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Introduction to the use of generative AI tools in teaching

This resource provides 10 ideas on the use of generative artificial intelligence (AI) to support students in their learning, together with suggested responses for teaching.

Generative AI can have many creative uses beyond simply generating text in response to prompts in a chat interface. However, many of these come with limitations that are not always immediately obvious. This advice assumes you may already have some experience in using generative AI tools like ChatGPT, Claude, Bard or Bing. If not, please refer to our [Beyond ChatGPT: The state of generative AI in academic practice](https://www.ctl.ox.ac.uk/beyond-chatgpt) report for an exploration of their capabilities.

The activities below may be used in Oxford’s different teaching settings (tutorials, classes, seminars, lectures etc) either before, during or after class, to develop understanding of the opportunities and pitfalls of using generative AI tools in academic practice.

## Generative AI tools and plagiarism

Students should be aware that AI tools cannot replace human critical thinking or the development of scholarly evidence-based arguments and subject knowledge that forms the basis of their university education.

Students using AI during their studies must learn and practise the same academic skills of note-taking and clear attribution which are safeguards against plagiarism, ensuring clear differentiation of their own work from any text or material derived from generative AI tools. Unauthorised use of AI falls under the plagiarism regulations and would be subject to academic penalties in summative assessments.

Where the use of generative AI in preparing work for examination has been authorised by the department, faculty or programme, students should give clear acknowledgment of how it has been used in their work.

## Ten ideas on the use of generative AI to support students in their learning, together with suggested responses for teaching

### Where in their learning can students develop an appreciation of the reliability and limitations of generative AI outputs?

Giving students multiple opportunities to critique generative AI outputs in relation to disinformation, fabrication and biased information, can help them assess its roles to assist their learning. Discussion can focus on the care that is needed in using these tools and reinforce the expectations of good academic practice in their studies.

* Consider asking students to generate different prompts to scope the same topic (and/or use a different AI tool) to see how the change in prompt and/or tool impacts the output generated. This iterative approach to designing prompt questions provides opportunities for students to appraise the outputs generated and discuss the limitations of generative AI as the sole tool within their studies.
* Encourage students to review generative AI outputs in terms of information bias, for example, what perspectives are being shared and what are not.
* Ask students to check the outputs for fabrications and false information, for example, can they locate any references cited and/or can they find other sources that validate the outputs, for example, from published papers and texts or assigned reading lists.

### Where in their learning may students use generative AI to find out about (or get started on) a topic?

Providing opportunities for students to use the appropriate AI tool to quickly scope a topic and then use this information to develop further their own ideas can help them get started in exploring material. Students may benefit from engaging with a wider range of source materials using the ability of some AI tools to translate between a limited range of languages. This allows students to access resources in their first and/or target language.

* Encourage students to use generative AI to scope a topic and bring short summaries of the key points for further discussion and review in class, for example, this could be prompts based on their reading list or other course materials.
* Ask students to use generative AI to identify and translate subject-specific vocabulary into more understandable terms and create a glossary. This can support students in building their understanding when reading academic papers.
* Discuss with students where AI can fail, for example, what aspects of the topic have been omitted, incorrectly reported or referenced, or how contributors from all nationalities, genders, ethnicities or backgrounds may not have been represented.

### Are there ways in which students may use generative AI to support consolidation of their lecture/practical class/seminar notes?

Students value having the opportunity to organise and structure their study notes effectively into a variety of formats (eg visual, bullet-points, lists, tables, mind-maps). Students can use these outputs to identify gaps in their knowledge and help build their understanding of connections between different topics.

* Consider asking students to use AI tools to consolidate their lecture notes into different formats, for example, in a bullet point list, structure outline, table of key concepts or mind map.
* Drawing on the AI generated outputs, use teaching opportunities to discuss with students what areas might require further clarification and encourage them to synthesise their ideas/knowledge across different topics.

### Where in their learning could students use generative AI to assess their understanding of a topic?

Students value multiple opportunities to gain immediate feedback on their understanding of a given topic. AI tools can generate open-ended questions and even evaluate a student’s responses. In this way, students can use this approach to identify gaps in their knowledge and focus their study time more effectively.

* Encourage students to use AI to generate practice questions about the subject they study with sample responses to enable them to independently self-assess their understanding of a topic.
* Discuss with students the content of the AI generated output and ask them to review how it changes, depending on the tools and prompts that are used as well as each time they ask the same question.

### Are there ways in which generative AI can support students to develop their data analysis and research skills?

Giving students opportunities to use generative AI to analyse existing data or explore the properties of data sets, may support them in developing their research and data analysis skills and in getting started with their research. Having discussions with students about the generative AI outputs can augment their own research and data analysis skills.

* Ask students to use generative AI to analyse an existing data set to identify trends and relationships and bring the output to class to discuss and review. Students could be asked to compare their outputs and discuss how they can evaluate the validity of the AI generated analysis as part of developing their own data analysis skills.
* Ask students to use generative AI to build surveys or questionnaires to augment their research skills learning and discuss the outputs in class. For example, explore whether AI can help in generating survey questions based on predefined objectives, suggest ordering of questions and provide ideas on how to improve surveys to maximise user engagement.

### Are there ways in which generative AI may help develop students’ reading and critical analysis skills?

Providing opportunities for students to review and discuss generative AI generated outputs may support the development of their reading and critical thinking skills.

* Ask students to summarise key texts and then ask AI to generate a summary using language that is easy for them to understand, structured in different ways. Encourage students to discuss how the summaries differ, even when students have given similar prompts to the same tool. You might use teaching time to discuss different ways in which writing alternative presentations can support deeper understanding.
* Ask students to use a generative AI tool to generate some critical questions about a text and compare this output with their own notes and understanding in discussion in class.

### Where in their learning may students use generative AI to support the development of their academic writing?

Students value opportunities to develop skills and understanding of the basic structure and format of different types of academic writing. Generative AI can support students to improve their academic writing as part of their academic skills development.

* Ask students to use generative AI to generate examples of different types of academic writing or presentations based on the same topic and bring the outputs generated to class to discuss. Students can see how a topic would be presented in an essay format versus an abstract or a poster presentation or a different writing style (students can see how to write for a general audience or a more specialised one).
* Ask students to use generative AI to generate templates or outlines for various essay types, including argumentative, descriptive, expository and narrative. Students might use these as a starting point for their own writing alongside a discussion about good academic practice and appropriate use of AI-generated content in your subject to avoid plagiarism.

### What are the ways in which students could use generative AI to gain feedback on their writing?

Students value having instant, personalised feedback on their learning, allowing them to understand where they are excelling and where they need to make improvements in their work. Generative AI can give supportive, constructive feedback to help students refine and improve their writing. However, this feedback is not always correct, and students need to be encouraged to use their critical skills to evaluate its appropriateness.

* Encourage students to ask for feedback on examples of their writing from different generative AI tools. Students can ask for suggestions on the structure, coherence and clarity of their writing and use this advice when approaching future writing tasks.
* Remind students that they are encouraged to proof-read their own work, as this is an essential skill in academic writing, and should not use generative AI tools to make material changes to work in draft.
* Ask students in a tutorial or class to develop quizzes using generative AI and complete them. AI can provide immediate feedback, allowing students to understand and correct their mistakes promptly and enrich discussions on common areas of misunderstanding. Students should be encouraged to further validate their answers against another non-AI source as generative AI tools can give erroneous information.

### Are there ways in which generative AI may enhance students’ learning in class?

Students value opportunities to hear a range of perspectives and AI generated outputs can elicit different viewpoints to those held by the students. It can generate alternative explanations of different contexts, give more examples and suggest analogies. This can serve to enrich and support students in developing their wider contextual understanding of a topic. Generative AI may also support students in understanding instructional texts (including how to guides) by offering opportunities to explore them in multiple formats.

* Consider asking students to seek outputs from generative AI based on a range of discussion topics/questions that you provide (eg same prompt, different generative AI tools, different prompts, same generative AI tool). Use teaching time to facilitate discussions between students in which they question one another on their respective outputs to ascertain and understand the range of perspectives that can be generated through different AI prompts and/or tools.
* Encourage students to use generative AI to research a practical methodology in advance of a laboratory class. This will support them to have a better understanding of why those techniques are used and reflect on the guidance in relation to the formal laboratory teaching protocols and guidance to ensure safe and appropriate practice. This can help build students’ confidence in undertaking experiments and learning about different approaches to experimental design. Importantly, this can enhance students’ engagement with practical work by moving them away from passively following protocols without necessarily understanding the underlying experimental rationale.

### Can students see examples of how generative AI has been used to support specific skills in language and coding?

Generative AI can support students learning across a range of subjects and develop outputs that range from text-based to non-text-based problems.

* Ask students to engage in written conversations with generative AI in their target language, allowing them to practise real-time interactions. This can be done in class with the students. Alternatively, ask students to do this before class and bring key learning points for discussion to the class, where you can encourage students to identify any errors in the AI generated outputs.
* Consider asking students to create multiple versions of example texts in many languages and ask students to translate them and compare translations or their own writing. Students can take advantage of generative AI’s deep multilingual capabilities to support their language development in multiple ways and multiple levels.
* Ask students to use generative AI to help them describe existing code or identify computer code errors. It can analyse a student's code and provide suggestions for fixing issues. This step-by-step approach promotes a clearer understanding, iterative development, and the value of learning from coding errors. Students can bring the feedback received to class for discussion.

## Further reading and resources

This advice is based on [Principles on the use of generative AI tools in education](https://russellgroup.ac.uk/news/new-principles-on-use-of-ai-in-education/) (Russell Group, 4 July 2023). Oxford University contributed to and has adopted these principles.

This advice does not advocate for any one specific tool. For comparison of the main chatbots, and an overview of development in generative AI capabilities, [Beyond ChatGPT: The state of generative AI in academic practice](https://www.ctl.ox.ac.uk/beyond-chatgpt), Centre for Teaching and Learning, October 2023.

The advice in this guide is in line with relevant University policies. Annex C of the [Examinations and Assessment Framework](https://academic.admin.ox.ac.uk/examiners), covering Procedures for the investigation of plagiarism, has been updated to include AI and provide examples of unauthorised uses of generative AI tools. Guidance for students is available from the [[Study skills and training webpages.](https://www.ox.ac.uk/students/academic/guidance/skills)](https://www.ox.ac.uk/students/academic/guidance/skills) The policy on the [Use of Third Party Proof-readers is also relevant](https://academic.admin.ox.ac.uk/policies/third-party-proof-readers)

If you are supporting research students, you should be familiar with the University's policy and guidance on [Research integrity and Practice](https://researchsupport.admin.ox.ac.uk/governance/integrity).