Generative AI Guide

What is Generative AI?

Generative AI (GenAI) is a type of artificial intelligence that can create new content—such as text, images, music, video, and even code—by learning patterns from large amounts of existing data. It includes a range of tools that can generate essays, artworks, soundtracks, and more, often in response to prompts given by users. One well-known example is the large language model (LLM), such as ChatGPT, which is designed specifically for understanding and producing human language. However, GenAI goes far beyond text, with applications emerging across design, education, research, and creative work. As these technologies become more common in university settings, it's important for both students and staff to understand their capabilities, limitations, and the thoughtful, responsible ways they can be used. (Source: ChatGPT).

As well as ChatGPT, some other well-known examples of LLMs are:

- Google Gemini
- Microsoft Copilot
- Claude by Anthropic
- LLaMA by Meta.

In addition, there are some popular GenAI tools that generate other types of content:

- DALL-E, Midjourney and Stable Diffusion create images
- DreamFusion converts text descriptions into 3D models
- AlphaFold predicts 3D protein structures.

All of these GenAI tools differ in the size and diversity of the data they were trained on, whether they had cut-off dates for internet access or real-time access, as well as varied strengths and specialisations, with some trained further on specific tasks. Therefore, selection of an appropriate GenAI tool can have a large impact, depending on its intended use.

An account is required to access many GenAI tools, with free and paid subscription account options available. Paid plans often provide access to

the latest, most capable models, have priority access at peak use times and significantly higher or unlimited usage quotas.

How GenAI works

LLMs function as chatbots, where they generate human-like text, with multi-turn conversations where they produce coherent, contextually relevant responses across a wide range of topics.

Some examples of functions LLMs can perform include:

- answering factual questions or explain concepts,
- providing writing assistance,
- generating, reading and editing code,
- translating between different languages,
- summarising long texts,
- analysing information and engaging in step-by-step reasoning.

LLMs **are not search engines**; they generate new text responses based on their training data, while a search engine finds and links to existing information. You should therefore consider the significance this difference could have on the veracity of the results obtained by each method.

GenAI Tools

Many LLMs require you to create an account to access them, and there may be varying levels of privacy risks, depending on how they manage your data.

UCD IT Services have created a guide on the AI services that have been verified for compliance with the university's privacy and IT security guidelines.

This guide also provides information on some of most commonly used GenAI tools, how to access them and some of their specific features.

Drawbacks of GenAI

While GenAI has many advantages and can act as a very effective tool, it is important to be aware that there are a number of drawbacks associated with them.

Hallucinations

> "Fundamentally, large language models are autocomplete systems—like the one you use when texting."

As GenAI tools are not capable of critical thought, they select the next word based on statistical probability, pulling from the massive datasets they were trained on. As a result, they can frequently produce incorrect or misleading information, even if it sounds convincing. These are called **hallucinations**, and it is not always clear how they happen. Therefore, it is imperative that you verify any information provided to you by GenAI tools.

Bias

Generative AI is trained on large amounts of data drawn from internet content, which is inherently biased, and it then adopts and amplifies that bias, reflecting societal prejudices around gender, race, religion and other demographics in its responses.

Privacy Concerns

There is often a lack of transparency around what data a GenAI tool collects, processes, stores and shares, and user input is often used to continue the training of the tool, although many do have options to change data retention and usage for model training. (This page provides instructions on how to do this with ChatGPT, along with other tips for using it responsibly.)

As a result, it is advised that you do not enter any personal or sensitive information while using GenAI tools.

Access Issues

GenAI tools are trained on and access information that is freely available on the internet. As a result, they do not have access to anything behind a paywall, including the large collection of academic texts that the UCD

Library subscribes to. Therefore, the UCD Library is still a crucial resource when completing any research.

In addition, many GenAI tools offer both free and paid subscription accounts. Free accounts often have usage limits, may experience slower response times during peak hours, may not have access to the newest model or be restricted from certain features. This can then produce discrepancies or inequalities between the information available to those who choose not to or cannot afford access to the paid subscription of a GenAI tool.

Information Recall by Users

Just as typing notes bypasses the memory benefits that come from the active mental processing required when writing by hand, over-relying on LLMs for assignments may weaken your ability to recall information because it avoids doing the hard work of thinking through and organising ideas yourself.[1]

Environmental Impacts

GenAI is very energetically expensive to run; although estimations vary and the numbers depend on an AI's size and task, it likely costs 10 times more to have an exchange with an LLM than to perform a standard keyword search.[2]

This is because they have to do many tasks at once in order to generate new text. This requires much more electricity, generated in data centres, leading to increased carbon dioxide emissions. In turn, they require a large amount of water to cool the hardware, and then high-performing computing hardware, which adds indirect environmental impacts through its manufacture and transport.

[1] Why Writing by Hand Is Better for Memory and Learning

[2] Focus: For tech giants, AI like Bing and Bard poses billion-dollar search problem.

Generative AI and Assessment

AI Assessment Scale (AIAS)

The College of Science has adapted a modified version of the AI Assessment Scale (AIAS) to provide clear guidelines to students about whether or not, and to what extent, they can use generative in their assessments, and to promote a culture of transparency around the use of generative AI.

The AIAS consists of 6 levels, ranging from **No AI** use to **AI Exploration**, where AI is used creatively to solve the task of the assessment. Each of the levels is detailed in Table 1.

Table 1. Based on the AI Assessment Scale (AIAS) design assets by Mike Perkins, Leon Furze, Jasper Roe, and Jason MacVaugh (https://aiassessmentscale.com/), licensed under CC BY-NC-SA 4.0. This work has been modified from the original.

Level	Generative AI use permitted	Description
1	**No AI**	The assessment is completed entirely without AI assistance, ensuring that students rely solely on their existing knowledge, understanding, and skills. *You must not actively use AI at any point during the assessment. You must demonstrate your core skills and knowledge.*
2	**AI Planning**	AI may be used for initial research (i.e. activities such as brainstorming, outlining, and information collation). This level focuses on the effective use of AI for planning, synthesis, and ideation, but students complete the assessment independently by developing, articulating and refining these ideas. *You may use AI for planning, idea development, and research. Your engagement with AI stops when you begin to create your submission. Your final submission should therefore be authored entirely by yourself and should show how you have developed and refined these ideas.* *You should keep a comprehensive record of all outputs generated by AI, and may be required to document these as part of the activities, or present them on demand.*
2X	**AI Review**	AI may be used in the same way as for Level 2 (AI Planning), with the addition that an appropriate AI tool may be used to correct grammatical errors and improve the language of text you alone have authored. You must not allow the AI tool to alter the sense of any text, offer a critique of or modify any arguments. The assessor may indicate the specific instruction you are to provide the AI tool with.

3	**AI Collaboration**	AI may be used during initial research plus drafting, feedback, and refinement. Students should critically evaluate and modify the AI suggested outputs, demonstrating their understanding. *You may use AI to comment on and review text you have authored. AI is intended to act akin to an instructor's comments on an essay or thesis chapter. You are strongly advised to critically evaluate the outputs AI provides.* *You should keep a comprehensive record of all outputs generated by AI, and may be required to document these as part of the activities, or present them on demand.*
4	**Full AI**	AI may be used to complete any elements of the task, with students directing AI to achieve the assessment goals. Assessments at this level may also require engagement with AI to achieve goals and solve problems. *You may use AI extensively throughout your work either as you wish, or as specifically directed in your assessment. Focus on directing AI to achieve your goals while demonstrating your critical thinking.* *You should keep a comprehensive record of all outputs generated by AI, and may be required to document these as part of the activities, or present them on demand.*
5	**AI Exploration**	AI is used creatively to enhance problem-solving, generate novel insights, or develop innovative solutions to solve problems. Students and educators co-design assessments to explore unique AI applications within the field of study. *You should use AI creatively to solve the task, potentially co-designing new approaches with your instructor.*

Each assessment/module will be assigned a level from the AIAS, which will define if/how the use of generative AI may be integrated into completion of the assessment.

Note that when Levels 2 to 4 have been selected for an assessment, this not mean you are required to use generative AI while completing your assessment, it is entirely optional, but the selected level specifies the permitted use of GenAI.

Using Generative AI in Assessment

When GenAI use is permitted, from Levels 2-5, and you have used a GenAI tool in the creation of an assessment, you must acknowledge this use and cite it appropriately, in accordance with UCD's Academic Integrity Policy.

When you have utilised GenAI, ensure you cite it correctly, as outlined by the Library Guide on Citing AI.

Regardless of the level of AI use, you as a student are fully responsible for content, quality and integrity of your submitted work. This means ensuring that it meets the academic standards, reflects your own understanding of the topic and complies with UCD's Academic Integrity Policy. Misuse of AI-generated content may be considered academic misconduct and responsibility of the final works rests entirely with you, the student.

Finally, you must also clearly state how you have used GenAI in the process of completing your assessment, by filling out a ***Declaration on the use of Generative AI form*** (available within your Brightspace module) and submitting it alongside your assessment.

Prompt Engineering

The input text or instruction that the user provides to a LLM to elicit a response is known as a prompt. It is important to write a structured, effective prompt for a GenAI tool in order to receive a quality output. This is known as **prompt engineering** and there are a number of prompt methods and frameworks that can be applied to receive quality outputs from GenAI tools. The UCD Library Guide on Artificial Intelligence provides some

examples of frameworks that can be applied in optimal prompt engineering.

Resources

UCD Academic Integrity Policy

UCD Artificial Intelligence Library Guide

- Artificial Intelligence: Prompt Engineering
- Artificial Intelligence: Citing AI

AI features from UCD IT Services

Are you AI Ready? Investigating AI Tools in Higher Education – Student Guide

Quick Guide on Generative Artificial Intelligence in Learning and Assessment (Faculty Guidance).