# Generative AI Guidance for Staff in Teaching and Learning

# Who is this guide for?

Any member of staff involved in teaching and learning as it relates to undergraduate, postgraduate and apprenticeship programmes. UEA has a Generative AI Policy which should be read in conjunction with this guidance document. Partner institutions can use and adapt this guide as required.

# Introduction

Generative Artificial Intelligence (AI) for our purposes is defined as any type of artificial intelligence system that identifies patterns and structures in data / information / material and generates content, including: audio, code, images, text, simulations, and videos in response to instructions (‘prompts’) that resembles human-created content. Generative AI tools can be trained on large language models (LLMs). These models are the algorithmic basis for generative Al tools such as ChatGPT and Gemini.

Machine learning has been in existence for a number of years, and it is common in software such as spelling and grammar checking. However, the rapid and ongoing development of generative AI tools which are able to replicate natural language and generate content has had a disrupting effect in the education sector. It is neither possible to avoid, nor outrun AI.

It is clear that most HEIs consider that simply prohibiting AI is neither a viable strategy nor an appropriate response to these developments - students will inevitably come across such technologies in their future and will need an understanding of their strengths and limitations.

There are a number of perceived opportunities and challenges on the use of AI in higher education.

## Opportunities

* + Developing awareness of and skills around academic integrity.
  + Articulating the attributes of our students which are independent of AI, e.g. critical thinking, self-reflection, tolerance, thought and action.
  + Diversifying assessment to focus on core competencies (however, need to ensure that students have an understanding of the potential uses of AI in their specific disciplines).
  + Providing students with advice and tools that can support/accelerate their learning and achievement of (existing and future) learning outcomes.
  + Providing new opportunities for judgement-free tailored instruction for students from disadvantaged backgrounds or with lower starting skill levels to level up their learning.
  + Speeding up analysis of data. Automating repetitive processes. Researching into the use of AI.

## Challenges

* Understanding the different types of AI which currently exist and monitoring new and evolving developments.
* Student use of AI inappropriately to generate complete responses to assessment items. This would make it seem that students have achieved more learning that is actually the case.
* Ensure that assessment is meeting the right learning outcomes to provide our students with skills which are independent of AI, or where AI is not intended to replace.
* Where developing AI skills are themselves a learning outcome ensure that it is appropriate.
* The use of AI may become paid for (advanced features already are) - therefore if the use of AI is a learning outcome there may be financial liability for students and/or the institution.
* Current language models (that are free of charge) are not 100% accurate in the content generated or the references provided, and their accuracy may depend on subject. This will improve in time and with premium (paid for) versions.
* Potential adverse effects from teaching students how to use AI in terms of overreliance on generative AI for assessments.
* Unequal opportunities for students with disabilities and SPLDs if there is an overreliance on Generative AI tools and no support on specialist software such as voice recognition etc.

# The Technology Available

Machine learning has been in existence for a number of years, and it is common in software such as spelling and grammar checking. However, the rapid and ongoing development of generative AI tools which are able to replicate natural language and generate content has had a disrupting effect in the education sector.

Generative AI is a sub-group of AI which creates new content, including images and diagrams rather than analysing existing data. Examples include Generative Pre-Trained Transformers (GPT). It should be noted that GPTs are not strictly AI but represent travel towards it.  They work on text based prediction algorithms and are trained on databases and then with human interaction.

The output from Generative AI can contain errors, bias, misinformation, missing information, and hallucinations (false information). Everyone who uses Generative AI should always check the content against their own knowledge and understanding. This is an essential part of the development of critical thinking skills. One way to get better information out of the AI tool is to understand more about hallucinations, why they occur and how to mitigate. In this [short clip](https://www.youtube.com/watch?v=cfqtFvWOfg0) an IBM representative covers hallucinations.

Generative AI technology continues to develop rapidly. Tools such as ChatGPT, Copilot, Google Bard, Wordtune and Quilbot are becoming widely known. Not all services are free, and some products have premium paid for functionality (freemium).

## Microsoft Copilot

UEA staff and students are currently able to access a limited version of Microsoft Copilot included in the Edge browser through the UEA Microsoft Licence. Provided the staff member is logged into Edge using their UEA account, Copilot provides commercial data protection, ensuring chat prompts and responses are not saved and consequently are not used to train underlying AI models. A green shield is shown to indicate this; if that shield icon is not shown, you will need to sign in with your UEA account. The Copilot App available separately for download on other devices automatically links to the users’ Microsoft account; when logged in with a UEA account it provides the same functionality and protection. Staff members must abide by relevant University policies regarding information classification and data management to ensure privacy and confidentiality are maintained.

There is a useful [AI Tools Directory](https://aitoolsdirectory.com/) where you can find details of the available tools and a description of how they can be used and whether they are free or freemium.

## I want to use a specific AI tool for teaching and learning, what do I do?

ITCS have outlined the steps that are necessary to obtain approval for the proposed use of a Generative AI tool by the Information Compliance Team (to ensure compliance with Data Protection legislation) and ITCS (to approve the security of the tool) in support of this Policy. ITCS issued notice of this approval process in their guide ‘[Harnessing the Power of Generative AI: A Guide for University Academic Staff](https://my.uea.ac.uk/news/article/harnessing-the-power-of-generative-ai-a-guide-for-university-academic-staff)’:

# Exploring ChatGPT as an example tool

[ChatGPT](https://chat.openai.com/?model=text-davinci-002-render-sha) is probably the tool which has received the most attention since January 2023. ChatGPT only has access to data up to 2021 and does not ‘scour’ the internet. It cannot access anything which is behind a paywall. Experiences of those who have used it to generate answers to essays have shown that it can produce reasonable answers to level 3 and 4 higher education written assessments. However, there are limitations:

1. The narrative while clear, is often unsophisticated
2. The question is referred to often within the response
3. The main ideas lack nuance
4. The insights are superficial
5. References are dated, or they are hallucinations (false information)
6. Key references are often missing

# Detection of AI generated content

You can sometimes detect AI generated text by experience of looking at the outputs. There is often a superficial narrative, the essay question is often referred to throughout. Often points are made several times but re-worded. References are often false, or key sources for your subject area are often missing.

There are detection tools available. You can use [ZeroGPT](https://www.zerogpt.com/), there are also tools available from TurnitIn, but Blackboard has recently stopped developing detection tools as they are unreliable. Detection tools should be used with caution due to reported inaccuracy and, as with other screening tools, merely one factor in potentially identifying submissions which warrant further investigation. The tool will not be able to differentiate legitimate use of Generative AI. UEA is not investing in an AI detection tool due to their unreliability.

By far the best way to limit the inappropriate use of generative AI in your students is training. The library have produced a [training guide for students](https://sites.google.com/view/firstassignment/finding-and-using-information/types-of-information/ai-tools?authuser=0), but there are activities you can do to support this.

* Show tools such as ChatGPT and Copilot to students and run question and example assessment though it.
* Ask the students to criticise the outputs and uncover the flaws
* Make sure that students know that if they use it within their work, that they must reference the contribution made.
* Make sure that students know that they cannot copy and paste AI generated content (when it is not part of the assessment design itself).
* Remind students of the Plagiarism and Collusion Policy which states “*While you are permitted to use artificial intelligence software to help you understand material and how that can be expressed, you are not allowed to use that software to complete the assessment (or any part of it) for you. If you use artificial intelligence software to complete the work for you, that will be plagiarism. In some cases, it will reach the level of contract cheating Policy point 5 pg 3*”

# Referencing AI Contribution

A general overview use declaration (in the submission declaration) in which you explain in general how technology assistance was used e.g. “I have used word processing and spell check as well as the reference sources cited in the reference list and …)

Specifically, when you would cite a human (for the idea, exact or general wording) then cite the technology:

Author of AI model used. (Year of AI model used). Name of AI model used (Version of AI model used) [Type or description of AI model used]. Web address of AI model used

§ E.g., OpenAI. (2022). ChatGPT (Dec 20 version) [Large language model]. https://chat.openai.com/

And a screenshot of the full thread of the cited AI interactions pasted to an Appendix.

# Staff Practice and Usage

There are a number of ‘green light’ approaches which can be used by staff. These have been grouped as teaching design, content creation and assessment.

# Generative AI for teaching design

Ideas for teaching design often come through speaking with colleagues and investigating the pedagogical literature. Generative AI can be used to generate lesson plans, surface new ideas and approaches.  An example creation is in Box 1 taken from biology.

**Box 1**

I asked ChatGPT the following question “create a discussion scenario for a seminar for higher education students in the area of single cell protein”.

**Discussion Points:**

**1. Understanding Single-Cell Protein:**

* What exactly is single-cell protein (SCP), and how is it produced?
* How does SCP compare nutritionally to traditional protein sources like meat, soy, and legumes?
* What are the potential environmental benefits of SCP production, such as reduced land and water usage?

**2. Technological Advancements in SCP Production:**

* How has biotechnology and fermentation played a role in advancing SCP production?
* Are there specific microorganisms that are more efficient at producing high-quality SCP?
* What are the challenges associated with scaling up SCP production to meet global demand?

**3. Food Security and SCP:**

* How can SCP contribute to addressing food shortages in regions with limited resources?
* Are there cultural or social barriers to adopting SCP as a protein source in different parts of the world?
* What role can SCP play in sustainable diets and reducing malnutrition?

**4. Economic and Societal Impacts:**

* What is the economic feasibility of incorporating SCP into the food supply chain?
* How might the growth of the SCP industry impact traditional livestock and agriculture sectors?
* Are there potential job opportunities and challenges related to SCP production and distribution?

**5. Consumer Acceptance and Perception:**

* How can consumers be educated and encouraged to embrace SCP as a viable protein source?
* What are the psychological factors influencing consumer perceptions of SCP?
* Are there lessons to be learned from the introduction of other alternative protein sources, like plant-based meats?

**6. Regulatory and Ethical Considerations:**

* What regulatory hurdles or standards need to be established for SCP production and marketing?
* Are there ethical concerns regarding the use of microorganisms for mass protein production?
* How might SCP intersect with debates about genetically modified organisms (GMOs) and bioengineering?

**7. Future Outlook for Single-Cell Protein:**

* What are the potential breakthroughs and innovations that could shape the future of SCP?
* How can interdisciplinary collaboration drive research and development in this field?
* Can SCP play a pivotal role in achieving the United Nations' Sustainable Development Goals related to food security and sustainability?

**My evaluation:** The response was well considered, but it was more a discussion plan, than a scenario. There were interesting questions which I could use to frame a 50 minute discussion, using pair and share techniques or stakeholder role play. I would need to change my prompt to ensure the output was more aligned to a scenario.

# Generative AI for content creation

Generative AI can support you in creating content for teaching. This could involve generating case examples to illustrate concepts or problem-based scenarios which can be discussed in teaching sessions. You could also use it to generate templates, for example letters.

Diagrams and images can also be created, but the AI tools here are often paid for, and run the risk of copyright issues.  There are also tools which will generate online content, but they are not free, and unsupported by UEA.

# Assessment Creation

Generative AI can be used to create assessment questions, e.g. multiple choice questions, but these must be evaluated. An example is shown in Box 2.

Box 2

I asked the question “write a multiple choice question with 5 responses to test knowledge on lichen symbiosis and indicate the correct response”

Question: Lichens are formed through a symbiotic association between fungi and which other type of organism?

A) Algae

B) Bacteria

C) Protozoa

D) Ferns

E) Mosses

Correct Response: A) Algae

**My evaluation**: In this case the multiple choice question was wrong, as lichens can form associations with both algae and bacteria, but the incidences of the latter are quite rare. The actual question was basic.

Another example:

I asked ChatGPT to: ’write a multiple choice question with 4 responses to test knowledge on role played by the principle of separation of powers in the British constitution and indicate the correct response’

Question: What role does the principle of separation of powers play in the British constitution?

A) It ensures that the Prime Minister has absolute authority over the judiciary.

B) It prevents the monarch from having any influence over the legislative process.

C) It helps maintain a balance of power between the executive, legislative, and judicial branches.

D) It grants the House of Commons the power to overrule decisions of the House of Lords.

Correct Response: C) It helps maintain a balance of power between the executive, legislative, and judicial branches.

**My evaluation:** This was a fairly straightforward question and the incorrect answers were well chosen. Whilst ‘C’ was the closest to a correct answer it is not wholly accurate as it fails to acknowledge the more nuanced balance of powers or partial separation which exists in the British constitution. So whilst acceptable could also be used as a teaching tool to prompt a more in depth evaluation by the students.

I then asked ChatGPT the question ‘To what extent is there separation of powers in the British constitution?’

*The concept of separation of powers, as traditionally seen in other constitutional systems like that of the United States, is not as rigidly defined in the British constitution. The British constitution is characterized by a fusion of powers, where the executive (Prime Minister and Cabinet), legislative (Parliament), and judicial (courts) branches are interconnected to some degree. Here's an overview of the extent of separation of powers in the British constitution:*

* ***Executive and Legislative Branches:*** *Unlike some systems, the Prime Minister and Cabinet are drawn from the majority party in the House of Commons, which blurs the separation between the executive and legislative branches. This enables the executive to have significant influence and control over the legislative process.*
* ***Parliamentary Sovereignty:*** *The British Parliament is supreme and can make or change laws without significant limitations from other branches. While this provides some degree of separation, it also means that the executive (government) is accountable to the legislature, blurring the lines further.*
* ***Judiciary and Legislature:*** *The British judiciary is independent and can review laws and government actions for their legality and constitutionality. However, the judiciary's role in reviewing legislation passed by Parliament is limited compared to systems with a more robust separation of powers.*
* ***Cabinet Members in Parliament:*** *Members of the Cabinet are drawn from the Parliament, and this dual role further integrates the executive and legislative branches.*
* ***Constitutional Conventions and Royal Prerogatives:*** *The Crown still possesses certain prerogative powers that are exercised by the executive, which can influence the legislative process. However, many of these powers are now exercised by ministers in the government.*

*In summary, while the British constitution lacks the strict separation of powers seen in some other systems, there are mechanisms in place to maintain a balance between the branches. The British tradition relies heavily on conventions, practices, and historical arrangements that have evolved over centuries. This fusion of powers is based on a delicate balance that seeks to prevent any one branch from becoming too dominant and to ensure accountability.*

My Evaluation: This answer was accurate, in so far as it relatively superficially correctly identified key elements of the principle as it operates in the UK. It did not, however, provide any authority or specific examples to support so whilst correct would be insufficiently detailed and too descriptive to obtain a good mark. Again, this could work as a discussion exercise or a formative assessment task requiring students to improve upon the starting point provided below.

# Marking using Generative AI

Staff can use AI to do some aspects of marking for example:

* Grouping and marking responses to short answer questions or multiple choice where AI functionality is part of a software package used to deliver an assessment and where there remains human oversight.

However:

* Generative AI cannot be used to obtain personalised student feedback on formative and summative assessment. Students can be encouraged to seek ongoing feedback on tasks and assignments, but the justification of a mark should be a human judgement.

# Assessment Design

There is no going back from this point. AI tools are only going to get better and we cannot outrun the pace of change. We need to re-think assessment design. In the first instance staff should consider using Blooms Taxonomy within assessment design and use assessment to evidence higher order thinking skills around creation and evaluation where it is harder for AI to respond appropriately at this time.

Blooms Taxonomy

|  |  |
| --- | --- |
| Create | Combining parts to make a new whole |
| Evaluate | Judging the value of information or ideas |
| Analyse | Breaking down information into component parts |
| Apply | Applying the facts, rules, concepts and ideas |
| Understand | Understanding what the fact means |
| Remember | Recognising and recalling facts |

There are two strategies for re-thinking assessment design:

1. Designing out
2. Designing in

# Designing out

## Alternative formats for assessment

Summative assessment which solely focuses on writing down information is the most easily replicated by AI. Students could be asked to write podcasts or have assignments which require video or recorded speech. These approaches could be combined together in a multimedia project or portfolio.

## Oral/in person assessments

Assessments which have an oral component, for example presentations, vivas, poster sessions and in class competency testing are not as easily replicated by AI. However it should be noted that there are some Generative AI tools which do produces images, diagrams and posters. Students could be asked to upload video of them talking through a poster or an infographic.

Viva-voce assessments can be scalable with 5-15-20 minute slots, feedback can be instant. A detailed marking rubric can be shared with students in advance. The sessions can be recorded and moderated. If you use this approach then you should consider ways to scaffold the approach and train students progressively in this skill. You will also need to be aware of students with reasonable adjustments where a viva could not be an appropriate method of assessment.

## Object and data reflections

Students can be asked to critically analyse and reflect on pieces of data, they could interpret physical objects or artefacts. This could be in person, or it could be recorded.

## Experiential learning

Students can be asked to work on case studies or problem based learning activities which require the generation of new knowledge, creative design or the development of products or resources.

## Proctored assessments

These are the use of invigilated exams or a test in class. However we would discourage the use of these unless there are strong pedagogical reasons and are delivered as part of a suite of assessments to diversify experience.

# Designing In

This is where we embrace generative AI within assessment tasks. We must prepare our students for when they encounter AI in the workplace.

Think of a task where students are tasked to use generative AI to obtain a piece of writing on a specific topic then:

* Get the students to think about the prompts they are using to generate the content
* Get the students to critique the output in terms of structure
* Ask the students to identify the flaws in the content for examples, hallucinations (false information) and bias
* Ask the students to assess the content in the light of their own knowledge and understanding
* Ask the students to follow up the references, see if they are genuine and if they reflect the key sources.

You can also obtain answers to example test in class or exam questions to be shared with students to evaluate the strengths and weakness of generative AI content.

If you would like more support in assessment design visit the CHERPPS [PebblePad Training Page](https://v3.pebblepad.co.uk/spa/#/public/ggkmntdG7wZgMd86c6ym59479W?historyId=iO3OZY8Syj).

## Generative AI as mentor

Encourage students to get ongoing feedback on assignments and tasks and get them to reflect on the feedback against their own knowledge and understanding and report on the guidance which has been provided and how they may or may not include it in their work.

# Where Generative AI should not be used

There are a number of ‘red light’ activities where staff should not use Generative AI

* Generation of letters to students or other staff including personal data and information. This is because the software will store data and information and potentially use it for other content.
* Generation of personalised student feedback on formative and summative assessment. Students can be encouraged to seek ongoing feedback on tasks and assignments, but the justification of a mark should be a human judgement.

# Generative AI in Research Projects

Our students on taught programmes will be conducting research, especially in their final year of study.

1. Students should not input research data into an AI tool unless it is an agreed part of the research project.
2. Students should not enter personal information into an AI tool unless permission has been obtained and there has been ethical approval.
3. Students will need instruction on the difference between feeding a transcript/observation notes/participant diary into e.g. NVivo, and feeding it into AI which could use it to generate further material.

# Developing Graduate Attributes as Relates to AI

When designing content and assessment we must consider learning outcomes and graduate attributes as they related specifically to the use of AI.

### Critical thinking-thought and action

Students should be able to take a piece of Generative AI text, diagram, image or code and check this against their own knowledge and understanding of a topic or area. They need to critically assess the origins and the authenticity of the content.

### Self reflection

Encourage students to use generative AI to identify ways that they could improve areas of feedback on previous assignments. Students can also use Generative AI to provide feedback on their work and identify areas for improvement at the editing stage.

Digital literacy

The use of AI in the workplace is going to expand and We should develop confidence in our students to be able to use AI tools, how to generate input questions to get the best outputs and evaluate what they do well, and where there are limitations.

### Integrity

We should discuss with our students the ‘authorised green light’ activity when it comes to use of AI in assessment. Students should be encouraged to look at assessment briefs for specific assignments and engage with discipline specific uses.

### Ethical awareness

Students should be aware of issues such as job displacement, exploitation, authorship, bias and misinformation.

Research skills

Help students develop skills in identifying research questions, and assessing the outputs

Problem solving. Students can generate outlines that are then used as the basis for deeper research and investigation. Encourage synthesis of sources by getting students to integrate other sources to support or refute generated output.

Organisation

Generative AI can be used to create study and work schedules allowing students to create personalised study plans or group work schedules.

# Acknowledgements

We acknowledge the kind contribution which the University of St Andrews have made in allowing us to replicate some of the content from their staff guide.

# Further Resources

There are plenty of ideas in the community on how to effectively use AI for teaching and learning, [101 creative ideas to use AI in education-a crowdsourced collection](https://zenodo.org/record/8072950) is one example.

[Should AI be used to assess research?](https://www.nature.com/articles/d41586-022-03294-3)

[ChatGPT listed as author on research papers](https://www.nature.com/articles/d41586-023-00107-z)

[Introduction to ChatGPT and ChatBots](https://ineqe.com/2023/03/29/guide-to-chatgpt-ai-chatbots/)

[AI Tools Directory](https://aitoolsdirectory.com/)

[Trusted Research](https://www.npsa.gov.uk/trusted-research)

<https://beta.jisc.ac.uk/blog/researchs-ai-future-is-nearly-here-are-we-ready>?