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Generative AI for emerging researchers: good, ethical or risky?

Introduction

Michael Willis

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Michael has worked in publishing for nearly 25 years. He champions the needs and aspirations of editors, reviewers and authors within journal editorial and peer review processes, advising and speaking on research integrity, publishing ethics, diversity, equity and inclusion, and researcher behaviour. Michael is content and delivery lead for the Wiley-SANLiC Author Engagement Programme.

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Poll

Which of these best describes you?

- PhD candidate or new post-doc
- Established researcher
- Departmental head
- Librarian
- Other

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Poll

Have you ever used any generative AI tools?

- Yes, during my research
- Yes, during the creation of my manuscript
- No, but I would like to learn more
- No, I don’t feel comfortable or I am not interested
- I am not sure

Today’s agenda

- how generative AI can contribute to the different phases of academic writing
- emergent cases and challenges associated with AI-supported and AI-authored writing
- how generative AI can support core principles of scientific argumentation
- how publishers view generative AI in authorship and peer review
- generative AI's impact on research integrity

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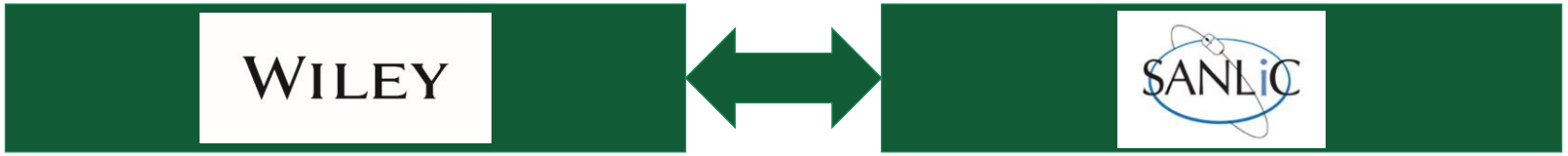

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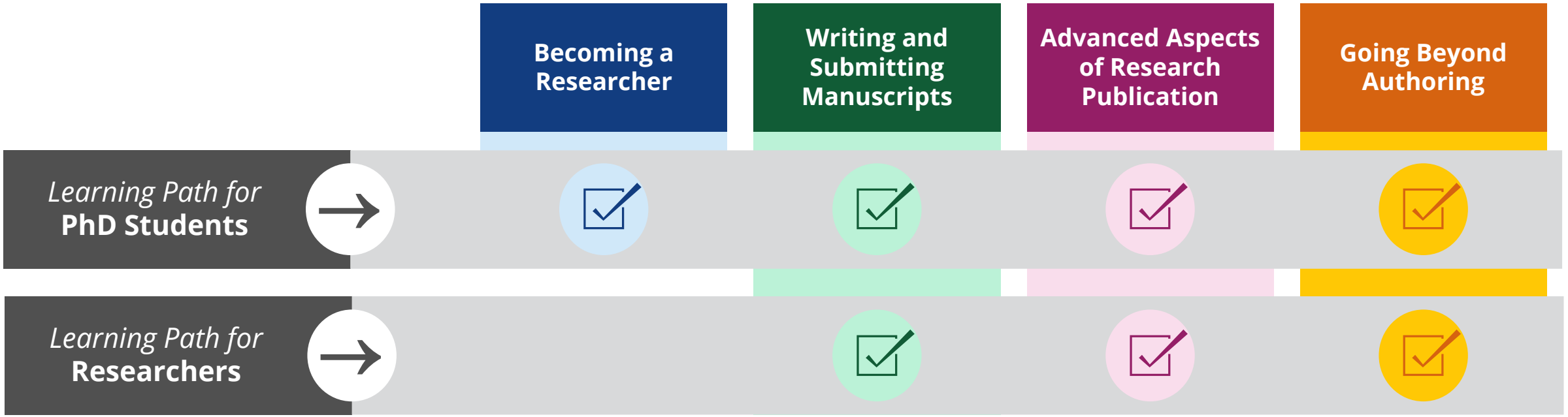

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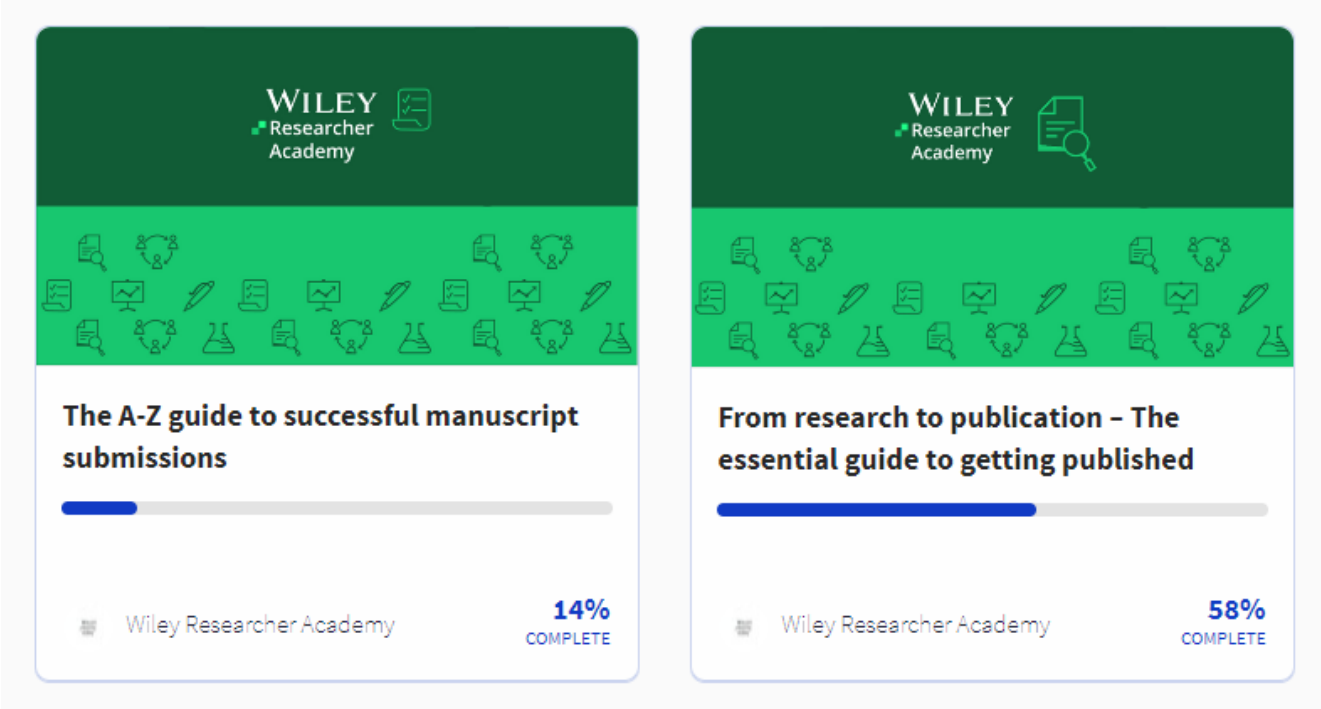

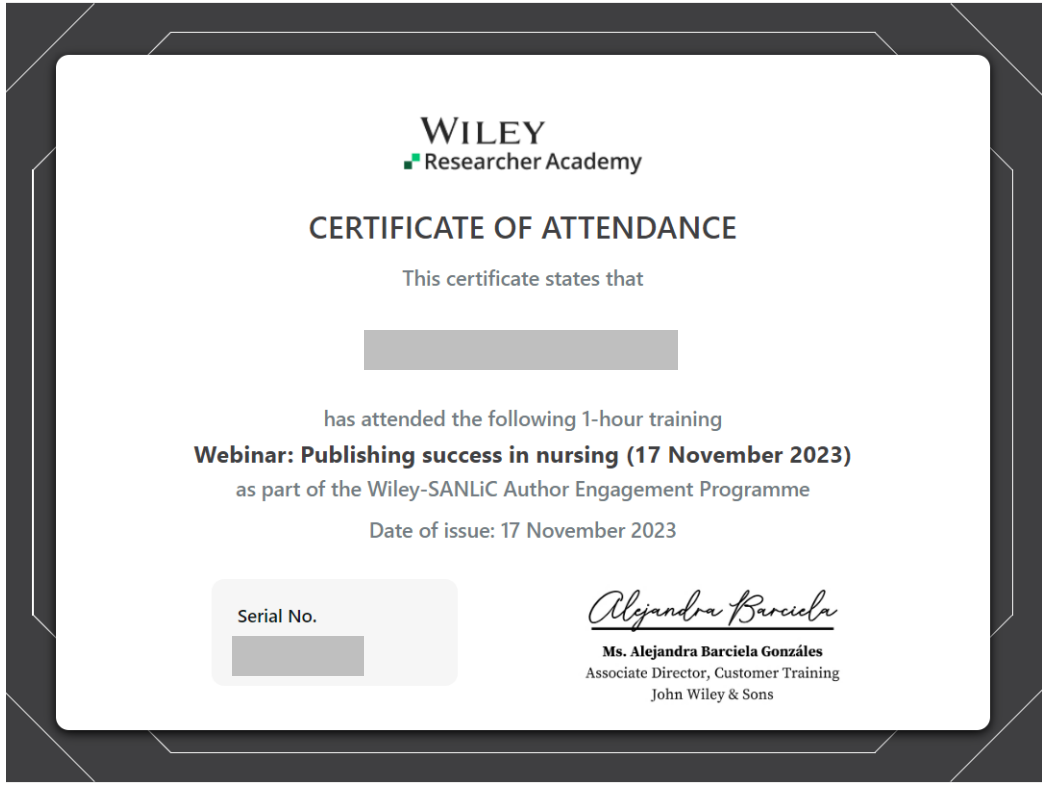

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Where to find out more

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for guidance on publishing Open Access

Wiley Researcher Academy

https://wileyresearcheracademy.com

for educational resources

Generative AI for emerging researchers: good, ethical or risky?

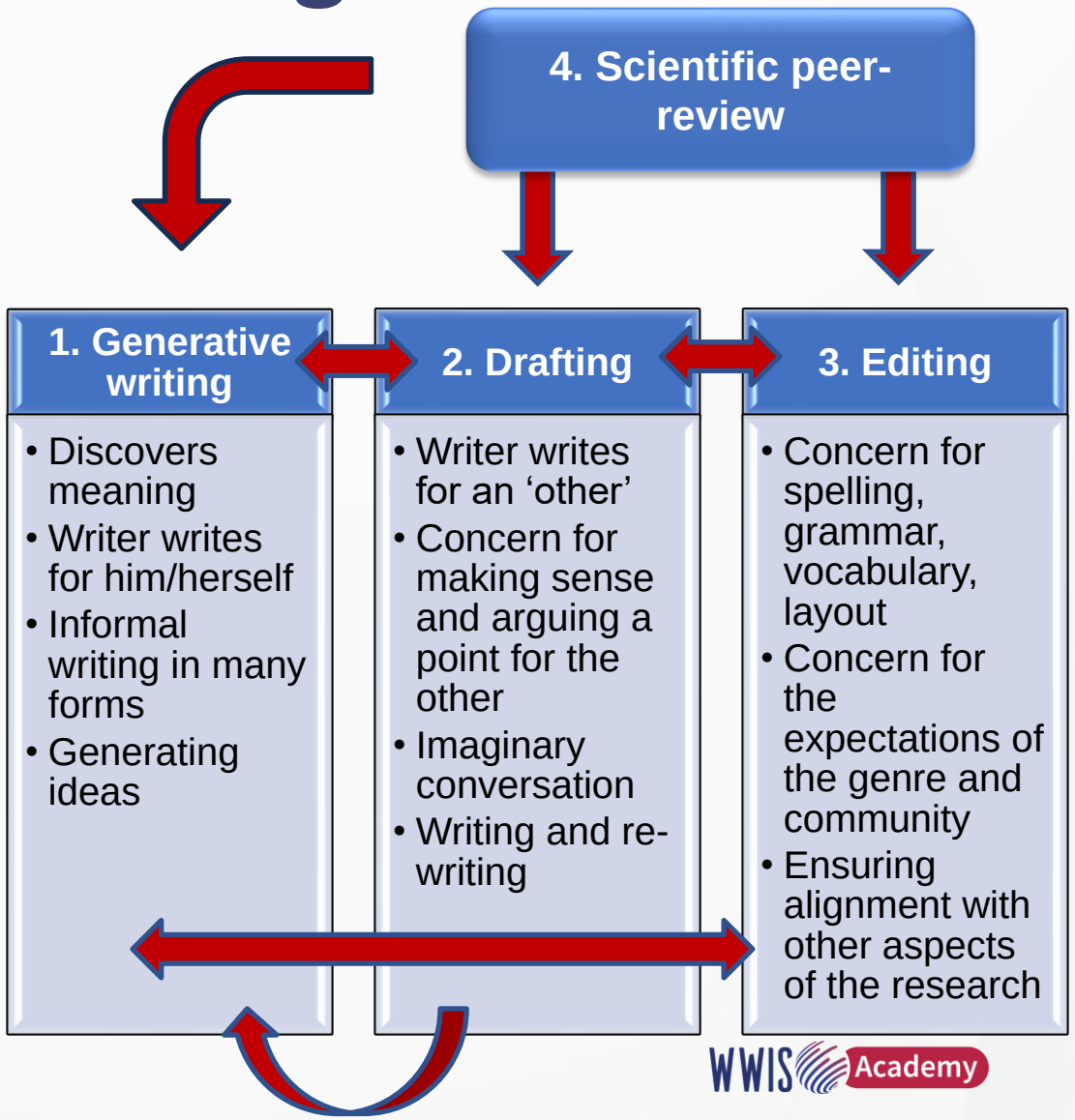
Dr Kirstin Krauss

Chief Digital Innovation Officer, ICANO Int. Ltd.

Dr Kirstin Krauss specialises in digital innovation, business development, and scientific knowledge production and assessment. He has taken on several advisory roles in areas related to research capacity building, research integrity services, education consulting, artificial intelligence, and project coordination for startup companies. In prior roles, Kirstin served as academic and Professor at a number of academic institutions. Kirstin holds a PhD in Informatics from the University of Pretoria, South Africa.

Four phases of scientific writing

1. In the **first** phase your brainstorming ideas. In such case you can write author or article driven. **Writing as a form of thinking.**
2. In the **second** phase, you need to start constructing a conversation, an argument
3. In the **third** phase you do **editing** and focus on **presentation**
4. In phase **four**: Engagement/Validation from the scientific community – reviewers, examiners, editors



turnitin

- Plagiarism / Similarity
- Predatory publishing
- Retracted research
- Citation pollution

Originality.ai

GPTZero

Scribbr

TRINKA

recite
Reference checking made easy

MENDELEY

Reference management

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HeyGPT BETA
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ChatGPT

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jenni

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Litmaps

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- Library databases
- Search strategies
- Organising strategies
- Preliminary literature reviews

Elicit

SCISPACE

Chat with any PDF

Casper AI

LATERAL

AI

4. Scientific peer-review

1. Generative writing

2. Drafting

3. Editing

AI

- **Scientific argumentation**
- **Theoretical elaboration**
- **Particularising Methodology**
- **Argument flow**
- **Weaving the golden research**
- **Paragraph flow**
- **Hedging techniques**

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Reflecting on experiments using GenAI tools to ‘generate research’

- Generating a mini-dissertation that passes
- Using GenAI to make data-theory links
  - Can I develop an evidence-based argument?
  - Can I ensure systematic rigour in the process to help the reader follow the logic of scientific enquiry?
  - Could I mimic text analysis?
- Using GenAI for proofreading/editing
- Addressing referencing issue of AI generated references

Combination of detection tools needed

Originality.ai

TRINKA

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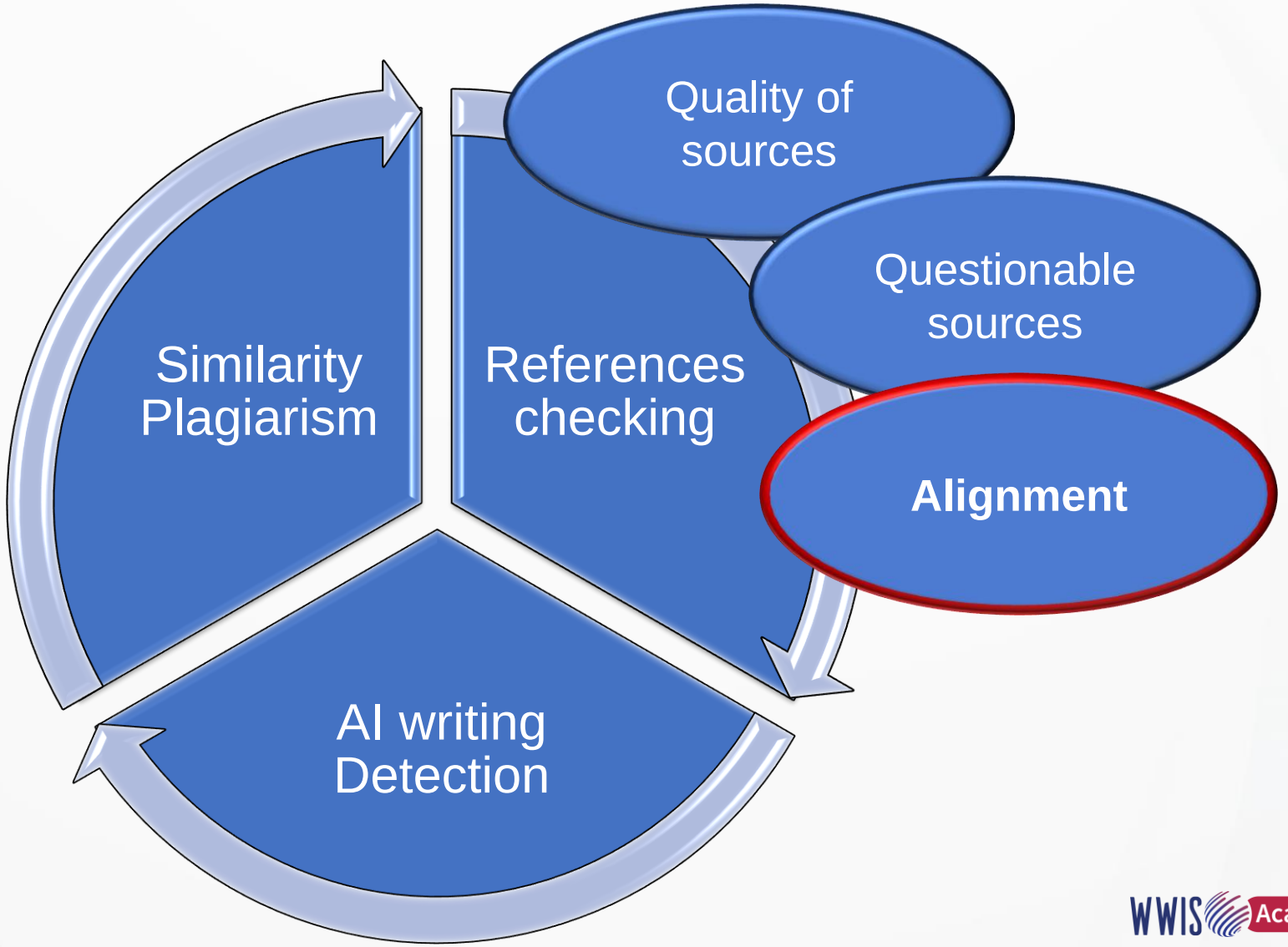
Reference checking made easy



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AI detection

https://www.cell.com/patterns/fulltext/S2666-3899(23)00130-7

- Detectors consistently misclassify non-native English writing samples as AI-generated
- Ethical implications of deploying ChatGPT content detectors and caution against their use in evaluative or educational settings

- https://www.vanderbilt.edu/brightspace/2023/08/16/guidance-on-ai-detection-and-why-were-disabling-turnitins-ai-detector/
- https://arstechnica.com/information-technology/2023/07/why-ai-detectors-think-the-us-constitution-was-written-by-ai/3/
- https://www.theguardian.com/technology/2023/jul/10/programs-to-detect-ai-discriminate-against-non-native-english-speakers-shows-study

How I mimicked the making of data-theory links using ChatGPT & ChatPDF

- Transcribe the data (auto transcribed)
- Extracted themes from the data
- Aligning the extracted themes to the research questions
- Extracting relevant quotes from the transcriptions
- Getting consistency & rigour in ‘analysis’
  - Can I consistently get the same themes from prompting?
  - Should I use all the themes that emerge?
- Can I connect my discussion and findings to a theory?

9 Sept 2023

https://futurism.com/the-byte/paper-retracted-authors-used-chatgpt

- “AI models often can jumble the facts, and may simply be too dumb to accurately regurgitate the math and technical language involved in scientific papers ”
- “ChatGPT can also produce false claims out of thin air, in a phenomenon perhaps too generously described as "hallucinating."”
- “"The whole science ecosystem is publish or perish,"
- "The number of gatekeepers can't keep up."”

ChatGPT and reflective writing

- https://automatedonline.org/2023/08/27/chatgpt-and-reflective-writing/
- https://www.forbes.com/sites/lanceeliot/2023/08/30/prompt-engineering-boosted-via-are-you-sure-ai-self-reflective-self-improvement-techniques-that-greatly-improve-generative-ai-answers/?sh=7b2447293c8e

A paper published in the journal Computers and Education: Artificial Intelligence (Li et al. 2023) recently made the remarkable claim that ChatGPT "may be capable of generating high-quality reflective responses in writing assignments administered across different pharmacy courses". As we wait for the systematic replication of these empirical findings (which we should wholeheartedly encourage regardless of theoretical and critical inclinations), I believe that some sc

A more realistic claim would be that ChatGPT can effectively reproduce certain forms of formulaic and predictable reflection that have become commonplace in tertiary education. These types of caveats are very important to add a much-needed sense of perspective to the current frenzied debate about GenAi and assessment. They should not be glossed over or taken for granted.

Forbes

FORBES > INNOVATION > AI

Prompt Engineering Boosted Via Are-You-Sure AI Self-Reflective Self-Improvement Techniques That Greatly Improve Generative AI Answers

Lance Eliot Contributor

Dr. Lance B. Eliot is a world-renowned expert on Artificial Intelligence (AI) and Machine Learning...

Follow

ChatGPT – my **initial** observations for my discipline (Information Systems)

- **Good with broad global ideas** – not good with specifics, new relations
- **Cannot contextualise research** – it can regurgitate contextualising
- Tends to produce **vanilla writing** – **smothering your own style**
- **Cannot argue, generate new arguments**
- **Regurgitates** what is already out there, hallucinates
- Fairly good with **proofreading**, bad with **structure**
  - Can help with transitional words and phrases
  - But, submit very small snippets that you can check
- Very close to **plagiarising** ideas even if Turnitin doesn't pick it up
- **Very bad with references** – everything is fake
- Good with **generating interview questions, and an interview protocol** - but needs guidance and checking
- Use it to **generate summaries or introductions**. A summary is not an original contribution
- Needs **facts checking**

What I learnt about using GenAI for theoretical elaboration

- It can be done, BUT …
- It is **shallow, inconsistent, haphazard** –
  - I have no clue if all the relevant data-theory links have been identified
  - Some of the data-theory links are weak and not the best to support the claims
- If I depend on generative AI to assist with making data-theory links
  - I will work only ‘deductively’ mostly
  - I will miss certain things
  - Lack of systematic rigour, inconsistent
  - Worldview bias embedded in AI
- Generative AI cannot get close to mimicking the principles of hermeneutics and text analysis
- I can mimic Honours and Masters level theorising

What I learnt about using GPT to assist with theoretical elaboration … *Cont*.

- AI-driven research tools can assist with the initial phases of **topic discovery**, **finding papers**, **organising literature**:
  - If used in combination with traditional more systematic and rigorous approaches
  - If thinking (especially generative thinking/writing) still resides with the author
- If **AI replaces thinking**:
  - Nothing has been internalised
  - You run the risk of entering a data collection situation with an empty head
  - Analysis can NOT begin during data collection
  - Reflection is less possible and less relevant
  - Not everyone will pick it up

Further concerns & risks

- AI Lacks **systematic rigour**
- Author and reader
  - Cannot trace argumentation
  - Cannot trace alignment, e.g., between literature themes and research questions
- As author I have distanced myself from the original text
  - Incorrect or shallow summaries of papers
  - I cannot **prove** that AI generated summaries are correct
  - I would not know that the best quotes or summaries have been extracted from the papers
- I have to be the **human actor** and **human guardrail**
- No "*inference to a better explanation*" – only existing explanations

Directions & Reflections

- AI is **not competitive**, but **complementary**
- Use a combination of tools for different phases of the process
- AI is a moving target
  - Keeping up, experimenting
  - Avoid predatory AI tools/scams
- Explore and verify AI tools, standards, consistency, accuracy, publication partners, etc.
- Understanding scientific argumentation skills will assist with Scientific Integrity

Generative AI for emerging researchers: good, ethical or risky?

Dr Lisa Wylie

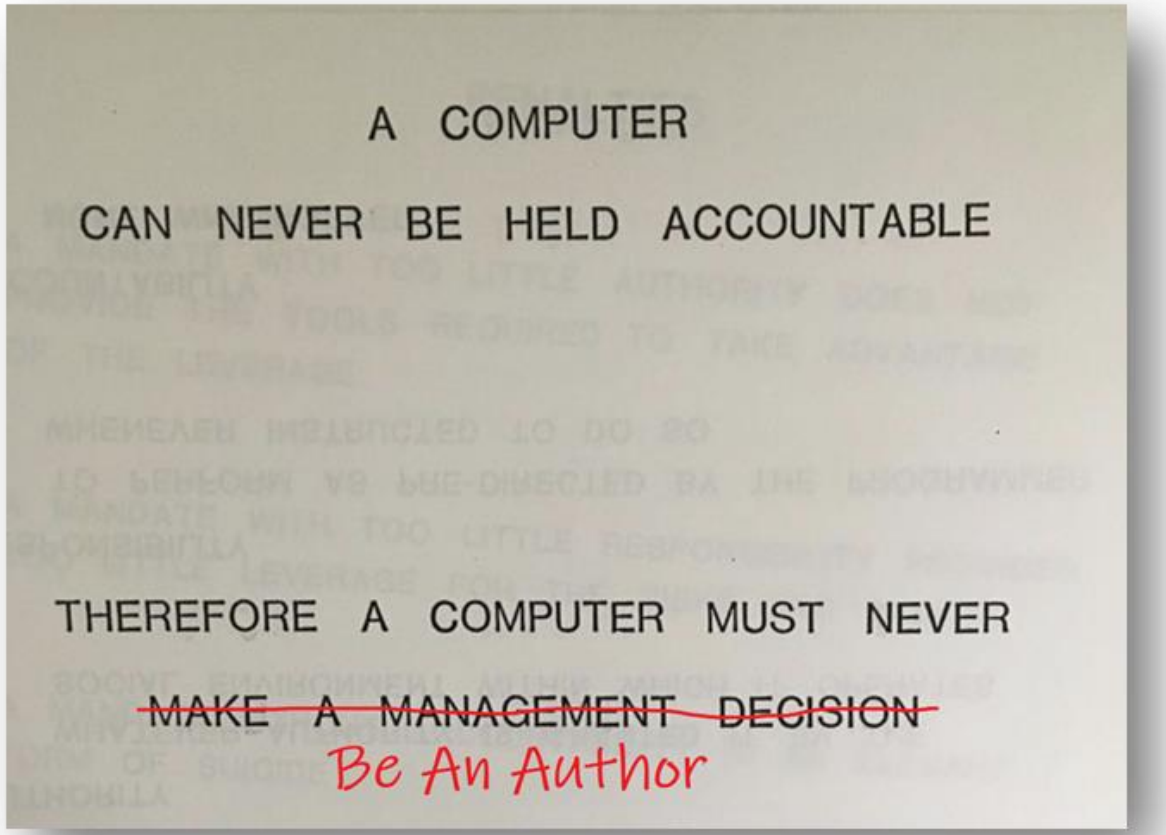
Senior Data Product Manager for Generative AI Product Strategy, Wiley

Dr Lisa Wylie specialises in data science and machine learning for the publishing industry, and has twenty years' experience in editorial, operations, and data science roles. She holds a PhD in Chemistry from Durham University, UK and is based in Glasgow, UK.

Generative AI in Scholarly Publishing

- Publishing's view on using Generative AI tools for authorship
- The Impact of Generative AI on Research Integrity

GenAI and Authorship – a general rule



Wiley's Authorship Policy for Gen AI

§Artificial Intelligence Generated Content (AIGC) tools—such as ChatGPT—cannot be considered capable of initiating an original piece of research without direction by human authors. They also cannot be accountable for a published work or for research design, nor do they have legal standing or the ability to hold or assign copyright. Therefore—in accordance with COPE's position statement on AI tools—these tools cannot fulfill the role of, nor be listed as, an author of an article.

If an author has used AIGC tools to develop any portion of a manuscript, its use must be described, transparently and in detail, in the Methods or Acknowledgements section. The author is fully responsible for the accuracy of any information provided by the tool and for correctly referencing any supporting work on which that information depends.

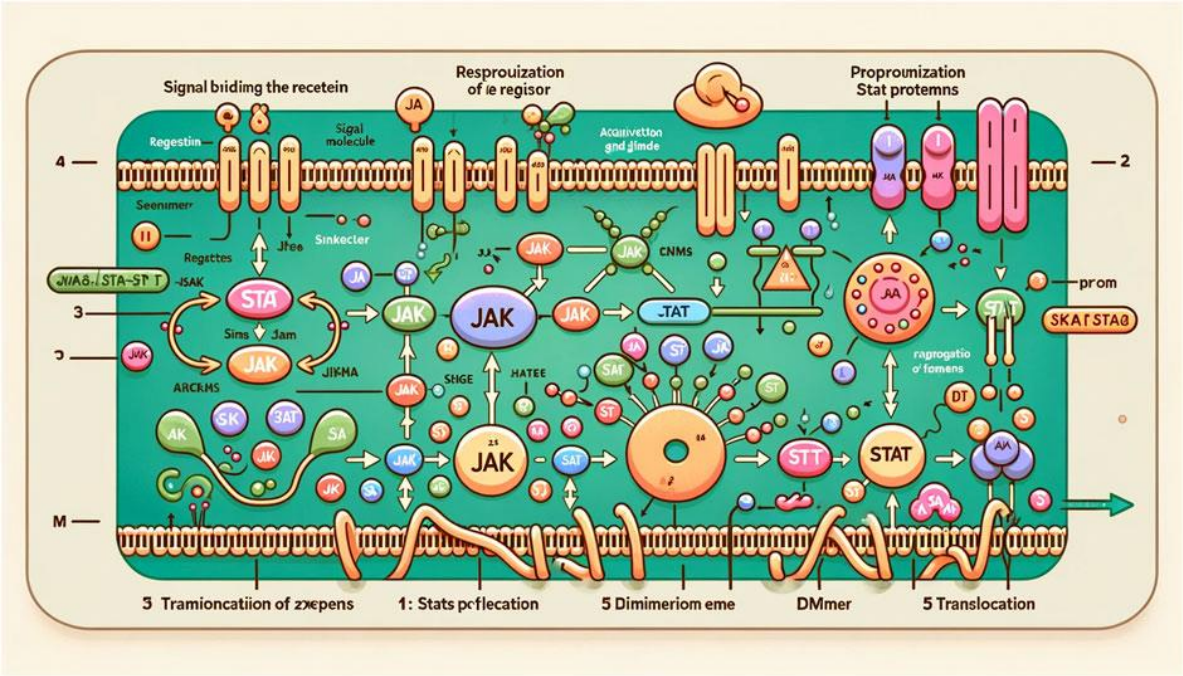
The final decision about whether use of an AIGC tool is appropriate or permissible in the circumstances of a submitted manuscript or a published article lies with the journal's editor or other party responsible for the publication's editorial policy.

For the most up-to-date information on our policies visit:

https://authorservices.wiley.com/ethics-guidelines/index.html#5

Authorship with Gen AI – best practice tips

- Be critical. Proofread everything. As the author you're accountable for all of the content you put your name to.
- Be clear. If you use GenAI in any part of the preparation of a paper, disclose it with as much detail as you are able to give.
- Be cautious. GenAI, like any tool, has strengths and weaknesses. It's better at some tasks than others, so look to take advantage of where it performs well, and avoid its known weak spots.
    - For example – be very wary of using Gen AI tools for the preparation of illustrative figures – models are generally very bad at producing mixed text and graphic information.



GenAI figure from a paper that was published in *Front. Cell Dev. Biol.*, then retracted. While the use of AI to create the figure was not an issue, the figure itself is nonsense.

GenAI in Peer Review

Is it appropriate to use GenAI tools in peer review?

Uploading review materials to a third-party GenAI tool infringes on confidentiality, privacy and copyright, per the STM's guidance. Therefore, reviewers **should not** use any GenAI tools in the preparation of their reports.

STM white paper on GenAI:

https://www.stm-assoc.org/wp-content/uploads/STM-GENERATIVE-AI-PAPER-2023.pdf

Generative AI & Research Integrity

While generative AI has the potential to significantly benefit the research community, it also poses threats to research integrity through:

- the creation of inaccurate content
- the facilitation of fraudulent content.

Addressing these challenges requires a multifaceted approach involving technological solutions, rigorous review processes, ethical training, collaborative efforts, and policy interventions.

GenAI & Research Integrity – general concerns

Inaccurate Content

There's a risk of AI generating incorrect or misleading information, especially if the training data is biased or flawed. This can lead to inaccurate research conclusions and research that is not reproducible.

Plagiarism

AI can inadvertently encourage plagiarism or make it easier to produce non-original work. Differentiating between AI-assisted writing and plagiarism is increasingly complex, requiring advanced tools and ethical guidelines.

Systemic Bias

AI systems may perpetuate biases present in their training data, leading to skewed research outcomes.

GenAI and Research Integrity – fraudulent content

AI-Generated Content

With advancements in generative AI, there is a growing risk of AI-generated research papers or peer review reports that are indistinguishable from human-written content. This technology can produce high-quality, seemingly authentic submissions, or seemingly in-depth review reports.

Data Fabrication and Falsification

AI tools can be misused to create convincing but entirely fabricated datasets and experimental details. This not only undermines the integrity of research but also poses a significant challenge for peer reviewers and editors in detecting such fabrications.

Manipulation of Results

AI can be used to manipulate results or statistical analyses to produce desired outcomes, which is particularly concerning in fields where data interpretation is complex and nuanced.

GenAI and Research Integrity – mitigating risk

Screening & Peer Review	Development and use of improved AI and machine learning algorithms to detect patterns indicative of AI-generated or fraudulent content. Strengthening peer review processes, including training reviewers and editors to identify signs of fraudulent content and encouraging more thorough and critical evaluations
Education & Collaboration	Implementing strict ethical guidelines and providing training for researchers, reviewers, and editors on the ethical use of AI in research and the risks associated with fraudulent content. Fostering collaboration among researchers, institutions, publishers, and technology providers to raise awareness about the threats of fraudulent content, and to develop collective strategies to combat it.
Policy	Enacting legal and policy measures to penalize the use of paper mills and fraudulent practices in academic publishing.

Conclusions

- GenAI tools are a fantastic resource with the potential to help researchers not just with publication but with the entire research process.
- Publishers are generally permissive of GenAI tool use, provided that use is clearly disclosed. Individual Journal Editors may have specific requirements – check before you submit.
- GenAI tools may not hold authorship of a publication.
- Be cautious in using and presenting content from GenAI tools – bias, error, and outright fabrication are always possible. Learn the technology's strengths and weaknesses.
- Be transparent – disclose your usage and be open about the perils as well as the benefits.
- Don't use GenAI to conduct peer review.
- Be vigilant and critical in your peer review and your reading - fraudulent content will only be on the rise in the coming years.
- Be curious – GenAI is an amazing technological breakthrough. Explore the opportunities it offers you.

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Q&A

For your diary

22 April: **How peer review makes you a better researcher**

21 May: **Credit and recognition**

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Publishing success in nursing

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