

CASE STUDY

Generative AI in Assessment: Towards Understanding the Student View

Joel Anthony Haddley, Department of Mathematical Sciences, The University of Liverpool, Liverpool, United Kingdom. Email: j.a.haddley@liverpool.ac.uk
Cesare Giulio Ardito, Department of Mathematics, The University of Manchester, Manchester, United Kingdom. Email: cesaregiulio.ardito@manchester.ac.uk

Abstract

This case study reports on an intervention that took place within a second-year mathematics module at a higher education institution in the United Kingdom. Prior to completing an essay, students were supported to understand the potential benefits and risks of using Generative AI to aid their process. Students were allowed unpenalised use of Generative AI to complete this assessment. They were interviewed to gain an understanding of how they used this technology, and their perceptions of it. A small sample ($n=3$) allowed for in-depth exploration. All participating students reported using Generative AI in ways which developed their critical awareness of the technology, and the authors believe that the overall value of the assessment to students was enhanced. The case study ends with recommendations for integrating Generative AI into assessment, and directions for further study in this rapidly developing field.

Keywords: Generative AI, Assessment, Higher Education.

1. Introduction

Generative AI is a disruptive technology whose mainstream awareness has recently come into sharp focus through rapidly increased availability and awareness of platforms. According to the best public statistics we could find, ChatGPT (for example) attracted its first million users just five days after it was launched in November 2022, and as of April 2024 boasted over 180 million users (Exploding Topics, 2024).

The main aim of this case study is to contribute to the understanding of student perceptions of Generative AI, and how and why they use Generative AI in assessment. Previous studies have demonstrated that students generally have a positive attitude towards Generative AI, citing its potential for personalised feedback (Baidoo-Anu and Owusu Ansah, 2023), and anonymous support; and that once students learn to trust the technology, they are likely to continue using it (Ka et al., 2023). The perception of students is rather more complicated when considering how other students might use, or misuse, this technology (Johnston et al., 2024).

The Russell Group published high-level principles to guide higher education institutions on how to adapt to the changing landscape (Russell Group, 2023). The fourth one states that, “Universities will ensure academic rigour and integrity is upheld”, and the impact on academic integrity has been among the first and main concerns about this new technology. Some education providers have responded to the challenge posed by forbidding student use of Generative AI for assessment (Lim et al., 2023), perhaps due to a generally different approach to avoiding or embracing new technology (Wozney et al., 2006), but opinion is very split: Dwivedi et al. report on the diversity of opinions in their paper, “So what if ChatGPT wrote it?” (Dwivedi et al., 2023). Some believe

emerging strategies will prevent plagiarism (Ahmad et al., 2023). Others argue that traditional assessment formats such as essays will stop being viable in the near future (Eke, 2023; Stokel-Walker, 2022), or at least will be integrated into an assessment strategy with alternative modes that mitigate the risks associated with Generative AI (Qadir, 2023). Academics cannot reliably identify whether a given text is written by a human or by Generative AI (A Matthews and Volpe, 2023). Novel approaches are emerging, such as asking students to critique artificially generated essays rather than to produce the essays themselves (Smolansky et al., 2023). Academics reported a high preference for this novel approach due to its restoration of academic integrity, but students reported only a slight preference, citing a loss of creativity. The very notions of creativity, academic integrity and plagiarism are up for debate as we enter this new age (De Silva et al., 2023).

The first three Russell Group principles (Russell Group, 2023) state:

1. Universities will support students and staff to become AI-literate.
2. Staff should be equipped to support students to use generative AI tools effectively and appropriately in their learning experience.
3. Universities will adapt teaching and assessment to incorporate the ethical use of generative AI and support equal access.

These lend themselves more to developing student capacity for lifelong learning (Mhlanga, 2023), and equipping students with adaptable, future-proof literacies (Bozkurt, 2023). It is more obvious in some disciplines than others how Generative AI is likely to play a role in the future (Yüzbaşıoğlu, 2021), yet the pedagogy to align with “critical use” encouraged by the Russell Group principles is still catching up (Sit et al., 2020). Some students believe that higher education institutions are not equipped to prepare students for work in sectors that use Generative AI (Abdelwahab et al., 2023), and it has been reported that the student voice is poorly represented when making decisions regarding learning, teaching and assessment provision related to Generative AI (Sullivan et al., 2023).

2. Intervention and Research Strategy

The intervention took place within a second-year mathematics module at a large UK university. The module is optional and enriches the degree programme by supporting students to develop transferrable skills that are otherwise not well-represented within the core modules. One of the main summative assessment activities is a 2000-word essay focusing on a topic related to education. Following an academic writing workshop, teaching takes the form of individual supervisory meetings. Students choose their own titles based on their interests and complete their own reading to inform the essay, all with support from the module leader. Academic integrity and poor academic practice are discussed in class, with more information signposted on the virtual learning environment.

The intervention was to allow students to use Generative AI when completing this assessment. In an initial phase, a seminar was delivered to raise awareness of Generative AI. This gave specific warnings about hallucinations, and that Generative AI is capable of plagiarism due to how it builds its response from input data. Students were warned that they would be responsible for ensuring their submission contained no elements of plagiarism but were advised how to use Turnitin’s similarity tools on draft submissions (Giray, 2023). Critically, students were made aware that the final mark would be based solely on the quality of the submitted essay, regardless of whether they

had used Generative AI. The seminar also raised awareness of constructive ways that Generative AI might be used:

- Brainstorming: Ideas for the content or structure of your writing.
- Review/Feedback: Critique and immediate advice on how to improve your writing.
- Summarise/Analyse: Your own work, or someone else's.
- Spellchecking/Phrasing: Practical tips to enhance your writing.

Following the seminar, students were invited to participate in two interviews. This was done on a volunteer basis, and participation in an interview would not impact results in any way. Three students expressed interest to be interviewed.

The first interview took place while completing the essay, and the second was after marks and feedback had been returned. To minimise bias, a co-researcher who had nothing to do with marking completed the interviews, and student anonymity was maintained from the module leader. Students were made explicitly aware of this. The first interview explored the student's prior experience of Generative AI, their own perceptions of it, what they believe the perceptions of others might be, and their initial thoughts on the appropriateness of such an assessment given the power of Generative AI. The second interview asked the student to reflect on their use of Generative AI having received marks and feedback, and to look forward and share whether they believe Generative AI should be permitted for such an assessment, or whether there should be restrictions. The specification and rubric for the assessment were purposefully left unmodified to explore and understand the baseline of how students use Generative AI when permitted to do so. Despite being enabled at the institutional level, the Turnitin AI score was not considered during marking; the essay was marked exactly as in previous years.

3. Results

3.1 Student A (ChatGPT 3.5, through online interface, October 2023 - January 2024)

Across both interviews, Student A shared an apprehension and distrust regarding Generative AI in the domain of education. Although they had heard of it, they had not used it before outside of a few sporadic experiments and were concerned that students with more experience using Generative AI might gain a technical advantage. Their distrust was underscored by experience using Generative AI for mathematics, where it often gave an incorrect answer. Moreover, stories about flatmates using Generative AI and losing marks, e.g. for mixed-up references, contributed to a feeling of unease about the technology. The student particularly appreciated the intervention highlighting how Generative AI might be used constructively. The student reported that both they and their peers felt that institutional guidelines are strongly against Generative AI, and their peers were shocked that the student was allowed to use Generative AI for this assessment. They said that people do not want to risk using it even if allowed, even if only for planning, in case they are caught out and penalised. The student remarked, "I worried that it might be considered cheating, especially when I used it to rephrase my own question. It did not feel entirely right," however the student later reflected that they believe they used Generative AI within acceptable guidelines.

When asked to consider what lecturers' perceptions of Generative AI might be, the student said that the few mathematics lecturers who have spoken about it seem intrigued and excited over its potential – adding that this is possibly due to technical aspects of it or the efficiencies it could bring. The student thinks most mathematics lecturers do not discuss Generative AI because it is not

particularly dependable for mathematics, and they therefore do not want students to become reliant on Generative AI.

The student used Generative AI when writing their essay. They particularly found it useful for summarising long sources into digestible chunks, and this aspect greatly sped up their work. They also used it for brainstorming, structuring thoughts, identifying pros and cons, or finding the right word for a sentence. There was however a learning curve, as the Generative AI platform often did not return answers in the format the student wanted – and further dialogue with the platform was required to obtain responses in a useful format. The student used Generative AI to create an essay plan and stuck to this plan for the write-up. The student reported this was helpful due to a lack of prior experience writing essays, and the suggested word counts simplified the process of structuring the essay. The student used Generative AI to suggest titles for the essay but was not happy with the output and ended up writing their own title instead. The one piece of writing that was used directly from the Generative AI output was a rephrasing of a question into a statement.

When asked about the role of Generative AI for assessment in the future, the student was not concerned about the impact on mathematics assessment as it would have to improve a lot to be helpful. The student said that essays as assessments continue to be appropriate, but students need to be trained to understand what Generative AI can and cannot do, and there needs to be clarity around what students are or are not allowed to do. The student proposed a compromise that Generative AI might be used for planning essays but not writing essays, acknowledging that no one can really monitor what a student might use it for. They said that “[if the university says] it’s ok to use AI, it feels like giving free rein to do anything,” and that the university needs clear guidelines, especially for essay-based disciplines, to prevent academic malpractice.

During the second interview, after some time to reflect, the student clarified their opinions on Generative AI and said that students, “should be advised not to rely on AI to write their essays entirely. It is common sense not to misuse it in that way. AI should be used as a tool, similar to how research sources are used. It is not cheating to use them effectively.” The student would continue to allow Generative AI to be used in this module.

3.2 Student B (ChatGPT 3.5, through online interface, October 2023 - January 2024)

This student had greater prior awareness of Generative AI compared to Student A, having used it informally for brainstorming ideas and helping with mathematics problems. This student had used Generative AI for structuring essays before, even though they described themselves as someone who does not typically use a lot of technology. They are not afraid of Generative AI, though they recognise that others might be, and reported that they and their peers are distrustful of it and would not rely on it to answer mathematics problems. One lecturer had told them not to use it.

Student B used Generative AI for brainstorming and planning the essay, asking for pros and cons on different titles, generating ideas for different approaches, and experimenting with different inputs to compare different outputs as some were not useful. The student had both good prior and researched knowledge about the essay topic, and used Generative AI only to fine-tune their writing, stating “I used some of these phrasings in my essay as [Generative AI] articulated my thoughts better than I could have.” The student found Generative AI very helpful and kept it open while working on the essay, regularly referring to its output.

When asked about the student's thoughts on whether other students might use Generative AI to cheat, they explained they believe the correct approach for the university to take is one of recommendation and guidance, rather than restrictions and limitations. They do not think that other students would not use Generative AI for doing anything more than what they used it for, stating that human-written essays are much better than anything Generative AI can produce. They pointed to the frequently inappropriate style that Generative AI adopts, writing in dramatic and overly flamboyant language. They said that maybe some students do use it to cheat, but their peers do not trust it to produce sufficient quality and do not use it to cheat. They reported that their work was their own, even if Generative AI helped. Given this, they believe that asynchronous, uninvigilated assessments such as take-home coursework remain valid.

Reflecting after the release of marks, the student realised that Generative AI had been more useful than they had initially thought, having used it to summarise sources – something they had not considered before the intervention within this module. They said they would definitely use it in the same way for another essay, even though they were not convinced it actually had a significant impact on the mark: it just sped up the entire process. They raised that there should be a level-playing field for students: since you can't really restrict students from using Generative AI to support essay writing, students should be advised on how to get the most out of it, avoid the associated risks, and encouraged to "play around" with it before attempting serious application to a task.

3.3 Student C (ChatGPT 4, through online interface, October 2023 - January 2024)

Student C has a subscription to a premium Generative AI service and has used it extensively before this assessment for a variety of purposes and reported experimenting with it too. Their use was rather different to Student A and Student B: they did not use it for brainstorming ideas, summarising sources, or structuring the essay; but rather used it to organise, summarise and critique their own ideas. This was especially useful after "talking" to Generative AI, using voice recognition features. They also used Generative AI for help with rephrasing but never copied anything directly into their own essay since they were never fully happy with the results. The student uploaded their entire essay to the platform to get an "external" perspective of its quality. They found it very useful for this purpose. They are satisfied with their mark and would use Generative AI for assessments again. Their perception of Generative AI changed during this assessment, and the student reported being "surprised" and that they had underestimated how useful Generative AI would be.

This student is unsure whether they would have used Generative for this essay without explicit permission but believes its use should not be prohibited for assessment in the future: "It's going to be everywhere," so it would in any case be impossible to forbid it. Moreover, the student is confident that they would be able to bypass Generative AI detection. The student said that assessments need to change, and that, "if a question is so easy that a student with [access to Generative AI] can reach the same performance as one that has revised a lot, then the question needs to be changed." Their advice for other students would be to experiment a lot, not to trust its output, and to generate a variety of answers to pick the best.

4. Discussion

4.1 Academic Integrity and Assessment Validity

Although the nature of the intervention allowed for unpenalised use of Generative AI, participants were prompted to share their perceptions of what “cheating” could mean within the context of using Generative AI to support essay writing. Participants stated that they or their peers would not trust the accuracy or quality of the produced output enough to submit it as their own work. This is a form of self-policing of academic integrity based on distrust of the platform. This may also be due to a risk aversion towards being caught, despite Generative AI detectors being unreliable (Ardito, 2023; Odri and Ji Yun Yoon, 2023), and Student C reporting a belief that they could easily be bypassed. Student A indicated this anxiety could be based on the perceived institutional position against the use of Generative AI, but such a culture could make it challenging to deliver the critical use advocated by the Russell Group principles. Notably, Student A presented the view that mathematics lecturers’ opinions differ from the university’s position.

Student A and Student B both reported direct copying of Generative AI output into their essays. Student A reported feeling uneasy about this, despite understanding that it was permitted by the assessment guidelines. Indicators for academic integrity include bravery, honesty and empathy (Staats et al., 2009), and future interventions should clarify boundaries more clearly to avoid students unnecessarily experiencing feelings of apprehension or guilt.

Student B’s use of Generative AI output is presented differently, and they directly used the output in their essay on several occasions. This use of Generative AI fell within the permitted guidelines of this assessment but raises questions about authorship. Authorship is discussed in (Yeo, 2023), which presents arguments for and against categorising such a use as plagiarism. On the one hand, the student inputted the text into the Generative AI platform, and so can claim authorship of the output; on the other hand, the words are used directly from an external source without acknowledgement. Student B’s claim to authorship is explicit. They reported that Generative AI did not lead to a significantly improved mark but saved time: implying that they were personally capable of arriving at suitable paraphrasing, and used Generative AI only to streamline their process. Even while using Generative AI, all (?) students reported repeatedly making judgement calls over the suitability of output to be included in the essay, evidencing their ability to use the platform in a critical way. As Student C pointed out, assessment needs to adapt to recognise the role of Generative AI. Given the potential grey area regarding direct copying of paraphrased material, it is essential that assessment specifications directly address whether or not this would be considered plagiarism to submit in the final product. But, as Student C points out, it may be impossible to detect it anyway. Provided an examiner considers the interplay between learning outcomes and Generative AI, and provided there is a mutual understanding between examiners and students regarding what consists of appropriate use of Generative AI, the authors believe this assessment format continues to be valid.

4.2 Generative AI Equity: Access and Competence

Student B advocated for a level playing field for Generative AI. Factors beyond the control of higher education institutions may have longer-term impacts on equitable access to Generative AI (Sætra, 2023) but, at the time of writing, OpenAI provides free access to GPT3.5. However, Student C had access to GPT4.0, which offers various improvements in reliability (Koubaa, 2023); thereby un-levelling the playing field. The availability of a multitude of models, and thousands of “wrappers” which change their capabilities with hidden prompts, and finally the speed at which the

sector moves, with several daily changes in each of the tools, further contribute to a fundamentally un-levelled playing field.

Possibly the most equity-creating aspect of Generative AI is that effective interactions can be based on natural language, not requiring particular technical expertise. However, this does not fully address all the layers of digital fluency required to interact proficiently with Generative AI systems: indeed, techniques such as prompt engineering can unlock several features of models that a “basic” user would not be able to access. Furthermore, both prior knowledge and integration in digital networks can make a stark difference – as mentioned, there are thousands of diverse ways to interact with the same model, each different, and knowledge of a particularly one, appropriate to the task being undertaken, can significantly enhance output.

Student participants had diverse levels of prior experiences with Generative AI, reflected in their confidence using the platform. All student participants, even Student C with the greatest prior experience, reported improved ability to use Generative AI following this essay; including recognition that Generative AI cannot be trusted.

4.3 Reported Benefits

This intervention aimed towards achieving some equity by highlighting possible constructive uses and possible risks. Students reported using Generative AI to support their essay writing in several ways, which we propose to classify in five macro-areas:

- **Creation:** Generative AI was used for brainstorming ideas, including topics and essay titles. This use requires the least prior authorship before creating the prompt but has the highest dependency on Generative AI for creation of content. Students reported using it as a starting point or inspiration but did not report further usage to write larger chunks of their essay.
- **Enhancement:** Students used Generative AI for improving their own work, in the form of paraphrasing or rewording. Compared to creation, students have greater initial authorship as they write their own starting point which they want to improve, and the dependence on Generative AI for creation of content is lower.
- **Feedback:** Students used Generative AI to solicit feedback on content entered into the platform. The prior authorship here is the greatest, and dependency on Generative AI for creation of content is the lowest. This use of Generative AI mirrors the personalised formative feedback provided by teachers, but feedback is immediate.
- **Structuring:** This theme covers use of Generative AI to suggest essay plans or organise material entered into the platform. Students reported using Generative AI in this way, which could be considered a scaffolded approach to essay writing.
- **Summarising:** Use of Generative AI to summarise text could be applied to one’s own work, or to someone else’s. Students reported using Generative AI to summarise the work of others, as a means to speed up the essay-writing task.

While it is difficult to completely decouple “product” from “process,” the first three themes are more related to product, and the final two are more related to process, so each may be more or less relevant depending on the intended learning outcomes of the assessment activity.

4.4 The Mathematical Context

Student participants reported that they, their peers, and their lecturers distrust the ability of Generative AI to solve problems in mathematics. Student B reported a lecturer had said not to use it due to its perceived inaccuracy. Student A believes the validity of mathematics assessment will not be undermined by the current capability of Generative AI in this domain.

It is true that current versions of this type of AI model perform badly at mathematical tasks (Davis, 2024), with a study evidencing significantly worse performance than the average student in university physics exams (Yeadon, 2023). Generative AI may be more suitable as an educational aid in other domains (Giannos and Delardas, 2023).

An interesting contrast can be observed in students' perceptions of staff views on Generative AI, with the university perceived to be strongly against the use of AI, but lecturers in mathematics being more excited or curious. While this may well be confirmation bias due to this intervention running within a mathematics module, Student A mentioned that "a few" mathematics lecturers expressed positive views about Generative AI.

5. Conclusion and Recommendations

5.1 The Student View

Student participants were of the opinion that when it comes to Generative AI, higher education institutions should focus more on guidance and support, than restrictions and penalties. Student C said it is going to be everywhere anyway: this could be interpreted that students should be trained to engage with this emerging technology or could simply be a pragmatic response as policing its use may well be futile. Student A initially advocated for guidance on what was or was not permissible, but their opinion evolved while completing the essay and settled on a similar viewpoint that students should be supported to engage critically with Generative AI. All (?) Student participants suggested that the intervention to raise awareness of the pros and cons of Generative AI would, in the future, benefit from encouraging students to develop their familiarity with the technology further in advance of a summative assessment to make sure they use it as effectively as possible. It should be highlighted to students that it is wise to compare several different outputs to prompts to get more ideas, and to select the best one; and students should understand that the output may not actually be very good at all, and Generative AI output should never be trusted for quality or accuracy.

5.2 The Authors' View

This particular intervention allowed for unpenalised use of Generative AI and so, by definition, no student breached academic integrity policies due to whether or how they used Generative AI in this assessment. But, more importantly, it is clear from the interviews that these students engaged with the assessment in a way that developed, not only their knowledge of the essay topic, but critical awareness and practical knowledge of Generative AI. The authors support the students' recommendations and plan to integrate them into this assessment in future years.

There is nevertheless a subtlety regarding what is actually being assessed, and the authors acknowledge that being able to author text directly is not exactly equivalent to authoring text using Generative AI to help phrasing. Along similar lines as (Bozkurt, 2024), more work should be done to unpack these differences, considering different perspectives on them. The authors additionally

recognise that this intervention ran in an upskilling module designed to enrich a mathematics degree, so it might be more appropriate to follow recommendations in similar contexts as opposed to contexts which depend more heavily on essays as a mode of assessment.

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