AI in Education:
Defining AI Chatbots

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Today's primary learning objectives

- Increase feelings of acceptance, curiosity, and motivation regarding generative AI tools.
- Define common terms and concepts in AI.
- Summarize how generative AI tools work.
- Try using an AI chatbot in an informal and exploratory setting.

Acknowledgements

- **ChatGPT4** for summarizing, brainstorming, and suggestions on the content.
- **Midjourney & DALL-E** to generate images
- **Designer** feature within PowerPoint to suggest slide layouts and stock images.
- **Grammarly** for spelling, grammar, conciseness, word choice, and so on.
- **Smartsheets** for automating registration.
- **Outlook** and **Zoom** for event coordination.
- **Google** for web search...

For the sake of transparency and to model best practices, here are some AI tools that I used when developing this workshop.

I used ChatGPT, and Midjourney and DALL-E, Designer in PPT. Oh yeah, I also have Grammarly installed. And if we mean algorithms and machine learning, not strictly LLM. Then I technically should say I used Google a lot too. I also used Outlook for event planning, it has AI features too. And Smartsheet for the registration forms. Zoom! Zoom has AI features too.

Yes, I am being melodramatic! But my intent is to suggest, hopefully in a humorous way, that there are fuzzy and ambiguous lines of distinction here. And warm us up to this topic. This is an ambiguous, and often contradictory topic. We are entering a twilight zone.

Let's be flexible

Image generated by DALL-E, 1/17/23

This is a big topic so we can't cover it all. Also, because it is so emergent, nobody has all the answers. Those answers are emerging in places like this. So, thank you for joining the discourse!

Everyone is at a different starting point. Some may be learning the very basics, some may be already thinking about bigger issues, or have begun adapting your course. Some of this you may already have heard, other parts might be new to you. Wherever you are, let's be mindful that different people are at different points and be flexible about where we might end up today.

The benefit of being together here is that we can share our thoughts with each other. This workshop will generate more questions than answers. It is a starting point for you to engage further with each other, CTL, and your own learning.

My expectation is the we will improvise a bit and hop around different topics that interest you. So let me know as we go, what you are thinking, if we want to skip ahead or circle back. Maybe even things that aren't on here yet!

Why should you care about AI?

- Our perspective and expertise is important to the discourse
- The landscape is evolving quickly
- Our students and instructors want guidance
- Using AI could improve how we do our work

- Other groups on campus are, as expected bringing their perspective to it, whether it's computer science, business, medicine, and so on. Also, in the bigger discourse, Higher Education is being scrutinized. Think Claudine Gay or Liz Magill or even Michael Tessier-lavigne. People are asking, are we preparing students for success? Is Stanford leading the way responsibly? Is a college education valuable? What role does education play in our society?

- I'm of an age where WWW and web search came to prominence when I was in high school and college. I'm a 90's kid. Some of us might remember dozens of different search engines, Lycos? Alta Vista, Ask Jeeves? Dogpile? It seemed to be evolving so rapidly. I remember teachers saying "Don't cite anything from the web! It's not a valid source" Then the next semester saying, "You can cite web sources from journals or news articles, but Wikipedia is not a valid source!", then later "Wikipedia is okay, but be sure to check the references!" It was constantly evolving.

- Students want guidance. For many of us, this is not our first rodeo. But for some of our students, this might be. And for some of us, this might feel like a first rodeo. If we abdicate then for-profit will fill that void, students will go and do it anyway. We

owe it to our students to give them guidance. .

- Lastly, AI can help us improve how we do our work. Web search, googling it, is now an indispensable part of how we do our work. We couldn't do our work without web search. People smarter than me are predicting that AI ubiquity, AI everywhere is coming soon. And it's going to become a routine part of how we do work like web search has become. And it will have a big impact on how we work, so it makes sense for us to get ahead of it.

How do you feel when thinking
about the future of AI in education?
Why do you feel that way?

Navigating new technology

- Connect to community
- Have a growth mindset
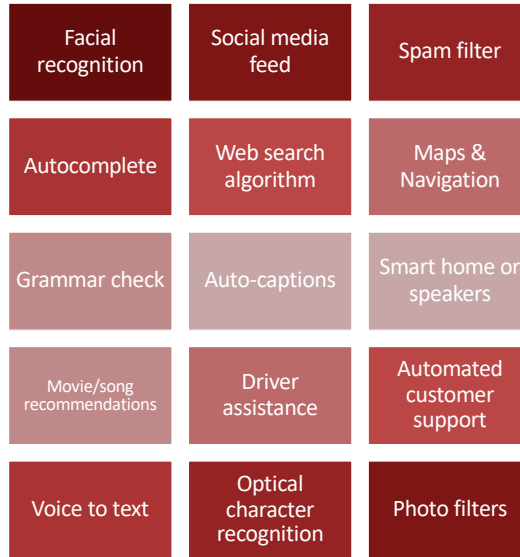- Take care of your well-being
- Engage in the discourse

Some of you might be like, "That's so cool. It can be trained to do all kinds of cool things." Or maybe "OMG, that is so dangerous! How can you trust it?"

Whatever your emotional responses to AI, it is all valid. We've been through periods of tech disruption before. Remember when Wikipedia and Google first came out? Remember when they said open online courses were going to revolutionize education? Remember the emergency pivot to teaching online?

We have strategies that help us navigate any big change or disruption. Growth mindset, community, and well-being. And joy is a part of that!

We know how to navigate this. We just gotta roll up our sleeves and do it again.

How many AI-powered tools have you used lately?

Facial recognition	Social media feed	Spam filter
Autocomplete	Web search algorithm	Maps & Navigation
Grammar check	Auto-captions	Smart home or speakers
Movie/song recommendations	Driver assistance	Automated customer support
Voice to text	Optical character recognition	Photo filters

Common AI Terms

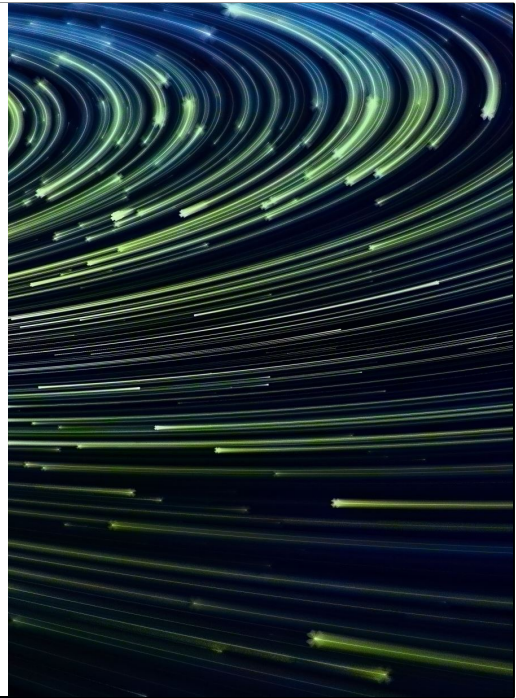| |
|---|
| Generative AI |
| Model |
| Large Language Model (LLM) |
| Chatbot |
| Deep Learning |
| Training Data |
| Algorithm |
| Prompt |

AI is a big catch-all term. Like "transportation" can mean vehicles, infrastructure, policy, etc. Let's examine a few common terms.

Generative AI – "Generative AI" is AI that leverages the prediction powers of AI to generate things: language, images, audio, media, and so on. AKA AI generators

AI model A model is an AI software program that has been trained on datasets to perform a specific task.

Large language Model - So a LLM is a complex model trained on vast amounts of data that generates language that resembles human-generated language.

Chatbot – A program that runs on an LLM. The interface is in a chat or text message interface, where a person interacts with the program in a back-and-forth conversation via typed text.

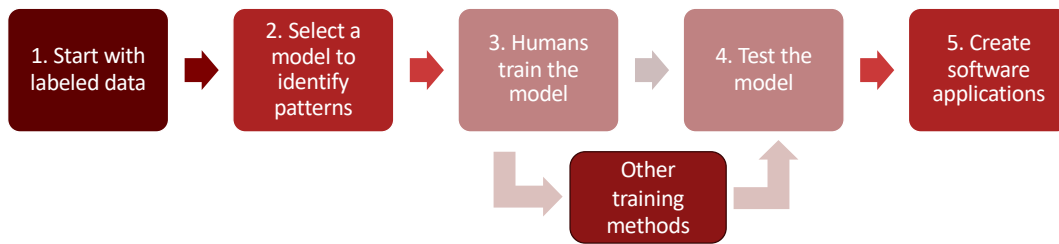**Deep learning** - A subset of machine learning inspired by how biological brains are

structured. It uses a technique by which a computer can learn without being directly programmed with rules. Deep learning layers these techniques for sophisticated output

Training data—Labeled data used in the training process to "teach" an AI model or algorithm to make a decision. For example, with an AI model for self-driving vehicles, training data may include images and videos in which traffic signs, pedestrians, bicyclists, vehicles, and so on are labeled.

Algorithm—A set of instructions or rules for performing a computation. Developers typically design algorithms used in AI to progressively iterate themselves, which we can consider a form of machine learning.

Prompt—Instructions entered by users to direct an AI generator to generate an output or complete a task.

How machine learning works

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┌─────────────┐   ┌─────────────┐   ┌─────────────┐   ┌─────────────┐   ┌─────────────┐
│ 1. Start    │ → │ 2. Select a │ → │ 3. Humans   │ → │ 4. Test the │ → │ 5. Create   │
│ with        │   │ model to    │   │ train the   │   │ model       │   │ software    │
│ labeled data│   │ identify    │   │ model       │   │             │   │ applications│
│             │   │ patterns    │   │             │   │             │   │             │
└─────────────┘   └─────────────┘   └─────────────┘   └─────────────┘   └─────────────┘
                                        ↓  ┌─────────────┐  ↑
                                           │ Other       │
                                           │ training    │
                                           │ methods     │
                                           └─────────────┘
```

1. I give an AI model a zillion photos of people. I've labeled some of the photos as "men" and some as "women".

2. The model is gonna analyze the color, shape, angle, and so on of every bit of these photos.

3. I ask it to guess if a photo is a woman or man. When it guesses right, I say "Ok", when it guess wrong I say "No". Each time it guesses it updates its own code.

4. After many rounds, I might add more labels. Maybe I add more diverse photos. Maybe different quality of photos, or people with different hairstyles or clothing. I don't really know how it exactly chooses it. I'm not telling it "photos of women must have these characteristics". It guesses, and I validate. Over time it gets so good at guessing, that I can assume it "understands" what a photo of a woman or man is (even though I know it doesn't understand in the same way a human might, but I can rely on it to guess correctly) Then I repeat this for all kinds of different faces or characteristics, like age, nationality, etc.

5. Assuming I eventually get this facial recognition AI model and algorithm working reliably, maybe I create an application that uses it for medical diagnostics. Or maybe an app that uses it for security purposes.

You probably can already find shortcomings in this process.

How to confuse machine learning

CHIHUAHUA OR MUFFIN SERIES. (n.d.). Karen Zack 🖥 Creative™. Retrieved April 8, 2024, from https://www.karenzack.com/work/recognition-series

Nesher86. (2021, May 14). *How to confuse "Machine Learning"* 🙂 [Reddit Post]. R/ProgrammerHumor. www.reddit.com/r/ProgrammerHumor/comments/nceia0/how_to_confuse_machine_learning/
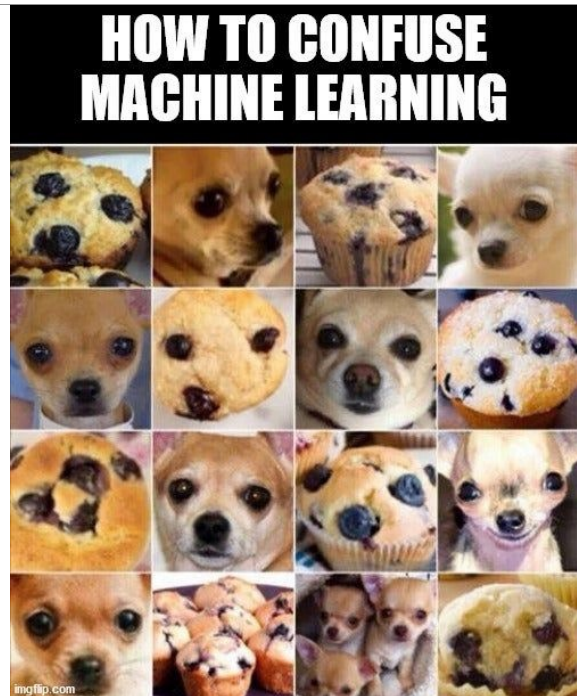
The original image **"Chihuahua or muffin?"** by Karen Zack was reinterpreted as an insightful jab at machine learning in the meme "How to confuse machine learning" posted by Reddit user Nesher86.

What about people who appear differently in different contexts? Where do all the training images come from? Is it representative of diverse kinds of people? What about the biases of the people validating and training the AI?? Or people who appearance and identity doesn't fall into those boxes?

What if your head looks like a blueberry muffin?

AI's that detect and generate images are different than the language AI. And LLM are much more complex and sophisticated. Instead of looking at the colors and shapes of images, AI generate language by using mathematical representations of the statistical relationships between words.

But the machine learning process is similar. Remember that is a tool. It has idiosyncrasies, strengths and weaknesses.

It is fire. It can cook your dinner and it can burn your fingers. So, its important to understand a little about how it works
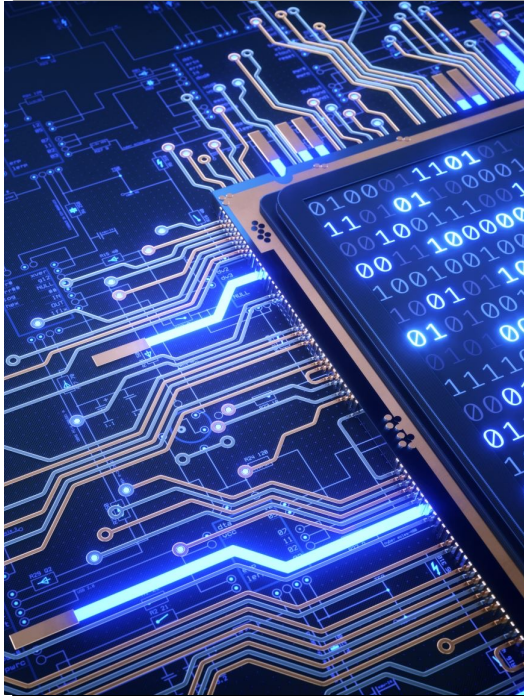
AI-generated language is unique

- Super-advanced auto-complete and word prediction
- Average of enormous amounts of data
- "Randomly" and "statistically" generated
- Little, if any, self-awareness and contextual awareness

AI is "intelligent" in a way that mimics human intelligence but is fundamentally very different from human intelligence.

In the end, LLMs generate language in a unique way. It is quite different from human intelligence.

In some ways "artificial intelligence" is not a good choice of words to describe what these tools are. They are not intelligent nor have intelligence. But I guess "AI" just sounds cooler, and it stuck.

Human-generated language is unique

- Self-exploration
- Self-expression
- Relating to others
- More than just conveying information

Use AI to enhance human-generated language not replace it.

Humans have many qualities that AI don't, (So far at least)
- We are biologically embodied
- We are each unique and different
- We are part of societies and cultures
- We have personal histories, memories, and psychological experiences.

This all factors in to how we use and generate language.

AI-generated language & Human-generated language

(Image generated by DALL-E, 12/18/23)

I believe they can complement each other.

I'm reminds me of the AIs that play chess. Computers could defeat world champion grandmasters of chess in the 90's. Then why do more people play chess today than ever before? Maybe it's that AIs made it easier for people to learn and become better chess players. And maybe having an AI that could beat anyone, helped people appreciate the value of playing with another person?

So how do you beat an unbeatable AI? Simple, humans teamed up with AI. These days human-AI teams, cyborg or centaur chess teams, can beat those once unbeatable AI or human grandmasters alone.

Another example is going to the gym. We can make robots that are better than humans at lifting things. But it'd be foolish to say "Hey let's invent a way to automate the gym, so the weights lift themselves and people won't have to go to the gym anymore." That's not the point of going to the gym! Or of going to school! But we are saying "Can technology make exercising better?" "Can it make going to school better?"

The point here is that I believe that if we communicate to students and hold in ourselves this view that human-generated language is unique and more than just about transmitting information, we might be more inclined to us AI to enhance rather than replace our voices. And that we might more easily view writing or generating language as a way of learning, not just a way to demonstrate learning at the end.

Writing does not equate thinking deeply. Just because a student wrote something, doesn't mean they thought deeply about it. Especially in a world with AI. And conversely, a student can think deeply about something and have great ideas and thinking, but written words alone don't capture that. Especially in a world with AI.

One thought I offer is, how might you make it so that students still learn, even if they use an AI to generate words? If a student has a long rich conversation with a chatbot about ideas for an essay, but in the end, the AI generates some of the words, sentence structure, and grammar that the student verifies, critiques, adapts, and edits. Is the student still learning what you intended? Maybe, depends on what they are learning.

There is no reason anymore why anyone with AI should be turning in an unstructured essay with poor word choice and unclear sentences. A chatbot can do that. But unique voice, original ideas, depth of thought, personal expression, human relatedness, contextual nuance. That is what humans bring to the table, whether writing it themselves or coaxing it from a chatbot.

You won't know until you try.

Which chatbot should we use?

Which search engine should we use in 1997?

A. Excite
B. Yahoo
C. Dogpile
D. Alta Vista
E. Lycos
F. Infoseek
G. Use your phone-a-friend

(Image generated by DALL-E, 1/30/24)

Phone-a-friend : "Dude, whats the name of that movie, where Tom Cruise slides across the floor in his socks and underwear singing that old time rock and roll song!!?? It's been driving me nuts. What is it??"
RISKY BUSINEESSSS!!!!!!

Maybe we've forgotten, but there was a time when search engines first came out, where you couldn't just find the answer to that question. You'd have to maybe put "Tom Cruise filmography", then search each film "synopsis of Far and Away" "synopsis of Days of Thunder" and then even then.

It took a while for search engines to become that sophisticated, and for us to learn how to to use them best. Same with AI. It'll take us time to figure it out, but we will. Best way to do so, is to try it for yourself.

Get in there and try it yourself. That's the best #1 piece of advice I can give you. Try a bunch of different things. Get creative, be weird, push it and see what happens.

Which streaming service should we use in 2020?

A. Netflix
B. Hulu
C. Amazon Prime
D. Disney+
E. HBO Max
F. Kanopy
G. Pirate Bay

(Image generated by DALL-E, 1/30/24)

It kind of depends right? What kind of shows do you like? How much you want to pay? What devices do you use?

Accessing AI chatbots

OpenAI ChatGPT	Google Gemini (aka Bard)	Microsoft Copilot (aka Bing)
• GPT3.5 (good) • GPT4 (better) • Free • Can use Stanford email to create account	• PaLM 2 (good) • Gemini (better) • Free • Use non-Stanford Google account	• GPT4 (best) • Web search • Free • Use non-Stanford Microsoft account

Similarly, there is no one correct answer with AI chatbots. There are the big three (and you might add Anthropic's Claude to that list), which is a good place to start. But there are also many smaller or more specialized LLMs as well. There really isn't a clear answer to which is the best at this point.

For our purposes, which is to gain fluency with AI chatbots, we recommend starting with one of these three.

ChatGPT
ChatGPT, developed by OpenAI, uses the Generative Pre-training Transformer (GPT) large language model. As of July 2023, it is free to those who sign up for an account using an email address, Google, Microsoft, or Apple account. You may also need a valid phone number to verify your account. See **ChatGPT help documentation** for more details.
 Go to **openai.com/chatgpt** and sign up to access ChatGPT.
Bard
Bard, a generative AI chatbot developed by Google, relies on the Pathways Language Model (PaLM) large language model. As of July 2023, it is free to those with Google

accounts. It is not enabled for Stanford University Google Workspace accounts. If you'd like to access this tool, please use your personal Google Account. See the **Bard FAQ** for more details.

Go to **bard.google.com** and sign in with your personal Google account to access Bard.

Bing Chat

Bing Chat, an AI chatbot developed by Microsoft, also uses the GPT large language model. Unlike most other chatbots it can access and search the internet. It is available from within the Microsoft Edge web browser. Sign in to a Microsoft Edge account to allow longer conversations with Bing Chat. See **Bing Chat help documentation** for more details.

Download Microsoft Edge and sign in with a Microsoft account to access Bing Chat.

Try using a chatbot

- Remember to:
  - Jot down your thoughts and feelings
  - Reflect on the chatbots performance
  - Share your experience with others

(Image generated by DALL-E, 3/1/24)

Start with something fun
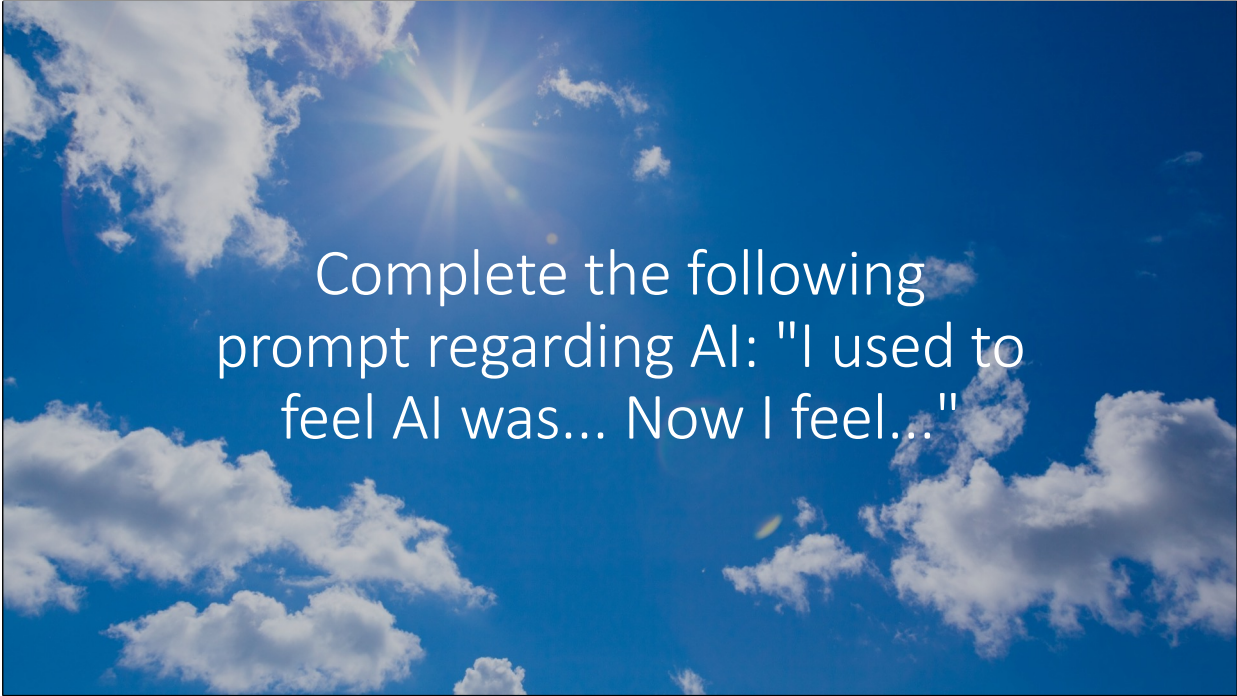
Create a recipe for a new fusion dish

Brainstorm ideas for a vacation to a fantastical world

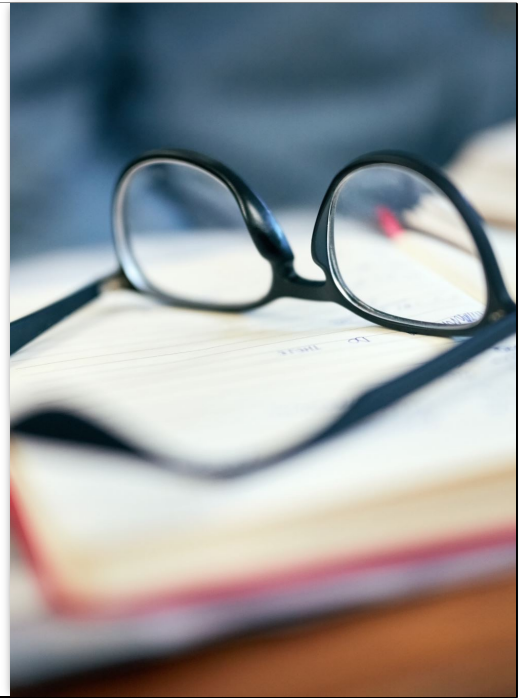Play a guessing game about an interesting trivia topic

Plan a surprise party for a special guest of honor

Continue to engage

- Use AI chatbots for your work tasks
- Read the AI Teaching Guide on the Teaching Commons website
- Attend upcoming CTL workshops on AI
- Talk about AI with colleagues and students

Wrap-up activity

Tinyurl.com/KenjiSurvey

(Image generated by DALL-E, 12/18/23)