Generative AI in Research Guideline

Section 1 - Introduction

(1) The University of Newcastle (University) recognises there are legitimate and beneficial applications for generative AI (GenAI) in research. Researchers, including students conducting research, may use generative AI tools within the bounds of appropriate operating principles, which are conditioned by the Australian Code for the Responsible Conduct of Research, the Responsible Conduct of Research Policy, and external funding and publishing bodies. Students must also beware aware of and consider the academic integrity implications of GenAI and adhere to the Student Code of Conduct and Academic Integrity and Ethical Academic Conduct Policy.

(2) GenAI technologies are tools that can be used to increase the efficiency of work practices via the unprecedented ability to manipulate and generate new content or data based on analysis of existing information. These capabilities present evolving opportunities and risks to Researchers that cannot be fully anticipated at this time. GenAI should only be used when it is the most appropriate solution for a service delivery or research problem. It should always be considered against other, traditional tools and should only be used if it maximises the benefit for the research.

Section 2 - Purpose

(3) The purpose of this guideline is to develop Researchers understanding of the applications, benefits and ethical considerations of using GenAI in research. It aims to equip Researchers with the knowledge to effectively integrate GenAI into their work to enhance research capabilities whilst minimising risks.

(4) This guideline is based on the current state of the technology and policy landscape. Given the rapidly evolving nature of AI technologies this guideline provides general advice only and will be regularly updated to remain a relevant resource for the research community.

Section 3 - Scope and Audience

(5) This Guideline should be referred to when considering the use of GenAI in research conducted under the auspices of the University.

(6) This Guideline is intended for use by Researchers of the University.

Section 4 - Definitions

(7) In the context of this document, the following definitions apply:

a. GenAI: any tool, system or software that can be used to generate new content in one or more formats (code, text, images, audio, video, etc);
b. hallucination: an output generated by artificial intelligence that is incorrect or misleading.

Section 5 - Potential benefits of using GenAI in research

(8) GenAI has great potential to accelerate scientific discovery and improve the effectiveness and pace of research and verification processes. The potential benefits of GenAI include:

a. improved efficiency and productivity by streamlining critical analysis, synthesis, design and writing processes, including grant, fellowship, and project proposals and publications;
b. summarising and synthesising content;
c. support of non-native speakers in producing texts in multiple languages;
d. producing text summaries from extensive and diverse sources;
e. automatically retrieving and contextualising a wide body of knowledge quickly.

(9) Despite the potential for GenAI to support research, these tools cannot replace a Researcher's creativity, reasoning, judgement, and critical thinking.

Section 6 - Potential risks of using GenAI in research

(10) GenAI must be used with caution, and it is currently inappropriate in some research processes due to inherent risks. Some risks are associated with the tool's technical limitations and others are due to the tool being used in ways that affect the integrity of the research practices. Researchers remain fully responsible for their research outputs, and must ensure they can verify and validate them.

Privacy and Data Security

(11) GenAI tools may capture user data and use it for other purposes. Therefore, Researchers are responsible for protecting unpublished or sensitive work by not uploading it into online AI systems without assurance that the data will not be re-used to train future models or for the untraceable use of data. Only data that would be appropriate to share with external organisations including third party copyrighted materials, confidential or sensitive information should ever be considered for inputting. Information not appropriate for input into AI systems includes, but is not limited to:

a. sacred cultural or religious practices;
b. locations of vulnerable species;
c. national security information;
d. police records;
e. primary materials related to export controls;
f. credentials;
g. information about research partners;
h. financial information;
i. health information etc.

(12) In accordance with the principles of responsible research conduct outlined in the Australian Code for the Responsible Conduct of Research, Researchers are accountable for any ethical or legal breaches such as but not limited to plagiarism or copyright violation. Data sovereignty and disclosure must always be considered when planning the use of GenAI in research and included in the data management to demonstrate how information privacy, including potential for re-identification, and cyber security risks have been addressed. Data or information that is commercial-in-

confidence, collectively owned as Indigenous Cultural and Intellectual Property, or is protected by copyright, should never be input into AI tools for research purposes.

Accuracy and Integrity

(13) GenAI content is increasingly polluting the internet. It can create authoritative-sounding and convincing outputs that may be incorrect, incomplete or biased posing a risk in terms of the reliability of the information. Researchers must carefully and critically review the output and results created by GenAI. In particular, Researchers must consider the random nature of GenAI tools, and the tendency to produce different outputs from the same input which will affect the reproducibility or robustness of research conclusions.

Bias

(14) GenAI operates as a black box that provides little information about how its outputs are generated. This has the effect of defining parameters that may reflect specific cultural or commercial values and norms that implicitly bias the content produced. In particular, minority views may be omitted as they are less common in the training data. This may limit the user's autonomy and agency by providing predetermined solutions or narrowing the ranges of possible outputs.

(15) Researchers must take responsibility of the integrity of the content created by GenAI in consideration of the following:

a. AI solutions that rely on sub-optimal quality data may result in sub-optimal project outcomes and recommendations;
b. Algorithms that contain systemic and repeatable errors may lead to prejudiced decisions or outcomes;
c. Researchers should clearly demonstrate that utilised data models are designed and used in line with a focus on diversity and inclusion;
d. Researchers should clearly demonstrate that the dataset used for AI-based tools and technologies is representative for the problem being addressed;
e. Regular monitoring of data models and outputs is recommended.

Section 7 - Guidance for the writing process

(16) Despite challenges and risks, Gen AI can significantly enhance the reporting of research work if used responsibly. It can be used to enhance the linguistic quality of a submission, such as improving grammatical accuracy, correcting typographical errors, enhancing formatting, ensuring clarity etc. The following should be considered:

a. Generative AI and AI-assisted technologies should only be used in the writing process to improve the readability and language of the manuscript
b. The technology should always be applied with human oversight and control and authors should carefully review and edit the result, as AI can generate authoritative-sounding output that can be incorrect, incomplete, or biased
c. Authors are ultimately responsible and accountable for the contents of the work
d. Authors must not list or cite AI and AI-assisted technologies as an author or co-author on the manuscript since authorship implies responsibilities and tasks that can only be attributed to and performed by humans
e. Researchers should declare the use of generative AI in all scientific writing and outputs.

Section 8 - Guidance for the use of AI to analyse and draw insights from data

(17) GenAI may be used in certain scenarios to stimulate critical or creative thinking by providing new insights or perspectives. Under appropriate circumstances, GenAI tools can assist with the analysis of large amounts of non-sensitive data, saving time from a procedure requiring manual analysis. It is not a replacement for the level of critical thinking, reflexivity and contextual understanding required for robust qualitative work.

(18) Researchers should never use data created by GenAI in the scientific process, for example falsifying, altering or manipulating original research data.

(19) Researchers should be transparent in their use of AI tools. This includes details regarding which AI tools have been used and when, how they were used, and the effect their use had on the research process. Input (prompts) and outputs should be retained to provide where relevant in line with open science principles.

Section 9 - Guidance for peer review

(20) Gen AI should never be used to perform peer review activities due to the risk of unfair assessment that may arise from the tool's limitations such as hallucinations and bias. Moreover, it safeguards the unpublished work from potential security exposure.

Section 10 - Guidance for journal submissions

(21) Researchers need to comply with the publication guidelines provided by each individual publisher. Many publishers now have specific instruction relating to the use of AI in their journals. Please see the below examples:

a. British Medical Journal: Publishers' and journals' instructions to authors on use of generative artificial intelligence in academic and scientific publishing: bibliometric analysis
b. Taylor and Francis: Editors' Statement on the Responsible Use of Generative AI Technologies in Scholarly Journal Publishing

Section 11 - Guidance for grant applications:

(22) Applicants are advised to exercise caution if considering using GenAI tools in the preparation of a grant application with the understanding that applicants are accountable for any misinformation or factual errors including those generated by AI. Researchers must be aware of and comply with and the specific information provided by individual funding bodies. Examples are listed below:

(23) NHMRC - Policy on the Use of Gen AI in Grant Application and Peer Review.

(24) ARC - Policy on the Use of Gen AI in ARC Grant Programs.

Section 12 - Considerations for ethics applications:

(25) GenAI should never be used in the writing of the critical components of human ethics, animal ethics or biosafety applications as the Researchers' critical thinking and decision making in developing these principles is critical to them being implemented in the conduct of the research.

(26) The use of AI in human research invokes additional concerns related to violation of the ethical principles outlined in the National Statement on Ethical Conduct in Human Research including potential biases, data handling, interpretation, autonomy, risk minimisation, professional competence, data sharing, and confidentiality. Where relevant, Researchers should include the use of AI tools in the data management plan, and this should be conveyed to potential participants in the information statement provided to them.

(27) Researchers involved in the development of AI tools are required to consider the data used in the process. Noting that HREC approval is required for the use of retrospective data for developing and validating AI technology.

Section 13 - Use of GenAI by research students

(28) Consistent with the information outlined elsewhere in these guidelines, students conducting research may consider using GenAI tools where appropriate to do so for the benefit of the research and their development as a Researcher. They should stay informed about the evolving benefits and risks associated with GenAI use.

(29) The principles of transparency of use are paramount. Research students must consult with their academic supervisor before utilising a GenAI tool in their research or writing. Further, a plan should be developed between the student and supervisor that outlines how the tool will be used, its intended impact on the research quality and the development goals of the student (linked to the learning outcomes of their program of study). Following the use of GenAI, the student would be expected to reflect on its impact on the Research and themselves as a developing Researcher and declare its use in a transparent manner.

(30) Examples where it may be appropriate to consider the use of GenAI tools include:

a. copy editing and proofreading purposes (see Section 5): The types of academic editing undertaken must be in line with that of the Guidelines for Editing Research Theses as provided by the Institute of Professional Editors and the Australian Council of Graduate Research Inc. All Researchers should be aware of the privacy and data security implications of using GenAI tools.
b. To analyse and draw insights from data (see Section 8): For instance, to stimulate critical or creative thinking by providing new insights or perspectives.

(31) Higher Degree by Research students are required to certify that the work embodied in the thesis is their own work. As GenAI technologies evolve, the challenge of identifying AI-generated content in academic settings is growing. The University does not expect staff to use third party AI detection software on student research outputs. In many instances, the most telling indicator of GenAI usage may be significant changes in the style, tone, or quality of a student's writing. For guidance to supervisors on how to respond to instances of possible inappropriate HDR student use of GenAI, please refer to the HDR GenAI Referral Flowchart.

Section 14 - Reporting concerns about the use of GenAI

(32) Any concerns regarding the potential inappropriate use of GenAI in research should be discussed with a Research Integrity Advisor or raised with the research integrity office: researchintegrity@newcastle.edu.au.

(33) All concerns will be assessed according to the Research Breach Investigation Procedure.

Status and Details

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Enquiries Contact	Jodie Marquez Director, Research Ethics & Integrity

Glossary Terms and Definitions

"University" - The University of Newcastle, a body corporate established under sections 4 and 5 of the University of Newcastle Act 1989.

"Risk" - Effect of uncertainty on objectives. Note: An effect is a deviation from the expected, whether it is positive and/or negative.

"Applicant" - Where referring to a student, an applicant is an individual seeking entry to a program or course offered by the University or its partner organisation/s. For all other uses of this term, the generic definition applies.

"Student" - A person formally enrolled in a course or active in a program offered by the University or affiliated entity.

"Health information" - As defined in the Health Records and Information Privacy Act 2002, or any replacing legislation.

"Learning outcome" - In accordance with the AQF definitions, the expression of a set of knowledge, skills and the application of the knowledge and skills a person has acquired and is able to demonstrate as a result of learning.

"Program" - When referring to learning, a program is a sequence of approved learning, usually leading to an Award. For all other uses of this term, the generic definition applies.

"Research" - As defined in the Australian Code for the Responsible Conduct of Research, or any replacing Code or document.

"Staff" - Means a person who was at the relevant time employed by the University and includes professional and academic staff of the University, by contract or ongoing, as well as conjoint staff but does not include visitors to the University.

"Thesis" - A dissertation involving research by a candidate for the award of a Higher Degree by Research (HDR) qualification.