RESEARCHER GUIDE



Ethical use of generative artificial intelligence (AI) for research purposes

https://bit.ly/3yTsA0G

UNIVERSITY OF CAPE TOWN
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Centre for Innovation in Learning & Teaching

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Updated August 2025 (originally compiled 2024)

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Published by the Centre for Innovation in Learning and Teaching, University of Cape Town

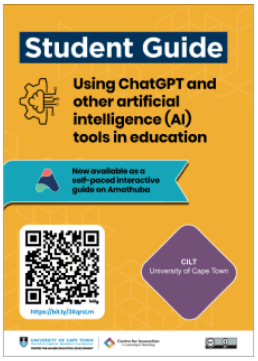
This guide shows some of the ways the wide availability of generative artificial intelligence (genAI) tools are being used to support research processes. It also raises concerns and limitations with using genAI tools. Research organisations, thesis supervisors, ethics committees, and publishers do often impose limits or require declaration of the use of genAI tools given the many concerns about authorship, ethics, and transparency.

AI is a fast-changing space, and the information in this guide is likely to become out-of-date quickly! This version was compiled in 2024 and updated in August 2025, and will continue to be updated regularly to include significant developments. This is in support of the UCT Framework for Artificial Intelligence in Education: Generative and Other AI in Teaching, Learning and Assessment (June 2025).

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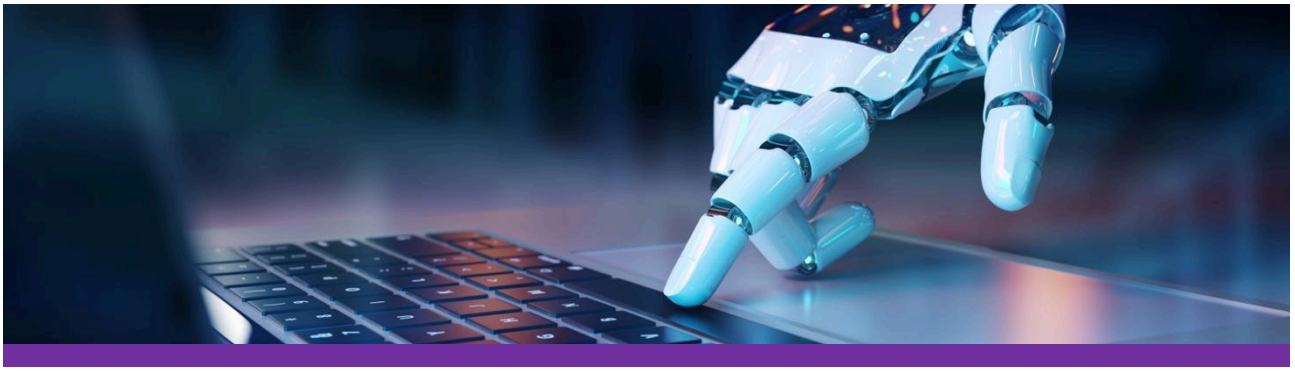












Contents

General use 4
General characteristics 4
Research integrity considerations 5
Research process stages with generative AI examples 7
- Stage of research: Conceptualisation and research idea generation 8
- Stage of research: Literature review 9
- Stage of research: Data collection/transcription 10
- Stage of research: Data analysis 11
- Stage of research: Write up 12

Bespoke research tools 13
Conclusion 14
References 15

Introduction

The availability and rapid uptake of artificial intelligence tools poses both challenges and opportunities for researchers. This guide looks at how generative AI (genAI) is being used in research, the implications for research integrity, some examples of AI tools, and suggestions on how these tools can be used productively and ethically across the different stages of the research process. Examples of interest to researchers, students, supervisors, and others are included.

Generative AI outputs are deemed unacceptable as substitutes for what researchers are expected to perform. Nevertheless, there may be routine tasks performed as part of research processes where genAI can be used productively and ethically. For example, researchers have used genAI to summarise or transform large amounts of text and data so as to identify what to investigate further. Researchers are required to be accountable, which includes assessing risks around bias and ethics. Ethical concerns can arise if, for example, by uploading sensitive interview transcripts to an external website this would breach data privacy policies.

Balancing productivity and ethical concerns requires careful consideration. This is a changing and uncertain space requiring those involved to develop shared understandings. This guide provides some cases and examples that can support this process.



Applications of genAI

This guide deals primarily with genAI based on large language models, such as ChatGPT, Gemini, Copilot, and Claude. These have natural language interfaces to genAI that invite one to have a conversation, however these are not human conversations, nor is the information necessary factually correct or free of bias. Gen AI operates through large language models (or LLMs) that are essentially responding to your prompts by predicting a likely next word. Given an input, the models work out the most likely next word. These are essentially statistical predictions based on the analysis of huge quantities of texts and the transformer architecture which allows the data to connect multiple parameters to improve the probability. (see Transformer Explainer; created by the Georgia Institute of Technology)

By crafting prompts one can control and direct to some extent what is generated so that it will be more useful. Providing context to generative AI will often improve the response. For example, it may be useful to include your role, the knowledge area, or any constraints on the output. One can also request generative AI to follow a preferred style of writing, by providing some examples.

> **Prompt:** *Please help me write helpful information for university researchers. I want you to understand this writing style so I will provide some examples. Remember my writing style as being MY_STYLE. Afterwards when I ask you to write using MY_STYLE, then follow this style of writing.*

Use cases other than academic writing might include computer programming, and marketing applications where the expectations about the type and style of the outputs would be different. More generic strategies for using genAI are introduced in other CILT Guides (also see A Generative AI Primer). Specialised genAI tools have been developed for different tasks. Examples of the tools orientated to research contexts are listed later in this guide as part of a research cycle.



General characteristics of genAI

Knowing how genAI functions can help with crafting prompts and anticipating cases where it will be useful. Here is a list of some of the key capabilities of genAI:

- **Language generation:** GenAI models are trained on natural language text and can generate coherent and grammatically correct content. This is useful for tasks like summarising articles, drafting papers, or generating ideas.
- **Large-scale information base:** GenAI models are trained on a wide variety of sources, which provides them with a broad information base. Researchers could use these models to gain insights into various subjects, identify relevant literature, and explore interdisciplinary connections.

- **Conversational:** Typically**,** genAI models are trained to conduct conversations in a customer support role, so they are polite, direct and avoid sensitive topics. There are many commercial applications for this chatbot use case. This style lends the tools to be used in a support role, to give feedback as an editor, tutor, or idea generator. There are opportunities for follow-up questions and requesting revisions to improve responses.
- **Speed and efficiency:** Generative AI models can quickly process large amounts of new data and generate outputs immediately. Researchers could save time and effort on tasks such as identifying possible sources for literature reviews, in getting assistance with data analysis, or brainstorming to get started on writing tasks.
- **Pattern recognition:** Generative AI models are capable of identifying patterns, trends, and relationships within data. Generating code to perform additional analysis and outputs on data is also possible, such as in Python or R. This can be valuable for discovering new insights or generating hypotheses in research.
- **Customisability:** Researchers can tailor generative AI models to their specific needs. Generative AI can be asked to adopt specific genres for creating a variety of outputs suitable to different audiences. Researchers can fine-tune models to influence the types of outputs produced.

Considerations and limitations

Being aware of the considerations and limitations of using genAI helps identify where unreliable responses are more likely and where checking is needed. Here is a list of some of the most serious limitations that could impact on researchers' use of genAI:

- **Lack of transparency:** The inner workings of many generative AI models are complex and opaque, making it difficult to understand how they generate their outputs. Since the results of many of the genAI outputs do not include sources, it can be difficult to identify errors in the generated outputs.
- **Errors and inaccuracies:** As the name implies, large language models are trained to enable them to generate natural sounding human language. It is important to remember, there is no fundamental cognition or understanding involved. Plausible sounding errors and inaccuracies, sometimes called 'hallucinations', are common. This means anyone using genAI needs to conduct a rigorous critical evaluation of all outputs.
- **Inherent biases or errors in training dataset:** Generative AI models learn from the data they are trained on, which may contain bias or particular perspectives. Researchers need to critically evaluate outputs for bias and/hegemonic perspectives.
- **Potential to fake data:** GenAI can also be used to create fake data or manipulate existing data. Researchers need to critically evaluate any data.
- **Reproducibility issues:** GenAI outputs may not be reproducible, as the same model may produce different outputs each time it is run due to the random nature of the generative process. This can make it difficult for researchers to replicate results and make claims about reproducibility.
- **Not like a research library:** There is no underlying scholarly research repository or library organisation which the tools are using to 'look up'. Rather use library research databases or discovery platforms like PRIMO, and consult with a librarian or expert in your field who can help you identify relevant titles and verify their authenticity. (See the Harvard Library Guide on Artificial Intelligence and Scholarship for further reading.)
- **Criticality**: Novice researchers might not develop certain skills when using generative AI in their research process. This impacts the ability to be accountable and critically evaluate the output generated by AI tools.

- **Social justice:** The limited functionalities of free versions of these genAI tools raises concerns around social justice. Can the institution expect students and staff to pay for monthly subscriptions? How does access to paid subscriptions benefit some and harm others? Who will benefit and who will be harmed? These are important questions researchers need to engage with.



Research integrity considerations

Researchers and students should familiarise themselves with the widely discussed integrity and ethical issues that must be faced when considering the use of AI tools in a research context.

Journals and publications It is not acceptable to use AI in assisting with the production of most parts of research publications. AI cannot be listed as a co-author and many journals require a declaration on AI use. Some journals will allow AI for conceptualisation or copyediting but not for original contribution in discussion or conclusions. Most journals have clear instructions on how to acknowledge the use of generative AI in research, which differ from disciplines to discipline. Where AI is legitimately used to generate text, this should be referenced in line with the referencing convention used and include further declarations, such as the prompts used. See UCT Libraries AILibGuide on how to cite AI.

Below are some examples of publishers' policies in regards to the use of AI tools. These policies may be adjusted as the tools change and develop, so always check the relevant journal's most recent guidelines.

Authorship policies of three large publishers

Publisher	Authorship policy	Summary
Springer-Nature (2025)	LLMs, such as ChatGPT, do not satisfy the authorship criteria. Use of these tools should be mentioned in the appropriate section of their academic paper, such as the 'methodology' or 'acknowledgements' section. Use of an AI-tool for "AI assisted copy editing" purposes does not need to be declared.	Generative AI cannot be an author or co-author. If used this should be clarified in the appropriate section.
Taylor & Francis (2025)	Authors must be accountable for their research work per the publishing agreement. Generative AI tools must not be listed as an author. Authors must clearly acknowledge any use of Generative AI tools in the Methods or Acknowledgments section.	Generative AI cannot be listed as an author or co-author. If used this should be clarified in the appropriate section.
Elsevier (2025)	Authors should not list AI as an author, nor cite AI as an author. Authorship implies	Generative AI cannot be an author or co-author. AI cannot

	responsibilities and tasks that can only be attributed to and performed by humans. In the writing process, Generative AIs should only be used to improve readability and language of the work. Authors should disclose the use of AI in the published work.	be cited as an author.

(Adapted from Rahman et al 2023, p.3)

In South Africa, research associations, ASSAf and SciELO, recently approved the Guidelines for the Use of Artificial Intelligence (AI) Tools and Resources in Research Communication. These guidelines emphasise that authors are solely responsible for ensuring the authenticity, validity and integrity of the content in their manuscripts. Any use of content generated by an AI application, since it is not the work of the authors, must be appropriately acknowledged. Not acknowledging such use could amount to plagiarism. The guidelines highlight the importance of transparency, reiterating that concealing the use of AI tools is unethical and violates the principles of transparency and honesty in research. While the current UCT Authorship Practices Policy does not explicitly mention genAI, the criteria that qualify contributors for authorship would, in general, exclude genAI.

The UCT Senate Ethics in Research Committee (EiRC) Guidelines and recommendations for the use of generative artificial intelligence (AI) tools in research has re-iterated the long standing values for guiding research integrity:

- Honesty in all aspects of research
- Professional courtesy and fairness in working with others
- Good stewardship of research on behalf of others
- Transparency in conducting research and dissemination of findings
- Fair practice from conception to implementation of research
- Shared accountability in the conduct of research
- Indigenous knowledge recognition and epistemic justice

In practically applying these values to the use of genAI, the EiRC also offers some guidance for operationalising these into research practices.

Transparency: Being open and honest about the use of tools in all aspects of research writing includes providing an explanatory note about the use of AI tools in outputs. Where appropriate, update the plagiarism declaration/honour pledge to include a requirement for students to describe their use of AI. Lance Eaton's Syllabi Policies for Generative AI is a collection of statements used in various universities that provide some examples of guidance for studentsl. There is further guidance to students on using AI in another CILT Student Guide: Using ChatGPT and other AI Tools in Education.

Research supervision: At the start of any research process, it should be made clear to students or collaborators whether and how generative AI tools can be used. Promote transparency and responsible research by explicitly discussing the consequences of academic dishonesty and inappropriate use of AI, and explaining what constitutes ethical use in a research context. This includes providing access to resources and opportunities to upskill.

Data privacy: Be aware that data inputted into generative AI applications may be used for training the AI model, which could lead to privacy concerns. Some genAI application versions allow you to change this setting so that input data is not used for training. Depending on the data, one would need to confirm compliance with UCT Privacy and Data Protection Policy.

Data analysis and consent: If you are planning to input data collected from students or study participants into a genAI application, you need to ask for consent. This will mean that you must change consent forms to ask participants for permission to use genAI to analyse your data.



Research process stages and AI tools

There is an array of specialised genAI tools that could be used in ethical ways in each stage of a typical research process in order to enhance process, collaboration and efficiency. In this guide, various research stages and examples of genAI tools are explored. Note, however, that genAI is developing fast and there are rapidly emerging new tools and practices.

The examples used are based on experiences at UCT with tools that are generally being used in our research community. The information provided is based on reviews of literature as well as real-life examples. As the tools are rapidly changing and developing, so some information may become outdated

While research takes many different forms and processes, this guide will discuss six common stages namely, conceptualisation and idea generation; literature review; data collection; data analysis; write up and dissemination.

Conceptualisation and research idea generation

Research function	Tool used	Example of use	Opportunities and ethical concerns
Brainstorming	**ChatGPT** **Gemini** **Copilot** **Claude**	Describe your research area or problem, and associated or potential research questions, approaches, and angles will be produced. Example prompts: > How has Soja's Third Space been used in the Student as Partners context? > What has not yet been researched in the Student as Partners context? > Please help me formulate research questions around student as partners, third space, South Africa, rules of engagement	Quick high-level overview of concepts. Easy to digest, accessible information (often in bullet form) Like asking a research assistant rather than an expert. Need to fact check. Models update their training data at different times
Mind mapping	Ideamap.ai (imports into freemind)	Intuitive mind mapping and brainstorming	Can be overwhelming in its complexity / vastness of ideas
Abstract writing	**ChatGPT** **Gemini** **Copilot** **Claude**	Create an initial draft of an abstract or compare one to yours. Provide bullet points and ask it to write as a paragraph.	Helps with starting or rethinking an abstract. Cannot represent your ideas fully.
Problem statement and rationale	**ChatGPT** **Gemini** **Copilot** **Claude**	Once you have a research topic, ask for help to formulate a problem statement or rationale.	Follows standardised format. What is generated is likely hypothetical and without any references. May provides a general response without accessing any original articles.

Literature review

Research function	Tool used	Examples of use	Opportunities and ethical oncerns
Repetitive and tedious structured tasks	**ChatGPT Gemini Copilot Claude**	Given the appropriate text, can be asked to format references or produce summaries in a specified format.	Is especially useful for specific use cases. Can have errors, so needs critical editing.
Automate time-consuming tasks	**Elicit.org**	Can assist with searching and summarizing papers, extracting data, and synthesizing your findings	Full paper search, but only searches the semantic web. Additional functionality is requires payment (free version has limitations) Does not replace engaging in more detail with selected papers that are key to your research as critical nuance and key findings might get lost in the generative AI summary.
Literature reviews	**ChatGPT Gemini Copilot Claude and other specialised tools**	Provide specific research topics or questions to generate related search terms for searching literature databases and web searches. Prompts: > Can you suggest some keywords and search strategies that I can use to find relevant sources on "Student as Partners" and equity in higher education? > Who are the seminal authors in the Student as Partners and equity literature?	Great overview of current trends and debates. Can't provide references, may hallucinate when asked for locally specific information Information is not necessarily correct: If asked for example for scholars on a particular topic in the Global South, scholars are often made up because they may be underrepresented in the training data.

Literature mapping	**litmaps.com**	Generates a map of relevant articles related to a specific seed article. Show the top citations and references related to a seed article. Selecting any article one can see who the article cites, and which articles are citing it.	Visual view of research fields using citations. Uses citations from a large database. Some papers are behind paywalls.
Evaluate articles	**scite.ai** (paid subscription only)	Helps with evaluating scientific articles by looking at citations. Shows how a publication has been cited by providing the context of the citation and a classification describing whether it provides supporting or contrasting evidence for the cited claim.	Contextualises article citations. Mostly medical sciences.
Summarises articles	**SciSpace AI (previously called Typeset)** **NotebookLM (can log in with UCT credentials)**	Allows one to upload PDFs and summarise articles. Additionally it can respond to questions related to articles. Question prompts: > What are novel methodologies in these papers? > What are unexpected results in these papers? > Are there any future research directions or unanswered questions suggested by these papers?	Aims to help understand research papers better. Has some limitations and requires assessing the responses critically.
Identify findings in literature	**Consensus.app**	A search engine that uses AI to find insights in research articles.	Extracts findings directly from articles.
Identify key parts of article	**Semantic reader**	Used to understand document structure and merge it with information via tooltips and other overlays. Category labels include Goal, Method, and Result.	Can customise what is shown. Works better for structured articles.

Data collection/transcription

Research function	Tool used	Examples of use	Opportunities and ethical concerns
Interview and survey questions	**ChatGPT**	With some context, generative AI can help develop, evaluate and test interview protocols or survey questionnaires.	Useful for standard types of questions. May not be appropriate for your target group.
Transcriptions	Otter.ai Turboscribe.ai	Allows live edits of transcriptions while listening to the transcript. Supports analyses of texts by for example providing a list of key words/terms used.	Can learn different accents and improves transcription, identifies speakers. Currently only English transcriptions are possible. Most features require payment. Free version is limited.

Data analysis

Research function	Tool used	Descriptions of use	Opportunities / Concerns
Code generation	**ChatGPT** (new models include Python Advanced Data Analysis (Python ADA))	You can provide data in a file, then ask for Python code to be generated that will analyze the data. The Python code can be executed. Follow-up prompts can be used to refine the analysis.	Generated Python code can be used to analyse other datasets without uploading any more data. Claude also has this functionality. Python code should be checked before reporting. Uploading sensitive data would not be appropriate.
Advanced data analytics	**ChatGPT Plus**	Can analyse large multimodal models. It generates text outputs (natural language, code, etc.) given inputs consisting of interspersed text and images.	While less capable than an expert in many real-world scenarios, it performs well for many professional and academic tasks. May generate harmful advice, buggy code, or inaccurate information.

Text analysis	**Voyant**	An open-source, web-based application for performing text analysis. It supports scholarly reading and interpretation of texts or corpus.	It can be used to analyze online texts or ones uploaded by users. Prolonged text-loading time and the challenge of gathering information using some visualization tools.
Text thematic analysis	**Maxqda and related data analysis tools**	Summarise texts, coding of themes, and identifying common themes across your codings. Can help to explain the coded content.	Can choose the language and the length of the summary. Can modify the summaries as needed.
The AI-first Code Editor Build	**cursor.sh** (based on VScode)	software faster in an editor designed for pair-programming with AI.	Scaffolds code, helps with writing code.
Quantitative analysis	**formulabot.com**	Supports quantitative analysis	Supports importing common existing data formats.

Write up

Research function	Tool used	Descriptions of use	Opportunities / Concerns
Writing assistance	**quillbot.com**	Assists with academic research and writing tasks.. Can improve writing style or paraphrase to shorten, provide vocabulary suggestions, and offer alternative word choices.	Helps brainstorming during the writing process. Offers explanations for its suggestions. Can be misused to obscure plagiarism.
Writing style	**wordvice.ai**	Helps fix spelling, punctuation, and style errors and improves the clarity and flow of your text.	Has explanations as well as tips to improve writing style. Works on all kinds of academic texts.
Grammar and style	**Grammarly**	Support academic writing by offering spell and grammar checks.	Works in Word and Google Docs, plugin. Free version works well. Can be a bit annoying when it's installed as a plugin.

Create content	Jenni.ai	Given prompts will suggest additional content for articles, websites, etc. Different citation styles can be selected.	Beyond repetitive tasks, may have ethical concerns, depending on how it is used.

Dissemination

Research function	Tool used	Descriptions of use	Opportunities / Concerns
Copywriting	jasper.ai	Used for copywriting and marketing campaigns.	Use in research reporting and public engagement. Is a specialised tool to standardise marketing content.

Generative AI and Research Data Management

Generative AI is being used for routine data management tasks such as data cleaning, metadata generation, and reformatting data. Generative AI also allows for the creation of synthetic datasets which preserve privacy while reflecting real world patterns, streamlining processes like data sharing and analysis. This can lead to **increased efficiency**, improved **data integrity**, and fewer **human errors**. However, there are challenges, including **bias in AI models**, which can lead to skewed data, and concerns around **privacy** and **re-identification** when using synthetic data. Additionally, AI models often act as "black boxes," lacking transparency, which can complicate **reproducibility** in research. **Data quality** also plays a crucial role — poor input data can result in unreliable AI outputs (see Sacramento State University Library guide).

Research ethics and data ethics

Research ethics and data ethics have raised many concerns with using AI (see The Alan Turing Institute: What is data ethics). The UCT Senate Ethics in Research Committee (EiRC) guidelines and recommendations discuss further issues and emphases the role of a researcher to make and defend their work.

Where AI has been used in the research data management process, consider including a README file when curating your data to explain how it was created and could be reproduced for interpreting the data correctly. This ensures that your research is accessible and reusable by others, improving transparency and replicability.

Bespoke research tools

Some universities are developing their own tools based on generative AI platforms to support research processes. An example is the suite of tools developed by the Academic Insight Lab

based on the YouAI platform. This includes both free and subscription-based tools.

- **Purpose statement feedback:** A research purpose statement is a concise, clear description of the specific goal or aim that a research project seeks to achieve. A well-defined purpose statement serves as a roadmap for the research, ensuring it remains focused and relevant. This AI tool will provide feedback on your purpose statement to ensure it succinctly describes the study population, approach, and setting of the study. https://youai.ai/ais/purpose-statement-feedback-tool-b50417ed
- **Research problem statement feedback:** Crafting a compelling research problem statement is often a daunting task, fraught with the complexities of contextualization, identifying knowledge gaps, and establishing significance. Receive personalized feedback powered by AI to ensure your research problem appropriately frames the research problem you plan to address. https://youai.ai/ais/research-problem-statement-feedback-tool-8d9f5704
- **Lit search:** designed to help researchers and academics in their literature search process. It is intended to assist you in identifying keywords, synonyms, search strings, and more, based on the key concepts and variables of your problem statement https://youai.ai/ais/litsearch-guide-a73c20ee/use
- **Writing diagnostic tool:** This AI-powered writing diagnostic tool evaluates academic writing samples, offering a holistic assessment through the lens of SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis. This sophisticated tool adheres to established best practices for academic writing and identifies key areas for improvement to enhance scholars' effectiveness and success in their research communication. https://youai.ai/ais/writing-diagnostic-2834c729



Conclusion

This guide does not suggest that a student or researcher should or must make use of genAI tools, but that they must apply their minds critically and practice good scholarship if they choose to make use of the tools. The guide shows some examples of how to use the tools, but that this is by no means an endorsement of any specific tool, or the use of genAI in research overall. Research is a human endeavour and the final accountability for any output remains with the researcher.

Generative AI can support researchers, helping with new idea generation, outlining research topics, writing abstracts and a range of other academic functions. Tools and practices are rapidly evolving and adapting. Litmaps, for instance, is specifically designed to support academic literature review and provide more consistent, reliable information. Generative AI is also widely used for performing repetitive and tedious tasks, such as summarising large text and identifying key findings from the literature.

However, there are greater concerns about generative AI used for writing an academic article and drawing conclusions and where transparency is required (Hosseini et al., 2023). Generative AI tends to produce hypothetical problem statements and research gaps with fake references. Generative AI for data analysis is currently limited and requires checking. Researchers need to show they have control, with genAI tool use being limited to a research assistant role (Rhaman et al, 2023).

References

UCT Framework for Artificial Intelligence in Education: Generative and Other AI in Teaching, Learning and Assessment (June 2025)

Senate Ethics in Research Committee (EiRC) Guidelines and recommendations for the use of generative artificial intelligence (AI) tools in research (June 2025)
UCT Libraries AILibGuide

The Ethics of Using AI Chatbots for Academic Assistance: What You Need to Know
https://www.linkedin.com/pulse/ethics-using-ai-chatbots-academic-assistance-what-you-james-nelson/
Chatbots in Education and Research: A Critical Examination of Ethical Implications and Solutions
https://www.mdpi.com/2071-1050/15/7/5614

Examples of policies for students on how they may use generative AI in a course
https://docs.google.com/spreadsheets/d/1lM6g4yveQMyWeUbEwBM6FZVxEWCLfvWDh1aWUErWWbQ/htmlview#

HybridHorizons: Exploring Human-AI Collaboration in Research Writing (1 hour webinar)
https://www.youtube.com/watch?v=f9CgCKwor_I&ab_channel=AcademicInsightLab

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