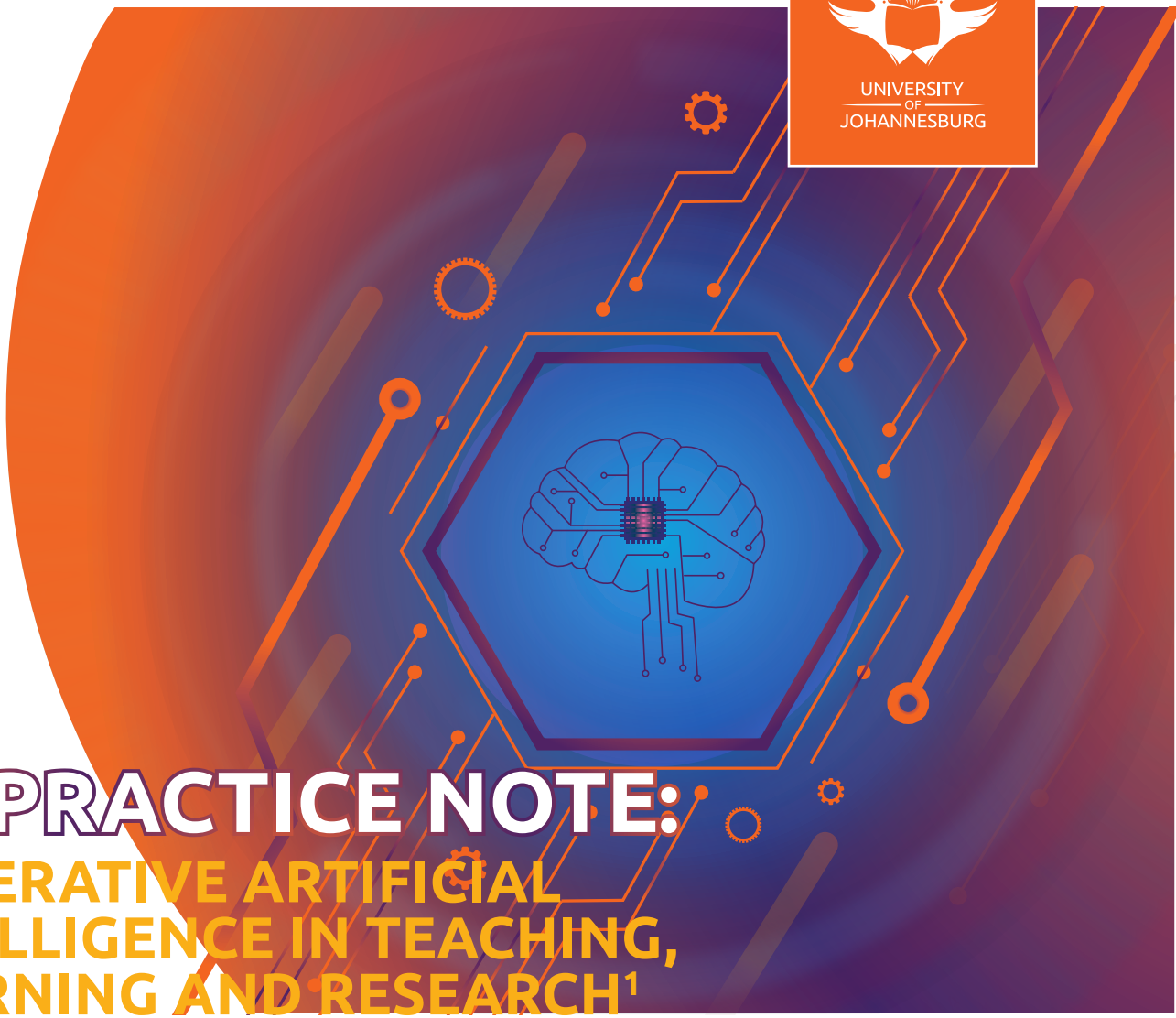
UNIVERSITY OF JOHANNESBURG



UJ PRACTICE NOTE:

GENERATIVE ARTIFICIAL INTELLIGENCE IN TEACHING, LEARNING AND RESEARCH[1]

[1] Generative AI tools (such as ChatGPT) have implications for administration and community engagement in higher education, but this practice note does not address this aspect.

INTRODUCTION

Rapid developments in generative artificial intelligence (AI)[2] technologies have led to an explosion of AI generators of text, code, images, and voice, of which ChatGPT is one example.[3] AI generators can, with varying degrees of effectiveness, generate answers to a question, produce code, text and content, and design an artefact, based on prompts. They can be used to learn, to respond to assignments, or to produce material for research and other academic publications.

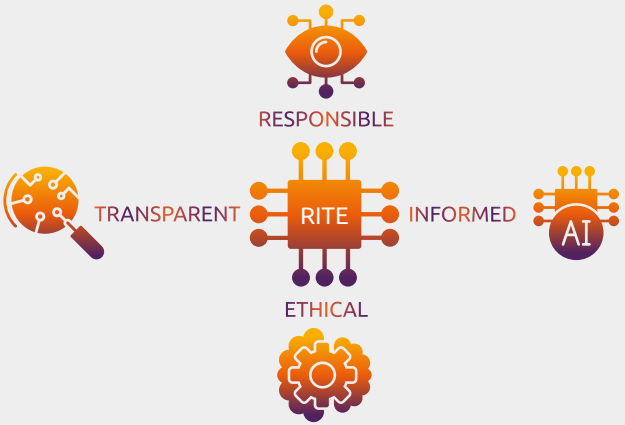
The purpose of this practice note is to set out the ways in which generative AI technologies may be used to complement learning, teaching and research.[4] The note acknowledges the benefits of generative AI while recognising its risks and potential harms. The essential approach is to be **Responsible**, **Informed**, **Transparent** and **Ethical** (Gutiérrez, 2023). The practice note promotes the critical and ethical use of generative AI across UJ (see Appendix A for useful resources).

[2] For basic explanations of what AI is – as well as machine learning, generative AI, and large language models – see UNESCO's recent quick start guide (Sabzalieva & Valentini 2023), Mills (2023a) and Riedl (2023). UJ also offers a free course on AI in the Fourth Industrial Revolution – see free online courses via uLink.

[3] Other generative AI tools currently available include Bing's Chat, Google's Bard, Anthropic's Claude, Alpha Code, DALLE-2, CoPilot, and MidJourney.

[4] For now, many generative AI tools are standalone tools, although some tools have begun to be integrated into other tools, systems and platforms used by universities, such as GrammarlyGo.

The use of AI tools must be **RITE**:



Be responsible: Be sure to foreground learning integrity in your use of generative AI tools. This means that you use the tool in a way that helps you make sense of the content and enhance your skills, rather than simply using it to complete an assignment. For example, limit the use of generative AI tools to the early stages of writing and research – to inspire, brainstorm and plan – rather than produce content for you. Immerse yourself in the process of learning, and not only the product you are asked to create. Be careful not to rely on generative AI, as you may not develop your own writing skills, style, critical thinking, and creativity.

Be informed: Before you use generative AI, you should "research who or what company developed the tool, how it was developed, how it works, what functions it can perform, and what limitations and/or risks it presents" (Gutiérrez 2023). Check for updates and reports on bugs or data leaks. Stay informed on the broader ethical issues relating to AI tools. Some of these issues include privacy and data, intellectual property infringements in the development of these tools, labour exploitation in the process of building these tools, and the environmental impact of the development and use of these tools.

Be transparent: Clearly indicate which tools were used, and how you used them.

Be ethical: Distinguish between what you produced, and text/image produced by an AI tool through citation and quotation marks. It is wrong to present AI-generated work as your own work and doing so is academic misconduct.

Always indicate where you have used generative AI resources and to what extent. Use the **plagiarism declaration** as a checklist to ensure that your work meets the necessary standards for **academic integrity**.

The practice note applies to all generative AI available at any time.

a. These tools are updated continuously, and new tools are created almost daily.

b. Given the speed with which this technology is evolving, it is imperative that the University remain abreast of developments in the field.

c. Some of the tools available at no cost are greatly enhanced when the user pays a fee. In paid apps, the risks of increased inequities and misuse require constant vigilance.

BENEFITS OF GENERATIVE AI TOOLS FOR LEARNING, TEACHING AND RESEARCH

Generative AI tools have multiple capabilities which have the potential to provide benefits and added value to academics and students alike. Generative AI tools has many uses, value and benefits, some of which are set out below:

- save time
- develop critical thinking skills if used correctly
- enhance motivation
- generate ideas and brainstorm
- generate code
- improve equity between speakers of different language or writing abilities
- improve grammar and writing structure, especially for English second-language writers
- develop AI literacies and skills[5]
- get over writer's block
- provide learning prompts and suggestions
- create many types of quiz questions
- do calculations
- assist in examination preparation by generating questions and answers
- experiment with different writing styles
- use with students who may have specific needs that can be addressed with AI
- find teaching materials, images, slide shows, etc. for lecturers
- updating of learning materials
- offer general feedback on students' writing
- grade students' work using a rubric
- generate ideas for images, visuals and graphics
- draft ideas and plan or structure written materials
- be used as a form of search engine to source, select and organise data and references

Specific to learning and teaching, Mike Sharples (2023) identifies ten roles for generative AI. The recent UNESCO quick start guide on CHAT GPT and AI in higher education unpacks these roles in further detail, as can be seen in Table 1. Watkins (2022) also offers some practical ideas for using generative AI in courses, emphasising the importance of making time to reflect on ethics, the aims and outcomes of specific activities, and integrating generative AI in ways that save time while deepening the learning experience.

[5] AI prompt engineering is a key aspect of AI skills. See Atlas (2023) and Eager (2023) for examples of good prompts.

Table 1: Roles of generative AI in learning and teaching (UNESCO 2023)

Role	Description	Example of implementation
Possibility engine	AI generates alternative ways of expressing an idea	Students write queries in AI tool and use the regenerate response function to examine alternative responses.
Socratic opponent	AI acts as an opponent to develop and argument	Students enter prompts into AI tool following the structure of a conversation or debate. Lecturers can ask students to use AI tool to prepare for discussions.
Collaboration coach	AI helps groups to research and solve problems together	Working in groups, students use AI tool to find out information to complete tasks and assignments.
Guide on the side	AI acts as a guide to navigate physical and conceptual spaces	Lecturers use AI tool to generate content for classes/courses (e.g., discussion questions) and advice on how to support students in learning specific concepts.
Personal tutor	AI tutors each student and gives immediate feedback on progress	AI tool provides personalised feedback to students based on information provided by students or lecturers (e.g., test scores).
Co-designer	AI assists throughout the design process	Lecturers ask AI tool for ideas about designing or updating a curriculum (e.g., rubrics for assessment) and/or focus on specific goals (e.g., how to make the curriculum more accessible).
Exploratorium	AI provides tools to play with, explore and interpret data	Lecturers provide basic information to students who write different queries in the AI tool to find out more. An AI tool can be used to support language learning.
Study buddy	AI helps the student reflect on learning material	Students explain their current level of understanding to the AI tool and ask for ways to help them study the material. AI tool can also be used to help students prepare for other tasks (e.g., job interviews).
Motivator	AI offers games and challenges to extend learning	Lecturers or students ask AI tool for ideas about how to extend students' learning after providing a summary of the current level of knowledge (e.g., quizzes, exercises).
Dynamic assessor	AI provides educators with a profile of each student's current knowledge	Students interact with AI tool in a tutorial-type dialogue and then ask AI tool to produce a summary of their current state of knowledge to share with their lecturer/for assessment.

(Source: Adapted from Sabzalieva & Valentini 2023:9)

With regards to research, the UNESCO quick start guide proposes possible uses of generative AI at different stages of the research process: from research design (e.g., brainstorm research questions), to data collection (e.g., prepare for interviews), data analysis, and writing up (e.g., as a personal writing assistance) – see Figure 1. It can also be used in technical parts of research grant applications, generating communication plans (Sabzalieva & Valentini, 2023:9), and to generate ideas for a presentation.

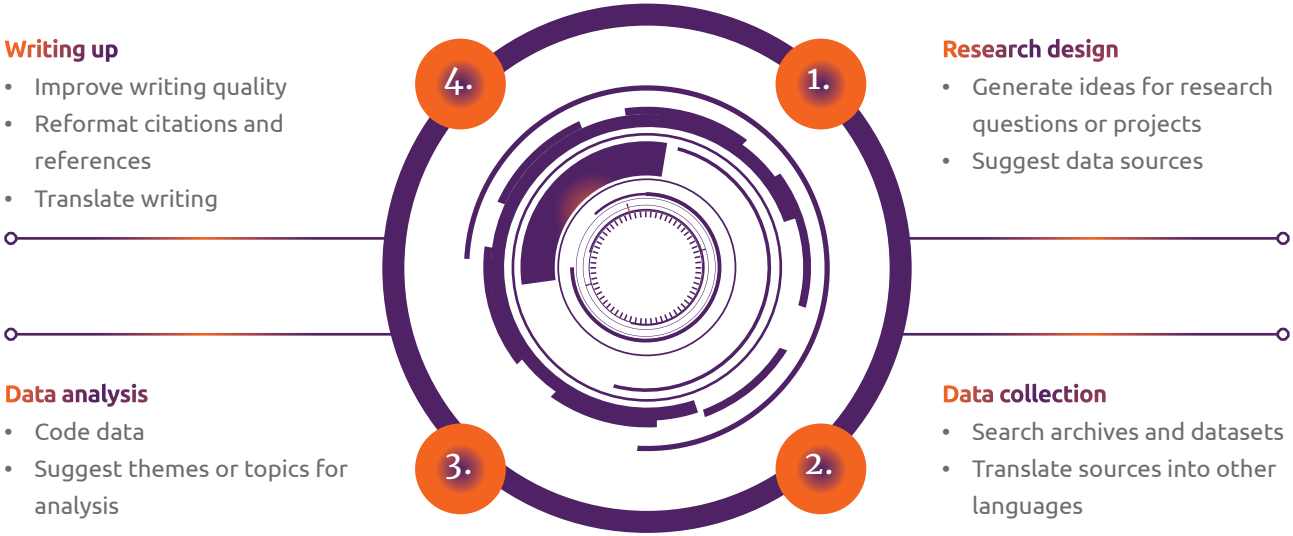


Figure 1: Possible uses of generative AI in research
(Source: Adapted from Sabzalieva & Valentini 2023:10)

To enjoy the benefits indicated above, without the risks and potential harms of generative AI, UJ students and staff need to understand and apply responsible, informed, transparent and ethical use of these tools. Learning and research integrity, assessment integrity and academic integrity must be at the forefront of any use of generative AI.

TEACHING, LEARNING AND RESEARCH INTEGRITY

Generative AI promises new advances in teaching, learning and research, though with clear concerns regarding the pace at which developments in AI are rapidly changing knowledge and society (Watkins, 2022; Prochaska, 2023). One clear benefit is the speed at which generative AI tools can produce content, gather and organise information. This does not replace the work of higher education or educational institutions, but rather emphasises the growing importance of fostering critical thinking, higher-order application, core literacies and collaborative capacity, within ethically-driven learning contexts.

Generative AI challenges traditional modes of teaching and learning in a number of ways. Rapid access to information and the ability to use tools such as ChatGPT to write essays, produce code, make calculations, or summarise readings changes the ways that students engage with knowledge, in some ways reducing the traditional number of 'steps' or processes required to unlock new information, such as writing, problem-solving, summarising or referencing. At the same time, new challenges emerge from the ease with which these steps are resolved, requiring teaching and assessment that keeps in step with generative AI as a new substrate of the learning process.

AI systems are imperfect and lack the ethical and critical capacity to sift through and determine the veracity of information, or detect biases – indeed, generative AI tools may reproduce social and cognitive biases based on the parameters and information available to them. While this may change in the future, it still requires staff and students to engage with generative AI as a component of the learning process rather than a substitute. It is therefore essential that staff are supported in developing critical literacy and capacity in the use of generative AI tools, not only in order to support their own work but to develop these capacities in students. Best practices from fellow institutions in SA, as well as leading global universities, point to the value of 'AI orientation' as part of student onboarding alongside dedicated review and discussion of generative AI tools in course outlines and introduction, writing workshops, assessments and practical activities.

The UNESCO guide provides an overview of some of the teaching and learning strategies that may be complemented by the use of generative AI. It also highlights the importance of conducting whole-

institution audits to assess the potential value that generative AI can add to teaching and learning, determine potential challenges and risks, and plan for cost-effective implementation. Designing effective monitoring systems forms part of the implementation of generative AI tools, particularly given the emphasis on proving that quality teaching and learning has taken place outside of traditional assessment modalities.

ChatGPT is a widely known and used generative AI tool. There are a number of ways that it and other AI tools can be used to create exciting, collaborative and meaningful learning experiences. For students, they can be used to develop critical thinking capacities by offering activities that require analysing, critiquing or building on information accessed through the platform. A number of examples have been provided above, with simple inclusions being:

- using an AI tool to answer an assignment prompt, and annotating the generated assignment with personal reflection and evaluation of the content as an in-class activity or using Track Changes.
- comparing an AI tool's results to problem-solving prompts alongside practical experiences, e.g., in the case of engineering, medicine, or design. This is particularly useful given the nature of geological shifts, biological anomalies, and other dynamics that may contest or contradict the information being processed by the AI tool.
- allowing an AI tool to be uses in assignments while allocating marks for reference to specific practicals, class discussions, and other shared experiential knowledge.

Paid applications such as Chat GPT-4 have increased these model's capacity for reading longer texts, able to provide insightful comments on full-length texts. It can also be used to set up an enquiry workflow. The key is to good use is effective prompts which ensure that ChatGPT goes from reading a text to providing insights needed. Institutions can build an 'AI tutor' as part of an existing LMS. It is recommended that UJ develop a monitoring tool to identify whether and how students and staff have used an AI tool such as ChatGPT in their research writing, and to establish whether AI generated searches and prompts have been applied.

The Scholarship of Teaching and Learning (SOTL) is critical to navigating the adoption and adaptation to generative AI use including in research. Undergraduate and postgraduate research modules and activities, and academic research activities generally need to consider the ethical and practical implications of generative AI tools within different fields. This includes using generative AI to develop research instruments, code or analyse data. Important privacy risks emerge when considering the institution's intellectual property and confidentiality regulations alongside the use of third-party applications for data processing. Additionally, new considerations around generated content ownership also apply, for example, where generative AI has been used to produce a significant proportion of the discussion in published research.

ASSESSMENT INTEGRITY

The purpose of assessment is for students to demonstrate their learning. Generative AI requires significant shifts in how learning is assessed given that current assessment modalities may be easily circumvented through the use of generative AI tools. This has implications for plagiarism and academic dishonesty, but furthermore undermines the primary outcome of meaningful learning taking place, and the processing of information into knowledge through analysis, application and experience.

There are several ways to mitigate the risks of academic misconduct through generative AI in the design of an assessment.

For example:

- assign more formative assessments
- do more assessed work in class / synchronously
- design assessments with practical requirements
- ask students to submit rough notes with the final work
- assign assessments to be completed in class, such as presentations, self-reflection tasks, in-person class tests, and so on
- ask students to hand-write assessments in class
- identify clear criteria for marking rubrics and assessment modalities
- require students to use the most recent resources available
- encourage collaborative online annotation of texts
- change the format of the task / submission to include formative assessments
- add the requirement for personal knowledge or experience
- ensure that assessments evaluate the student's ability to argue, or to provide analysis, or evidence
- require students to make analytical, fact-checking or evaluative critiques of the AI response
- assign peer review tasks
- ask students to reflect on their own thinking and writing processes on written feedback forms

It is important for assessment to consider what is to be learned and what students should be able to demonstrate at the conclusion of a course or module. A note from UK universities highlights the importance of drawing industry and social partners into the revision and rethinking of assessments that emphasise the application of knowledge to practical conditions and challenges. Group assessment, including peer evaluation, is one way to build layers of formative and summative assessment into the design of courses. Service projects with reflective and theoretical components can also build critical analysis into the practical dimension of learning. Cost and time constraints are unavoidable considerations when thinking through alternatives to existing assessment methods, which in turn requires thinking about how multi-departmental or cross-disciplinary panels or working groups could support any number of generative AI assessment processes within a given term or semester. Allowing students to choose between using generative AI or not, with effectively delineated criteria for each assessment type, may also provide more scope for those students interested in other modes of learning and conducting research.

ACADEMIC INTEGRITY

Academic integrity comprises honesty, trust, fairness, respect and responsibility. These values should underpin all academic work by UJ students and staff irrespective of technologies used. A holistic understanding of academic integrity extends to the whole University.

The inappropriate use of generative AI for teaching, learning and research may contravene academic integrity. In such cases, academic dishonesty results. For these reasons, this Practice Note must be read in conjunction with UJ's Policy on Plagiarism and Disciplinary Code and Procedures for Employees, Regulations for Student Discipline, and the Student Regulations.

To present the work of someone else or of a generative AI tool, in whole or in part, as one's own, is academic dishonesty. To mitigate the risks of academic misconduct, in the context of generative AI, it is recommended that:

- lecturers clearly communicate with students – in learning guides and in class conversations – whether and how they may use generative AI in their course and for which assignments.
- students and researchers be transparent and sign a declaration that the work is their own.
- where generative AI has been used, the declaration should include an acknowledgement of the tools used, with indications of for what and how these were used (see Appendix B for an example of such a declaration template).
- students and researchers take responsibility for any factual errors or fabricated references in their work, even if these were generated by AI tools.
- There should be awareness that with advances in AI autonomy, work generated could become increasingly original.
- Whilst there are no conventions as yet for referencing, there is a suggested approach from the University of Queensland, Australia. In brief, these are based on the APA guidelines for personal communication **and** correspondence as the content is generally not recoverable.

In-text references:

Author of generative AI model, Year of version used

Example: (OpenAI, 2022) or OpenAI (2022)

In the Reference list:

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

Example: OpenAI. (2022). *ChatGPT* (Dec 20 version) [Large language model]. https://chat.openai.com/

Note that the complete transcript of the response obtained to a prompt can be included as an appendix.

Notwithstanding any declarations as to the veracity of the tools, AI-text detection tools[6] have limitations. Accusations of academic dishonesty based on detection tools alone may be false and further engagement with the content as well as with the student/s and researcher/s would be required before action can be taken against this kind of academic dishonesty. The low reliability of AI writing detection tools in general (Heikkilä 2022; Milano et al 2023) requires that an assessment of the content of material not rely on an AI checker alone.

[6] These include OpenAI's AI Text Classifier, CheckGPT, Content At Scale, Writer.com's AI Content Detector, Originality AI, Crossplag's AI Content Detector, GPTZero, and Turnitin's AI-writing detection score.

ETHICAL CONSIDERATIONS IN THE USE OF GENERATIVE AI

Generative AI tools can be used to improve teaching and learning through troubleshooting, developing resources, evaluating outputs, generating dummy student responses, and identifying new activities and pedagogical strategies. It can be used to assess language proficiency, offer students personalised learning support, and make sense of large amounts of data or complex scenarios. However, these also create new challenges in the ethical use of generative AI for teaching and learning.

First, it must be noted that there are inherent biases in AI tools, and concerns related to privacy, accessibility and equity, and sustainability. The two major biases in AI are cognitive bias and gender / racial bias. AI does not 'know' the facts, or what is right and wrong; it only reproduces based on the content it has been able to gather. Secondly, generative AI tools give the developers the means to gather data about users without their permission and for unknown purposes.

Privacy issues should be foregrounded in concerns around the use of generative AI. There have been several public cases of data leakage, where generative AI has reproduced sensitive or personal information gathered from users. This further raises concerns about intellectual property and data confidentiality, particularly in the use of demographic and qualitative data. While generative AI has been lauded for its value in marking or grading assignments, using it to mark reflective and personally-embedded work has serious ethical implications, both for the privacy of the student and for the potential dissemination of personal information through ineffective security parameters.

Additionally, it is important to have clarity on the data storage/ data protection policies of generative AI tools such as ChatGPT, as well as AI plug-ins for existing programs. Where institutions are using third-party tools for teaching, learning and research, ongoing evaluation of privacy and data storage policy is essential to protecting the academic freedom and freedom of information on university campuses. This includes the right of refusal, scrubbing of sensitive geo-data or log-in information, and so on[7]. The difference in terms of service between free and paid-for versions of AI tools should also be considered.

Affordability means that those who can afford it are privileged in respect of its use. Unless institutions provide blanket or subsidised access to generative AI tools, it is likely that students with greater financial means will be able to maximise the benefit of these tools for their academic performance, and/or be able to afford upgrades that outpace existing usage, plagiarism and assessment policies in place. The alternative would be to restrict the use of generative AI except under authorised conditions or using university-approved tools, although this presents with planning and monitoring demands.

Finally, sustainability concerns have been raised regarding the environmental impact[8] of ChatGPT and related generative AI tools, alongside human rights concerns regarding the manner in which the tools are developed. The University needs to consider the legal and ethical implications of the generative AI enlisted to support institutional functions, as well as prioritise research, collaboration and development for ethical, open-source and low-cost alternatives.

[7] https://www.lexology.com/library/detail.aspx?g=33bf4b4f-ffd9-4bf1-bfc1-7c790d86a22f.

[8] https://medium.com/@chrispointon/the-carbon-footprint-of-chatgpt-e1bc14e4cc2a).

CONCLUSION

UJ recognises the benefits of generative AI for learning, teaching and research, underscored by the following principles for responsible use:

- Be informed: Before you use a generative AI tool, you should "research who or what company developed the tool, how it was developed, how it works, what functions it can perform, and what limitations and/or risks it presents" (Gutiérrez 2023). This includes regularly checking for updates and reports on bugs or data leaks.
- Be transparent: indicate which tools were used, and how you used it.
- Be ethical: distinguish between what you produced and text/image produced by AI tool through citation and quotation marks.
- Be responsible: for example, limit the use of generative AI tools to the early stages of writing and research – to inspire, brainstorm, plan – rather than produce content.

RECOMMENDATIONS

Each domain in the University will be impacted differently by the use of AI generators. Care should be taken across all domains to ensure that appropriate measures are in place to encourage the critical use of these applications. The assurance of the integrity of learning and teaching, assessment, and research and academic integrity must be maintained.

As the adoption and adaptation of generative AI in higher education expands, it may become necessary to consider a core course or set of progressive micro-credentials in critical AI literacy, ethics and skills. Resource and support facilities for the use of generative AI should be housed within the library and information services in order to appropriately locate AI tools within the domain of research and knowledge.

Scholars such as Crawford et al (2023) and Nah et al (2023) argue that the introduction of generative AI in higher education will increase the need for deeper education on ethics, critical thinking and analysis, as well as issues in social justice, inequality and ecology. Students need to be equipped to validate, verify, and critique sources of information, including answers generated by chatbots. They also need to be aware of the limitations of these tools, including those identified by their creators, as well as the ethical and legal considerations that apply when making use of generative AI tools and platforms.

It is critical to consider what effective penalties for generative AI misuse may constitute, both for staff and students. It is likely that a wide survey of ideas, inputs and strategies will need to be considered given the continually changing nature of AI and the differences between disciplines. Incentives can also be offered that prioritise alternatives to AI use, e.g., using resources such as books or journal articles, or conducting snap research with peers on campus. Sharing personal information, using chatbots to screen commercially or personally sensitive work, or analyse confidential data, are some of the issues that will need to be managed in orienting staff and senior students to the use of generative AI.

APPENDIX A:
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APPENDIX B:
EXAMPLE OF A DECLARATION TEMPLATE ON THE USE OF GENERATIVE AI IN ACADEMIC WORK

Name and surname:	
Student / staff[9] number:	
Faculty:	
Department:	

Name the specific work (e.g., assignment, academic article, report, etc.):

Submitted to (e.g., module name, journal name, publisher):

I _____ hereby confirm that:

1. The document I have submitted / contributed was written by me.
2. I have acknowledged the use of any generative AI tools as / where relevant (list below as applicable).
3. I acknowledge awareness of any updates to the generative AI tools used, up to the date of this submission. This includes AI plug-ins or assistants included in existing programs, such as Grammarly or Atlas.TI. I take responsibility for any fabricated references or factual errors stemming from the use of these tools.
4. I understand that plagiarism, including *self*-plagiarism, is academic misconduct. I have not used the content in this document before. If it has been submitted for assessment previously, it is properly cited.
5. I have appropriately cited or indicated the use of AI-generated content in the document where applicable.
6. I acknowledge that any undeclared use of generative AI will constitute academic dishonesty and will be dealt with according to relevant University policy.
7. I understand that I will be held accountable and liable for any academic misconduct that arises in breach of any relevant University policy, as well as for the legal or financial consequences of such infringements.

Acknowledgement of generative AI tools used:

Generative AI tool used (list each separately)	Purpose	Explain the extent of use of the generative AI tool

[9] Includes postdoctoral research fellow(s) and/or visiting/virtual academics.


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