Reflecting on the use of Generative AI in Higher Education Teaching & Learning

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1) Introduction/Background

Elizabeth's reflective journey started with wanting to understand more about what Generative AI can do and a short Futurelearn course (Compton et al. 2023) in Dec 2023.
Sebastian became interested in how his background in statistics and machine learning relates to Generative AI.

Generative AI tools such as Chat GPT or Google's Gemini provide new capabilities that can potentially be used by both students and those teaching them.

While often initially thought of in relation to plagiarism concerns, they are tools which are:
• currently in existence – can't just bury our head in the sand and ignore them
• likely to also be increasingly integrated into the world of work
So we need to look to inform staff and students about sensible use and avoiding problems.

So, what are AI and Generative AI?

Artificial Intelligence (AI) refers to the capacity of computer systems to perceive their physical or digital environment, learn from that perception and/or other data, and to apply reasoning and decision-making strategies to achieve a particular goal. The underlying technology for the "thinking" is largely based on empirical (observation-based) modelling. Generative AI is a category of AI designed to generate new data based on specific input and a given empirical model it previously created from so-called training data, i.e. data the AI learned from. The most prominent examples of generative AI involve text, image or audio generation. The former are being used more and more in higher education settings, see e.g.

https://www.timeshighereducation.com/campus/chatgpt-and-generative-ai-25-applications-teaching-and-assessment.

2) Example Tools

Name	Description and link
ChatGPT	Generates new data in form of coherent text relevant to the context (or "prompt") provided by the user. https://chat.openai.com/
Gemini (formerly Bard)	a generative AI chatbot developed in response to the popularity of ChatGPT. https://gemini.google.com/
DeepDream	a programme using convolutional neural networks to enhance patterns in images and generate surreal versions of them. https://deepdreamgenerator.com/
DALL-E	a generative model designed to create images from text-based descriptions provided by the user. https://openai.com/dall-e-3/
Stable Diffusion	a deep-learning based generative model to create images from text prompts provided by the user. https://stability.ai/stable-image

Table 1: Examples of Generative AI tools

3) Image example

Iterative prompt use is often needed when generating images. To be fair, this poster title is fairly hard to illustrate!

Figure 1: An image generated with Stable Diffusion using this poster's title as a text prompt.

4) Some pitfalls to avoid

Data hallucinations

Gen AI puts together a likely sequence of words – so it can hallucinate/create e.g. new sections of 'law', new 'facts', and invent citations to non-existent documents.

Data privacy

Many Gen AI tools also use any material you enter into the tool for training purposes – need to check the small print and consider what you enter very carefully.

Correctly sourcing information

Where did the information come from? Always need to double check and find an authoritative source that can be cited for any facts/opinions. If Gen AI was used to summarise documentation, did it miss anything important?

Copyright complications

There are currently legal cases in process where Gen AI has replicated existing text that was under copyright. There are also legal cases involving the use of artists work to train AI to produce similar images. The legal boundaries will become clearer with time as cases come to a conclusion and any new legislation is created.

Bias

If there is bias in the training materials (often the internet) then the responses can be expected to be biased, and with the cultural viewpoint of most of the material on the internet.

5) Adapting learning to the new capabilities

Assessment design

For the Introduction to Climate Change and Sustainability course we assessed using a short magazine style article, an image based reflection where the students chose or created three images and discussion participation. We decided to give guidance to the students that use of AI was acceptable, but AI prompts and their output should be given in an appendix. We also provided links to some of the most common tools. We also introduced them to the potential pitfalls to avoid and the University of Glasgow guidance on AI use which has been developed over the last year and a half:

https://www.gla.ac.uk/myglasgow/sld/ai/students/.

Student reaction

We found that almost no students included AI use in an appendix for either of the pieces of submitted written work. Anecdotal discussion revealed that some students are using it to summarise notes, but there are concerns about plagiarism risks and widely different degrees of familiarity with the tools.

Further reflection

It will probably help once a consensus has developed between different institutions – i.e. a commonly accepted code of practice that everyone understands.

Conclusions

A good understanding of the capabilities and pitfalls of Generative AI and how these interact with learnng, assessment and more generally in the world of work is becoming critical for Higher Education Teaching and Learning professionals. Clear communication of accepted ways to use generative AI to both students and staff is important. Building learning about the use of Generative AI into a specific assignment where AI use is required could be one approach to help reduce uncertainties and develop skills.

References

Compton, M., Acar, O. & Haberstroh, C. 2023. Generative AI in Higher Education [MOOC] https://www.futurelearn.com/courses/generative-ai-in-higher-education