assume  $z$  to be 0.3, which is a common value found in empirical studies, and we'll see how the curve changes for different values of  $c$ .

Used Wolfram



Here is the graph of the Species-Area Relationship (SAR) for different values of the constant  $c$ , with the exponent  $z$  fixed at 0.3:



In this graph:

- The x-axis represents the area  $A$ .
- The y-axis represents the number of species  $S$ .
- Each curve represents a different value of the constant  $c$ , ranging from 1 to 10 in increments of 3.

As you can see, higher values of  $c$  result in a higher number of species for any given area, illustrating how  $c$  sets the baseline species richness and affects the steepness of the SAR curve.



RL

**You**

could you explain in simple terms neural theory in ecology and how it relates to species diversity and complexity ?



RL

You

could you explain in simple terms neural theory in ecology and how it relates to species diversity and complexity ?



ChatGPT

Neural theory in ecology is an analogy that compares ecosystems to neural networks in the brain. Just like neurons in the brain, species in an ecosystem are interconnected through a complex web of interactions. Here's a simplified explanation:

1. **Interconnectedness:** In the brain, neurons are connected to each other through synapses, where they transmit signals. Similarly, in an ecosystem, species are connected through various relationships like predation, competition, and symbiosis.
2. **Learning and Adaptation:** Neurons can strengthen or weaken their connections based on the signals they receive, which is part of how learning occurs in the brain. In ecosystems, species interactions can change over time, allowing the ecosystem to adapt to new conditions. For example, if one species becomes extinct, others may fill the gap, or if a new species is introduced, the ecosystem may adapt to include it.
3. **Complexity and Stability:** A brain with more neural pathways can process information more robustly and flexibly. Similarly, ecosystems with greater biodiversity (more species diversity) tend to be more resilient. They can withstand changes and disturbances better because there are more species to fulfill roles and support the system.
4. **Emergent Properties:** Just as consciousness is an emergent property of the complex network of neurons and their interactions, the health and functionality of an ecosystem—its ability to cycle nutrients, purify water, and support life—are emergent properties of the complex interactions among species within it.



RL You

could you explain in simple terms neural theory in ecology and how it relates to species diversity and complexity ?

ChatGPT

Neural theory in ecology is an analogy that compares ecosystems to neural networks in the brain. Just like neurons in the brain, species in an ecosystem are interconnected through a complex web of interactions. Here's a simple explanation:

- 1. Interconnectedness:** In a neural network, neurons are connected to each other through synapses, where they transmit signals. Similarly, species in an ecosystem are connected through various relationships like predation, competition, and mutualism.
- 2. Learning and Adaptation:** Neurons can strengthen or weaken their connections based on the signals they receive, which is how the brain learns. In ecosystems, species interactions can change over time, allowing the system to adapt to new conditions. For example, if one species becomes extinct, others may fill the gap, or if a new species is introduced, the ecosystem may adapt to include it.
- 3. Complexity and Stability:** A brain with more neural pathways can process information more robustly and flexibly. Similarly, ecosystems with greater biodiversity (more species diversity) tend to be more resilient. They can withstand changes and disturbances better because there are more species to fulfill roles and support the system.
- 4. Emergent Properties:** Just as consciousness is an emergent property of the complex network of neurons and their interactions, the health and functionality of an ecosystem—its ability to cycle nutrients, purify water, and support life—are emergent properties of the complex interactions among species within it.



# Lifelong Learning and Generative AI: Unpacking ChatGPT's Potential

*a conversation with Ray Schroeder*

**QUESTION 4 :** What insights can be shared on the potential impact of upcoming AI educational assistants such as OpenAI Academy on the future paradigms of lifelong learning and professional education?



Khanmigo is a ground-breaking AI tool designed to improve learning and teaching.

Khan Academy moves the needle for educators and students. With Khanmigo, our AI-powered teaching assistant, it just got better.



University of Manitoba | Extended Education





# Long Learning and Generative AI: Unpacking ChatGPT's Potential

*a conversation with Ray Schroeder*

*“Whereas humans are limited in the kinds of explanations we can rationally conjecture, machine learning systems can learn both that the earth is flat and that the earth is round. They trade merely in probabilities that change over time. For this reason, the predictions of machine learning systems will always be superficial and dubious.....In short, ChatGPT and its brethren are constitutionally unable to balance creativity with constraint. They either overgenerate (producing both truths and falsehoods, endorsing ethical and unethical decisions alike) or undergenerate (exhibiting noncommitment to any decisions and indifference to consequences). Given the amorality, faux science and linguistic incompetence of these systems, we can only laugh or cry at their popularity.”*

*(Chomsky March 8 2023 NYTIMES).*





# Deep Learning and Generative AI: Unpacking ChatGPT's Potential

*a conversation with Ray Schroeder*

**QUESTION 6: ... . 'Ah-Ha' moment**

# THANK YOU



<https://sites.google.com/view/raysspace/genai>



## Ray's Online: Trending Now Articles on Generative AI in Higher Ed

23 articles (1,000 words each) – with policies, practices, and perspectives on the rapidly changing nature of GenAI and emerging trends over the past 18 months.

Links to all of the Trending Now articles in Inside Higher Education

<https://www.insidehighered.com/opinion/blogs/online-trending-now>



## Ray Schroeder

Senior Fellow at UPCEA, the Online and Professional Education Association; Professor Emeritus at University of Illinois Springfield