# Tech Snacks: Generative AI & Higher Ed

Fear and excitement about generative AI technologies such as ChatGPT and Dall-E have hit the headlines hard in recent months. What is generative AI, and what are the implications for you and your students?

## What is AI?

**Artificial intelligence (AI)** refers to the product that results when a computer is trained to imitate human intelligence and to perform complex tasks in a way that (at least externally) looks similar to the way a human would perform them.

One model of AI training occurs through **machine learning**. In this model, algorithms and statistical models are used to analyze and draw inferences from patterns within datasets, allowing the imitation of human "learning" but on a much broader scale that would be unmanageable for humans. This learning can be "supervised" – the algorithm makes use of identified patterns (through labeled data) to classify new data or make predictions (e.g., classifying spam email, image recognition). It can also be "unsupervised" – meaning the data is unlabeled and the goal of the algorithm is to identify patterns or interesting insights.

**Generative AI** comes into play when an algorithm is designed not only to analyze content but to create new content (e.g., text, images, video, audio) based on the dataset patterns it has been trained on.

## How does generative AI work and what can it do?

Generative AI programs like OpenAI's **ChatGPT** (for text) and **Dall-E** (for images) are trained with massive datasets primarily taken from the internet. Below is a very simplified explanation of the training.

The **ChatGPT** models use a pre-training process that involves the prediction of missing words or the next word in a sequence of words. This process allows the model to learn the underlying structure and relationships between words in natural text, which enables it to generate coherent and human-like responses to prompts. To fine-tune GPT for a conversational chatbot task like ChatGPT, the model was then trained on a large dataset of conversational text, with input-output pairs representing common conversation turns. The model was fine-tuned to predict the most likely response to a given input prompt based on its understanding of the patterns and relationships in the training data.

One of the key learning models behind **Dall-E** works by mapping image-caption pairs and determining how semantically related a "natural language snippet" (caption) is to a visual concept. When you put a text prompt into Dall-E (e.g., "bowl of soup as a portal to another dimension"), it maps the elements of that phrase back to related visual concepts it has encountered.[1] Another key learning model is image-to-image translation, which involves "capturing special characteristics of one image collection and figuring out how these characteristics could be translated into the other image collection."[2] Through models like this, an algorithm can, for instance: apply distinct characteristics like "artistic style" to images.

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[1] https://www.assemblyai.com/blog/how-dall-e-2-actually-works/
[2] https://arxiv.org/pdf/1703.10593.pdf

# What are the drawbacks in the context of Higher Ed?

**Instantly generated papers and images (which can't [yet] be definitively detected by tools like TurnItIn or text/image classifiers)**
Students can generate text for assignments or papers. For example, they can input a writing prompt or topic and use ChatGPT's generated text as their own without proper citation or attribution. TurnItIn cannot definitively detect this writing because it is technically original. Students can also ask Dall-E to create designs (instead of creating them themselves).

**Instantly generated homework and quiz answers (which also can't be detected)**
Students can use ChatGPT directly for answers to homework or test questions, essentially using the tool as a substitute for their own work and independent learning.

**Lack of skill development**
Through the above examples, ChatGPT and Dall-E allow students to complete assignments quickly and with minimal effort, without actually developing their own skills, knowledge, creativity, and critical thinking.

**Misinformation and bias**
Since ChatGPT's output is based on probability, it can produce the same errors and biases as the data it was trained on. ChatGPT "seems" very confident in its answers, which makes it difficult for users to suspect factual errors.

# Are there any benefits?

**Tutoring**
ChatGPT is very adept at modulating its communication for different levels of user expertise and understanding. AI may be able to provide extra support and explanation in content areas where students are struggling. For instance, you can ask it a question and then ask it, "repeat the answer, but explain it like I'm an 8th grader."

**Help with administrative tasks and drafts (when originality is not important)**
For procrastinators and busy people, ChatGPT can provide a draft to start from.

**Image generation for non-designers**
If you need that perfect image for the concept you're trying to illustrate, Dall-E can probably create it, in seconds. No more searching through hundreds of Google images to find the right one.

# What can I do to deal with this as an instructor?
- Create a syllabus statement about your policy on the use of generative AI technologies.
- Be very clear about which tasks may and which definitely do not warrant some use of AI.
- Craft prompts, instructions, and rubrics to emphasize the importance of original thought (ChatGPT often produces vague, fluffy text that may be technically correct but lacks depth).
- Find ways to assess process vs. product (e.g., drafts, peer reviews, discussion videos).
- Hope for more reliable detection tools in the future. 🙂 TurnItIn claims to have a solution coming out soon. In the meantime, here's their [guide for approaching AI generated text in the classroom](#).