

CQSD

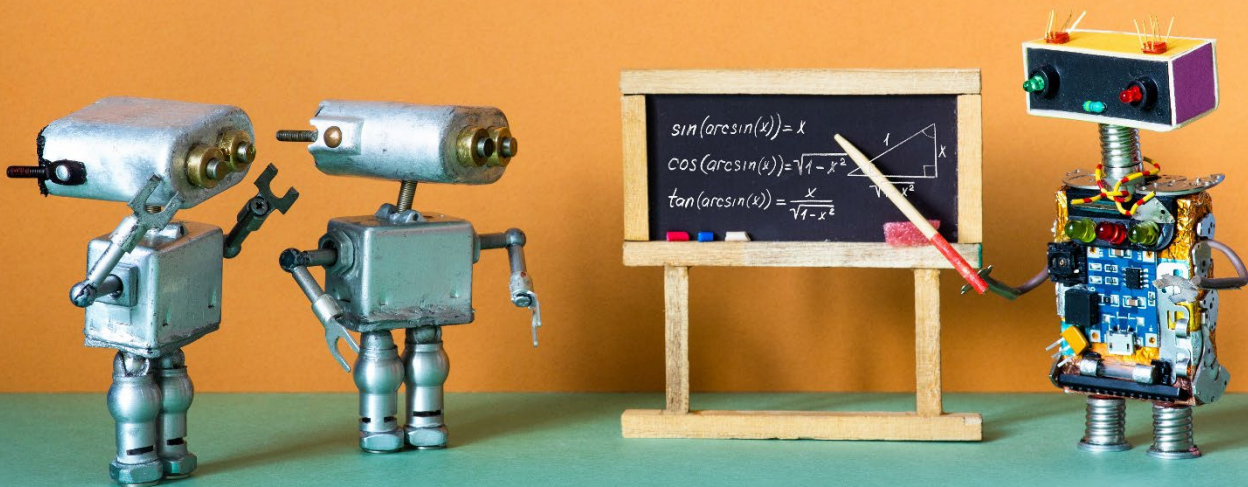
CENTRE | QUALITY SUPPORT
FOR | & DEVELOPMENT



FOCUS ON: GENERATIVE ARTIFICIAL INTELLIGENCE TOOLS

INTRODUCTION TO GENERATIVE AI

V1.0 (NOV 2023)



GENERATIVE AI TOOLS: UNIVERSITY OF READING'S APPROACH

The University of Reading (UoR) is committed to taking a positive and educational approach to the potential use of generative artificial intelligence tools (GAIT) as part of the teaching, learning and assessment activities undertaken by our students.

The University aims to support the use of such tools, where appropriate, to enhance the educational experience and employability of students while at the same time maintaining the high academic standards and integrity of our assessments and awards. Generative AI tools here to stay, and so we must move with the times and ensure that our teaching and assessment methods, and the support we provide to our students in using such tools effectively, reflect the modern world.

GETTING STARTED WITH GENERATIVE AI TOOLS

This introductory guide is designed to demystify Generative AI tools for staff, highlighting their benefits and their limitations, offering recommendations for their use, and concluding with some Frequently Asked Questions (FAQs).

This guide is a joint creation of the [University's Generative AI Working Group](#) and [CSQD](#). It serves as an introductory piece in our series focused on the use of GAIT in Higher Education (HE). Given the dynamic and fast-paced advancements in this field, our guidance will be regularly revised and updated to stay current. Each guide includes a version date, indicating the relevance of the information at the time of publication.

PRINCIPLES TO SUPPORT THE USE OF GAIT

The University Board for Teaching, Learning and the Student Experience (UBTLSE) has identified the following principles to guide the UoR approach to supporting the use of GAIT and in developing institutional policy:

- Appropriate and positive use of generative artificial intelligence, along with an informed and critical stance regarding its role in society, will quickly become woven into the fabric of the attributes expected of a graduate.
- An open and collaborative approach to using GAIT will be essential as the technology and its application in education evolves.
- Institutional guidance and policy on academic integrity and, in some cases, assessment design, will need to adapt to ensure that our sector-recognised academic high standards are always maintained.

As such, it is recognised that:

1. Students will need to be supported to develop critical artificial intelligence literacy alongside other foundational academic skills.
2. Students will need to be supported to use GAIT effectively and ethically in their learning experience, and for formative and summative work.
3. Staff will need support to adapt their teaching and assessment, where appropriate, to incorporate the inclusive and accessible use of GAIT.

UoR Position Statement

The University's [position statement regarding GAIT](#) effectively draws on recently published guidance in the sector.

It is recognised that the use of GAIT represents a rapidly evolving paradigm shift in many sectors and therefore agility in developing institutional policy and guidance will be essential. It is also recognised that Schools will need to consider the issue and plan in the context of their own disciplinary pedagogies and assessment practices.

WHAT ARE GENERATIVE AI TOOLS (GAIT)?

Generative AI is a form of Artificial Intelligence (AI).

"Artificial intelligence leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind" – [IBM, 2023](#)

This broad definition includes various types of AI, ranging from basic rule-based systems to complex neural networks.

Narrow or weak AI is a term used to describe a system which can respond to a particular set of inputs by following established rules. These systems are constrained to only address

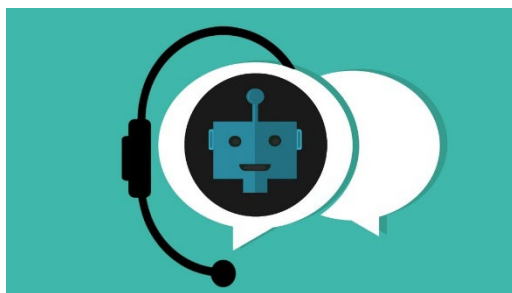
problems in certain, restricted domains, rather than being able to apply knowledge from one domain to another in the way that the human brain can. By contrast, general AI (also known as **Artificial General Intelligence** – AGI) can reproduce this cross-domain thinking much like a human being, however AGI has not been achieved at the time of writing.

Artificial intelligence tools are often programmed to respond in a way that *appears* human.

We sometimes speak of narrow-AI being ‘trained’ on **datasets** to mean that the tool has been exposed to a large relevant dataset (e.g., words being said, images, etc.) and programmed to respond based on the patterns within that dataset. It is important to understand that the training dataset places limitations on how the narrow-AI tool responds and may introduce biases into its responses. These narrow-AIs are sometimes referred to as **large language models**.

A defining feature of narrow-AI models is that they can only respond in particular ways by performing a limited set of pre-determined tasks. Yet these are rapidly developing and have quickly become embedded into our everyday activities as they aid productivity. Current examples of narrow-AI include:

- Voice-activated assistants like Siri, Alexa or Google Assistant which can respond to user voice prompts to search the internet or make phone calls.
- Microsoft Office's 'Editor' tools which assist in refining and editing documents.
- Medical imaging software tools that analyse patient X-rays to detect specific anomalies, such as cancers.
- Productivity tools like inbox management features, or chatbots which operate by selecting from a predetermined set of phrases.



Generative AI is typically considered an example of **narrow AI**, **yet it can produce new content**, based on patterns it has learned from large datasets. 2023 has seen a rapid evolution in the development of a wide range of generative AI tools (GAIT – see opposite).

- Typically, a generative AI will generate output that is like the training dataset, where the perceived originality stems from the AI's use of advanced statistical methods to formulate plausible responses.
- The output can later be refined with further prompts to improve the quality and/or usefulness of the output.

Typical GAIT outputs

GAIT are capable of providing a range of outputs in response to user prompts and queries, including:

- Written text in multiple formats e.g.: essays, presentations, revision questions, exam scripts, summaries of other written texts, essay plans, lesson planning materials
- Images
- Videos
- Audio
- Computer code
- Solutions to mathematical and engineering problems

Users can also ask to improve a piece of text they are writing, requesting that certain aspects are improved, e.g., clarity, structure, flow and use of language.



Some GAIT examples include:

[OpenAI's ChatGPT](#)

[PerplexityAI](#)

[Google Bard](#)

[Microsoft Co-pilot \(formerly Bing-Chat\)](#)

[OpenAI's DALL·E \(for creating images from text descriptions\)](#)

[Midjourney \(image creation\)](#)

[Synthesia \(text to video creation\)](#)

Some GAIT are ‘trained’ by providing them with access to the internet meaning that they are not susceptible to the limitations of models trained on fixed/static data sets.

Many tool providers are now incorporating elements of narrow-AI or generative-AI into their products to the extent that it may become increasingly difficult to know if a given piece of software has these features without extensive investigation.

In many instances, user prompts or data, including refinement requests from users, is then stored by GAIT and used to further train the algorithms; this raises concerns over the ethical use of GAIT, intellectual property and ownership of sensitive data. Ethical considerations are discussed below.

BENEFITS OF GAIT FOR STAFF AND STUDENTS

There are several reasons why staff and students would benefit from embracing the productivity gains offered by GAIT, for example:

1. Using GAIT can reduce the time spent working on documents either through reduced editing time or support in starting a piece of writing e.g., the user can request support from GAIT in developing an outline plan, setting a clear direction from the outset.
2. In some instances, GAIT can improve quality and provide support to learners by summarising, paraphrasing and providing different perspectives on new ideas.
3. Learners can use Generative AI to create revision materials including questions to test themselves with, whilst staff can use the tools to create materials for revision sessions or assessment support sessions e.g., give an example of a poor essay for students to read through and compare to a good essay.

Please do refer to our [additional guides on GAIT](#) which cover their benefits in greater depth.

LIMITATIONS OF GAIT AND THEIR IMPLICATIONS FOR STAFF AND STUDENTS

GAIT models are only as good as the data on which they have been trained, and the prompts which have been inputted. Factual errors can and do occur.

Significant issues associated with GAIT:

1. Bias – political, racial, gender and cultural bias towards views from the northern hemisphere bias as this is where most of the information the tools have been trained on, was created. Consequently, some outputs can be discriminatory.
2. GAIT can create content that is factually incorrect or otherwise nonsensical, meaning that all output needs to be independently verified and critically evaluated by the user. (GAIT is said to ‘hallucinate’ here when it produces false information, and the false information provides is referred to as a ‘hallucination’).
3. Some have only basic features available for free accounts and more sophisticated features for subscribers; this has the potential to disadvantage some students unless care is taken to carefully set tasks which can achieve high grades using free to all versions.

In addition, the following limitations of GAIT should be noted:

- Not all GAIT models are continuously trained on new data and information e.g., ChatGpT3 is trained on data only up to 2021. Internet Chatbots such as Bard and Co-pilot can access more recent information as they are connected to the internet.
- While these tools can spark new ideas by suggesting options a user may not have thought of, their outputs are essentially variations on pre-existing knowledge. They do not necessarily provide guaranteed original insights or content.

“They (GAIT models) predict the next word from approx. 1,500 preceding words. They are *stochastic parrots*, and not so different from a very well read but dull human being”. – [Philippe De Wide, 2023](#)

- Such tools are not able to reflect on real world situations or specific case studies.
- Some can provide sources for the information provided, others do not, whilst some create fictional sources (‘hallucinations’). Microsoft’s Co-pilot will find sources for users which are contemporary but when prompted to use them to write an essay, informs users this would be unethical!
- They cannot access module specific information or other information on Blackboard unless the user provides access to it.

RECOMMENDATIONS TO STAFF

If you haven't already, have a play with some of the tools such as ChatGpt, Co-pilot, DALL·E and Bard.

Access these tools via the links provided on Page 3. As previously mentioned, some of these tools are free, some require a paid subscription (but may offer a free trial period). All of them require you to create an account and they are relatively user-friendly and easy to get started with. Begin with a basic query related to your field or your published research. Familiarising yourself with these tools in your area of expertise can quickly reveal both the benefits and the limitations of GAIT:

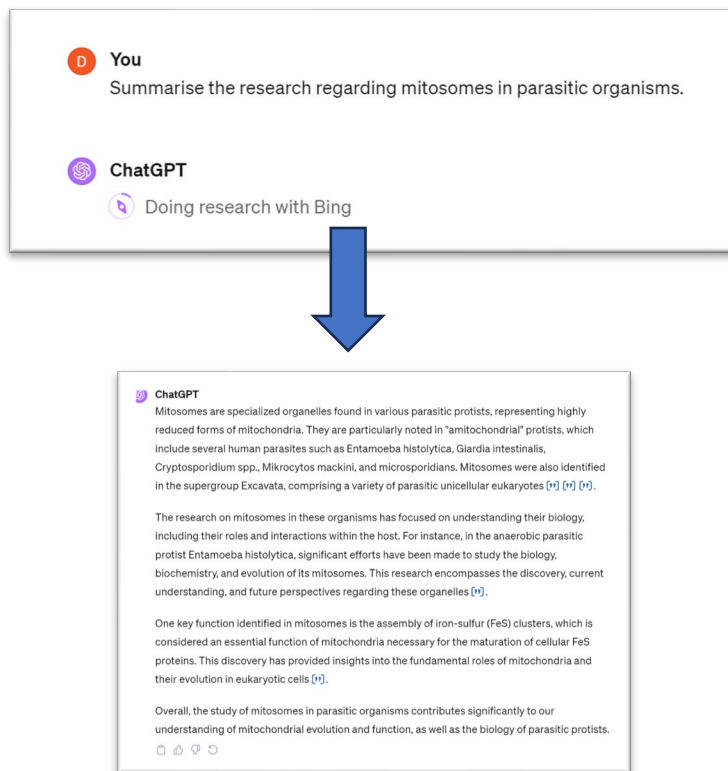


Figure 1: Running a query in ChatGPT4 related to a highly specific research area. ChatGPT outputs a summary with links to a selection of relevant publications and a Wikipedia article. Whilst the summary is initially informative, further prompts are needed to delve deeper. Notably, the referenced publications are not the most foundational in the field, which would be more appropriate for a high-level summary.

As you become more confident in using GAIT, see if these tools are useful for your own teaching and learning practice. For example:

1. Input assessments similar to what you would give students and observe the results.
2. Use GAIT to generate multiple-choice questions for your students as part of their revision practice.
3. Create session plans for your teaching.
4. Summarise research articles.

Once you've got some outputs, ask the generative AI tool to enhance and refine these. You can achieve this by improving your prompts, making them more detailed and context rich. For optimal results, it's advisable to refine prompts within the **same** chat session, allowing the GAIT model to use the history of your queries for better responses:



Figure 2: Refining GAIT outputs

There are [several resources online](#) on how to craft effective GAIT prompts. An excellent guide regarding this is offered by [Eager and Brunton \(2023\)](#).

The more familiar you become with these tools, the more use you can gain from them, as well as an awareness of their limitations. [Engaging in 'chats'](#) with the tools can offer a practical way to understand their functionality. You might also use them to learn new things e.g., how to create an Excel pivot table or tips on making the best roast dinner!

Additionally, have conversations with colleagues about their use and experiences of GAIT and create shared resources and documents so that as a team, you can find the best tools and uses of generative AI for your discipline.

Support for using GAIT in HE extends beyond the university, such as webinars, podcasts, expert advice, and guidance from various institutions. Notably, the University of Kent offers "Digitally Enhanced Education" webinars with global experts, with bite-sized recordings on their [YouTube channel](#).

FREQUENTLY ASKED QUESTIONS

What is the University's position on GAIT use in teaching and learning?

The University has published a [position statement on GAIT](#). This statement is hosted on the [CQSD website area dedicated to Artificial Intelligence](#).

Do I have to use GAIT in my learning and teaching?

Not all staff will want to or be able to use GAIT in their teaching, however, agreements should be made about when and where in each programme students will have opportunities to use GAIT to ensure they understand its: capabilities, limitations and how to use it ethically.

Should I turn all my assessments into in-person assessments to guarantee that they are the students work?

This is not necessary and there is still a place for coursework as a valid tool for assessing learning. However, greater care must now be taken when designing the assessment and mark scheme or marking rubric to ensure that appropriate skills and attributes are rewarded. [The University is committed to increasing the use of authentic assessment and reducing reliance on in-person examinations or class tests](#).



Figure 3: A conceptual image generated by DALL-E representing FAQs about the use of GAIT in HE.

If I talk to my students about GAIT will they all start to (mis-)use these tools?

The student body already has a high level of awareness of GAIT. By openly talking about GAIT use and how it might be used responsibly within your discipline context you can promote appropriate scholarly use of GAIT as a learning tool.

Can I allow or prohibit my students from using GAIT in their studies?

Students are going to use freely available tools to aid their studies anyway, a blanket ban would be inappropriate and artificial, a bit like banning them from using MS Word. Our role is to identify appropriate use of GAIT in suitable contexts. For example, guiding our students to use GAIT to support their learning, and providing clear instruction around when it can or cannot be used in assessed tasks.

How can I help my students use GAITs appropriately?

If GAIT use is appropriate, e.g., when engaging with formative non-assessed tasks, then a range of scholarly uses should be modelled to students and feedback provided on their use of these. For example, in a lecture one could use a GAIT to generate some prompts for investigation and then use these as a starting point for critically evaluating the information provided and appropriate subsequent activities.

How do I let my students know that they can use GAIT in their assessed work?

If you decide it is appropriate for students to use GAITs in their assignment this must be clearly stated on the assignment brief. The University has introduced three categories for the use of GAIT in assessments which can be found in our [Generative AI and Assessment guide](#). By default, if no mention of GAIT is made then it is prohibited. It is good practice to enumerate the range of ways you are expecting students to use GAIT and how they might evidence this in their work, as well as how they have critically reflected on and subsequently used this content.

References and further reading

Eager, B., & Brunton, R. (2023). Prompting Higher Education Towards AI-Augmented Teaching and Learning Practice. *Journal of University Teaching & Learning Practice*, 20(5). <https://doi.org/10.53761/1.20.5.02>

IBM. (n.d.). Artificial Intelligence. Retrieved November 23, 2023, from <https://www.ibm.com/topics/artificial-intelligence>

Times Higher Education. (n.d.). Introduction to Prompting Generative AI: ChatGPT for Teaching and Learning. Retrieved November 23, 2023, from <https://www.timeshighereducation.com/campus/introduction-prompting-generative-ai-chatgpt-teaching-and-learning>

UK Council for Graduate Education. (2023, April 21). Generative AI, ChatGPT, and the Impact on Postgraduate Work [Video]. Retrieved November 23, 2023, from <https://ukcge.ac.uk/resources/resource-library/generative-ai-chatgpt-and-the-impact-on-postgraduate-work>

University of Kent. (n.d.). *Digitally Enhanced Education Webinars* [YouTube channel]. YouTube. Retrieved November 23, 2023, from https://www.youtube.com/channel/UCDs-c_TX9GUIA3ODjlbayYQ

Published Nov 2023. This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

