

AI Building Blocks Series

AI for Research

Dr Vilinda Ross

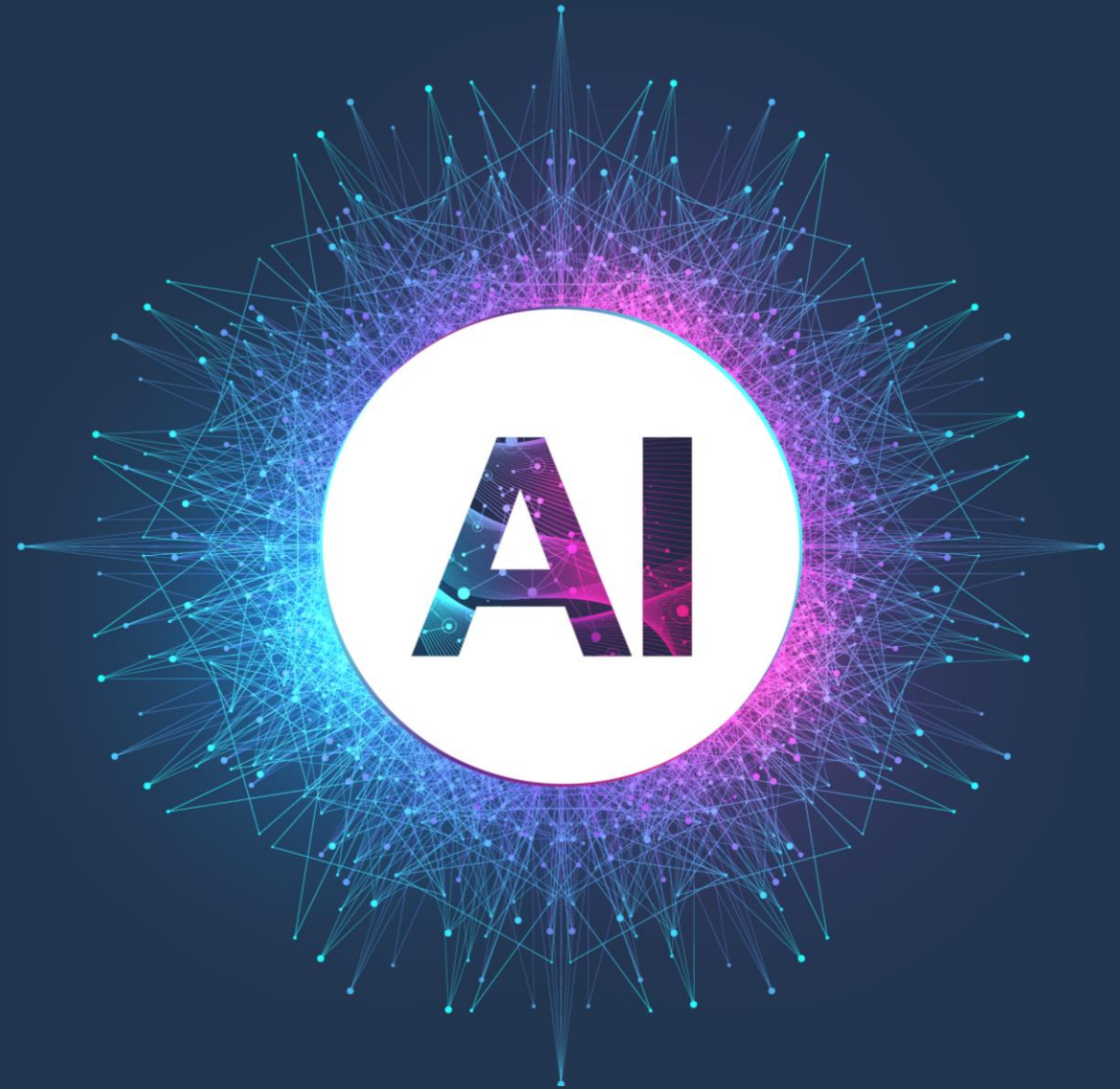
Educational Developer - CED

Dr Aidan Deery

Digital Learning Designer - CED



QUEEN'S
UNIVERSITY
BELFAST





AI Building Blocks Series

AI Foundations	13 Feb, 11am	Aidan Deery
AI Ethics	20 Feb, 11am	Aidan Deery
AI for Everyday Tasks	27 Feb, 11am	Una Lynch
AI for Teaching and Learning	13 Mar, 11am	Kirsty Gillen
Pedagogy Over Tech 7 Steps for Active Learning with AI	20 Mar, 11am	Patrick Phillips
AI and Accessibility	25 Mar, 11am	Sarah Stewart
AI for Research	27 Mar, 11am	Vilinda Ross, Aidan Deery



[Recorded Sessions: Catch up here](#)

R-A-I-S-E

Our guidance is based on the RAISE Principles:
**Responsible Use, AI Best practice,
Integrity, Support, and Equitable Access.**

Key Guides

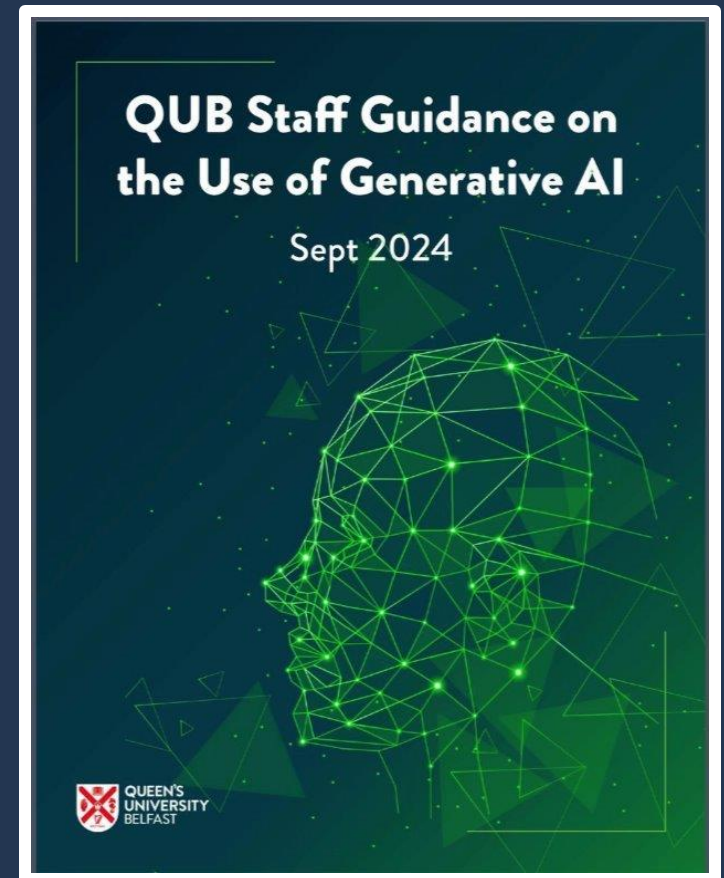
- [QUB Position on AI](#)
- [RAISE Principles: QUB Staff Guidance on the use of Generative AI](#)
- [Trailblazers Guide: AI as Your Partner](#)

AI and Assessment

- [Guidance on the use of AI in Assessment: 24-25](#)
- [Use of Gen AI in Dissertation Projects](#)
- [Use of AI Detection Tools](#)
- [AI Assessment Self-help Guide](#)

Video

Watch our short video for advice on what to look out for when starting to use Generative AI: [Click here](#)



Aims of Session

- Using AI in Research
- Practical Tips and Pitfalls
- Signposting
- AI Research Tools Demo



How are researchers responding to AI?



Survey of 2,000 researchers (2024)



The majority (76%) have used AI



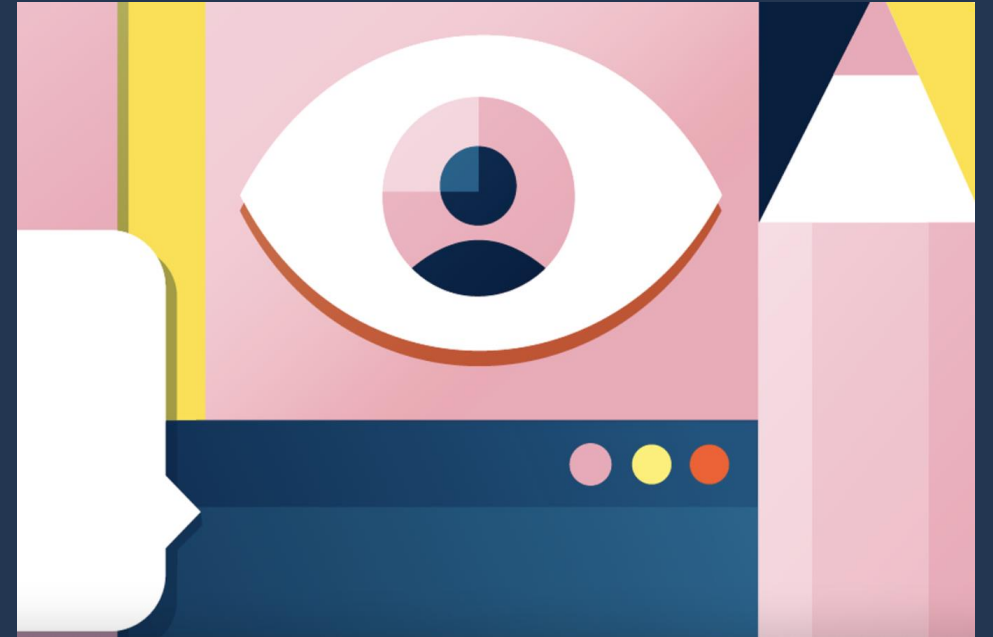
Of those that have used AI in research, 67% have felt it has benefited them



69% felt it was important to assess the implications of using AI tools

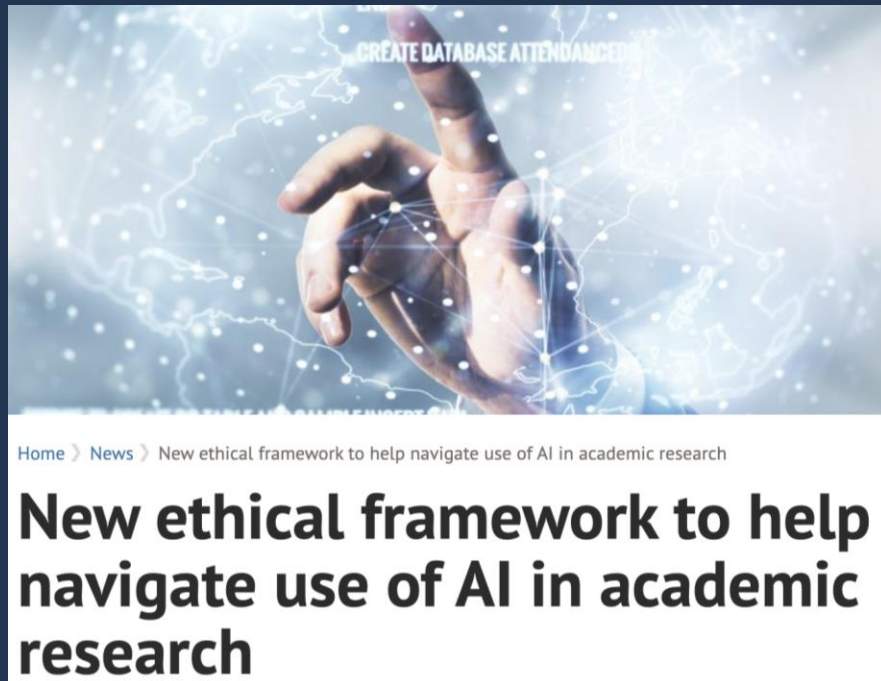


However, fears also shared



Oxford University Press, May 2024

Using AI in Research

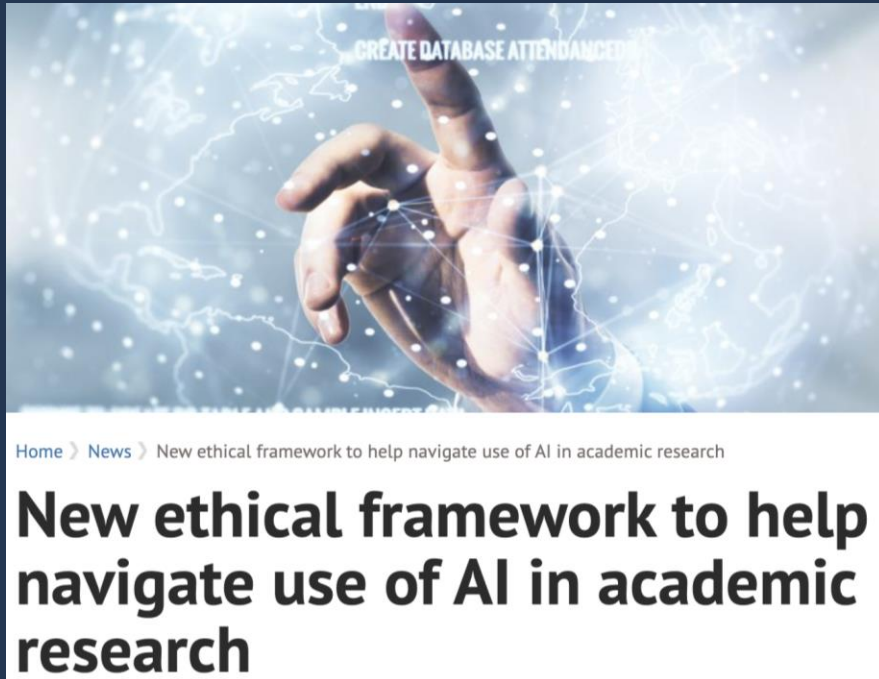


As AI tools become increasingly sophisticated, clear ethical guidelines are therefore crucial to maintaining the quality and credibility of scholarly work

University of Oxford, November 2024

Nature Machine Intelligence, Vol 6, Nov 2024, 1272-1274

Using AI in Research



The framework outlines 3 criteria:

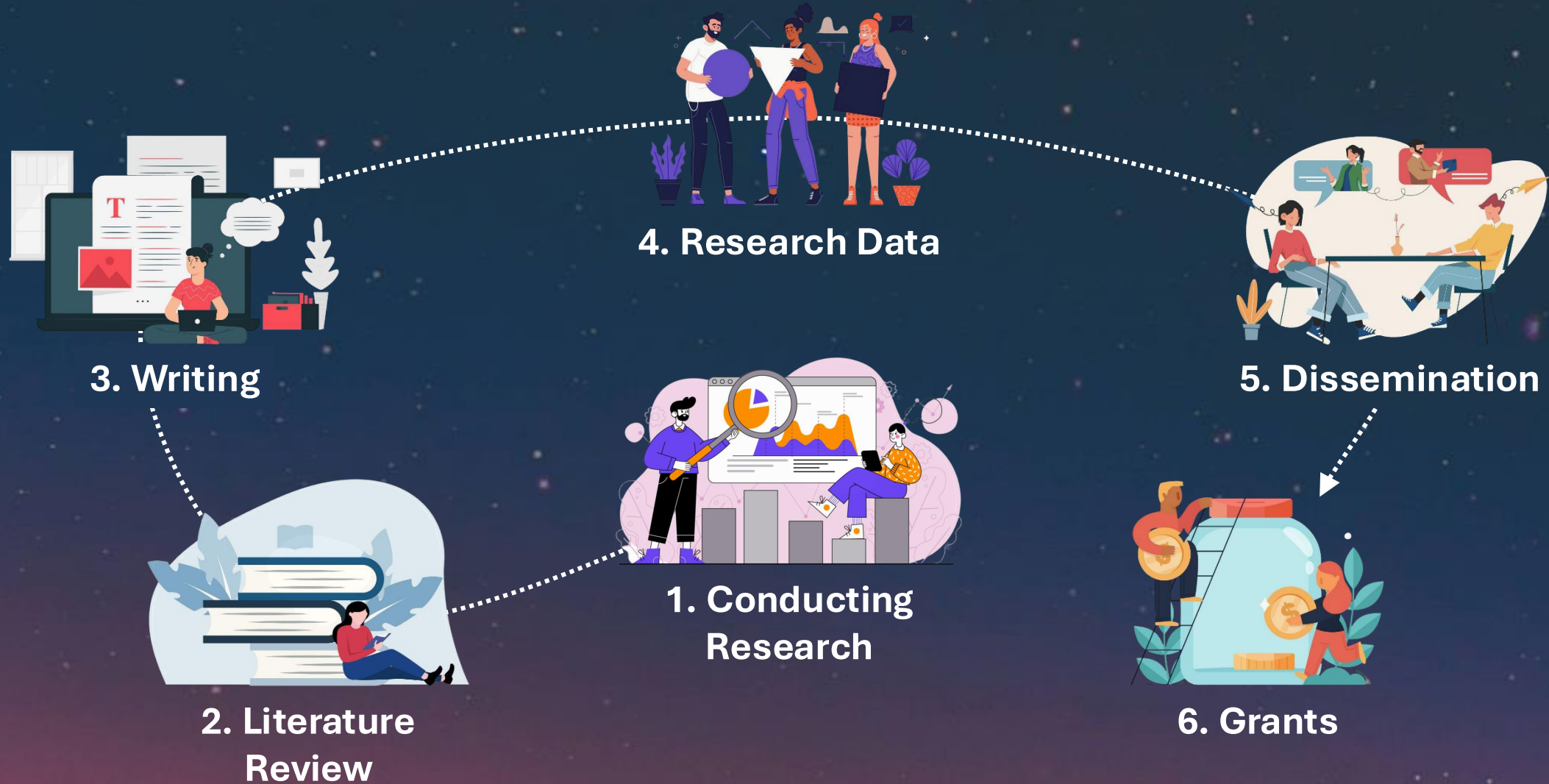
- Human vetting and guaranteeing of accuracy and integrity
- Ensuring substantial contribution to the work
- Appropriate acknowledgement and transparency of LLM use.

University of Oxford, November 2024

Nature Machine Intelligence, Vol 6, Nov 2024, 1272-1274

Using AI in Research

Choose a title below to explore how AI can be used to support research practice



Conducting Research

How can AI support the research process?

Implications – positive or negative?



Literature Review

Some examples of how AI can support the process includes:

Search – relevant literature

Synthesise existing research

Summarise articles


Reference Management



Citing AI use

Queen's Library Guide – how to effectively integrate AI tools into the literature search process



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Library / [LibGuides](#) / [AI and the Library](#) / Home

AI and the Library: Home

[Home](#) [Referencing AI](#) [Uploading content to LLMs](#) [Further Assistance](#)

Purpose: This library guide offers an overview of how you can utilize Generative Artificial Intelligence (AI) to enhance your use of library resources at Queen's University Belfast.

Remember, before incorporating Generative AI into your research or writing, ensure you:

- Review the guidelines from your course or school regarding AI usage. Consult with your Academic Advisor, Programme Director or Module Convenor to confirm if AI is permitted.
- Read the [University's Position on AI](#) where you will find further direction on:
 - [Understanding AI](#)
 - [AI in Education](#)
 - [AI in Research](#)
 - [AI for Efficiency](#)

After completing these steps, explore this guide for advice on using AI effectively and ethically in literature searches and in sourcing materials for your studies.

Key Message: Generative AI can help expedite some elements of traditional library research, but it should not be used as an alternative resource for finding peer-reviewed, academic sources. Always validate information using the Library's academic databases and its wider range of resources.

The Role of Generative AI in Academic Research	AI and Library Databases & Resources	Evaluating AI-Generated Information
<p>What is Generative AI?</p> <p>Generative AI tools, such as ChatGPT, are advanced systems that create text based on patterns learned from vast amounts of data. These tools are trained on large datasets that include books, articles, websites, and other publicly available information. By recognizing linguistic structures and common themes, they can produce coherent and relevant responses to a wide range of queries.</p> <p>However, it's important to note that while these tools may provide helpful, contextually accurate information, they do not access real-time data or all peer-reviewed academic sources. They cannot search university library databases nor Google Scholar,</p>	<p>How do library databases use AI?</p> <p>AI has long enhanced search performance in library bibliographic, full-text, and other databases by enabling users to control searches with keywords and filters, while the AI efficiently processes and delivers relevant results.</p> <p>With advances in generative and conversational AI, we relinquish up some control over the search process, relying on AI to deliver relevant results. As we interact more, the AI learns and improves its accuracy. Conversational AI allows natural language searches, shifting away from traditional database methods. The University's guidance on this is detailed in the Prompt Engineering section.</p>	<p>The Importance of Critical Evaluation:</p> <p>All content from AI tools needs to be critically evaluated. AI can provide useful insights, but it's essential to fact-check and cross-reference information with reliable academic sources to ensure its accuracy and credibility.</p> <p>Spotting Errors:</p> <p>To identify misinformation or inaccuracies in AI-generated content:</p> <ul style="list-style-type: none">Watch for vague or unclear claims.Check for outdated information.Look for a lack of proper citations.

Writing

Some examples of how AI can support the process includes:

Brainstorm – generate ideas

Proofread – suggest improvements

Offer different perspectives



Research Data

Some examples of how AI can support the process includes:

Data cleaning (e.g., Julius)

Data processing (e.g., OCR)

Chart and graph generation



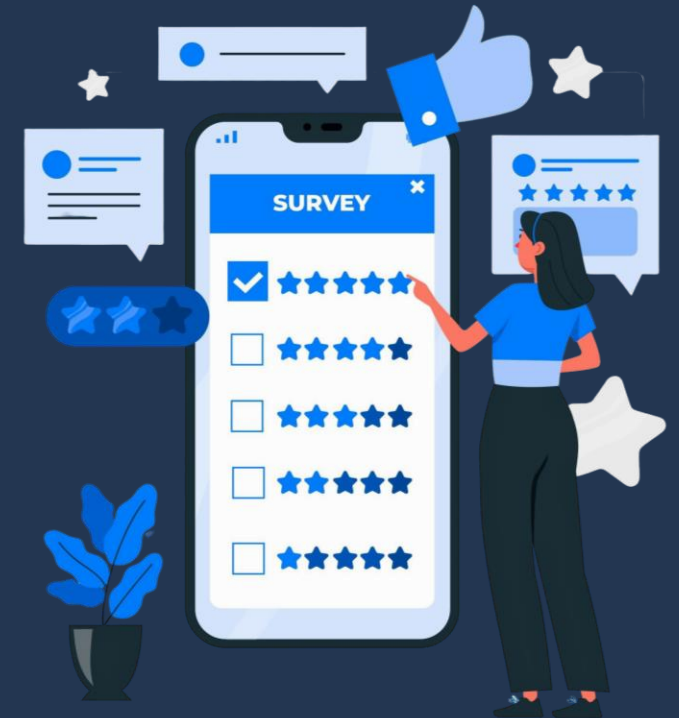
Use of AI in Institutional Surveys

Queen's Survey Team, (QSS, NSS)

Thematic and sentiment analysis

AI generated summaries

Historical trend analysis



Communicating/Promoting Research

Some examples of how AI can support the process includes:

Use of different writing tones

Social media promotion

Plain English summaries

Automated translations



Research Funding Applications

Clearly acknowledge the use of Gen AI in application

Use of own voice and ideas

Check individual funding call guidance



AI in Writing Funding Proposals
(Source: Research and Enterprise,
SharePoint site)

Research Funding Applications

AI is NOT acceptable for an entire grant application

Reviewers must NOT share application content with Gen AI



AI in Writing Funding Proposals
(Source: Research and Enterprise,
SharePoint site)

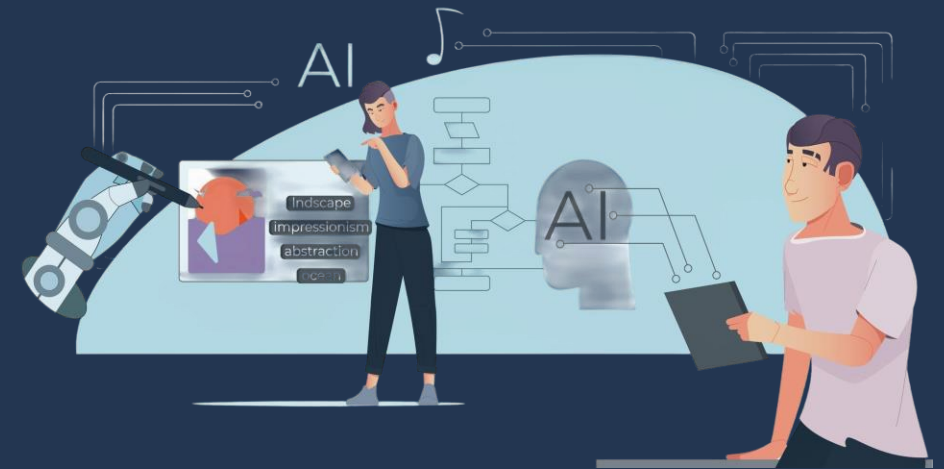
AI Guidance for Research

Engage in critical thinking

Decide if you need to use Gen AI

Reference AI use in your work

Be present in your research



AI Guidance for PGR's
(Source: Queen Mary, University of London)

AI for Research Toolkit



AI Research Tools



Heuristica

Concept mapping



Consensus

Peer-reviewed search



Research Rabbit

Literature mapping



SciSpace

AI paper summarisation



Julius

Research + data analysis

AI Deep Research



ChatGPT

Deep Research – o3 model



Elicit

Systemic review and reports



Perplexity

Uses DeepSeek R1 model



Gemini

Available in Gemini advanced



Grok

Available via an X account

Chatbots/LLMs



Copilot Chat

Microsoft-integrated AI



ChatGPT

Versatile AI chatbot



Gemini

Google-integrated AI



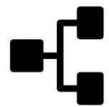
Claude

Conversational & creative



DeepSeek

Open-source R1 model

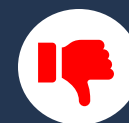


Heuristica

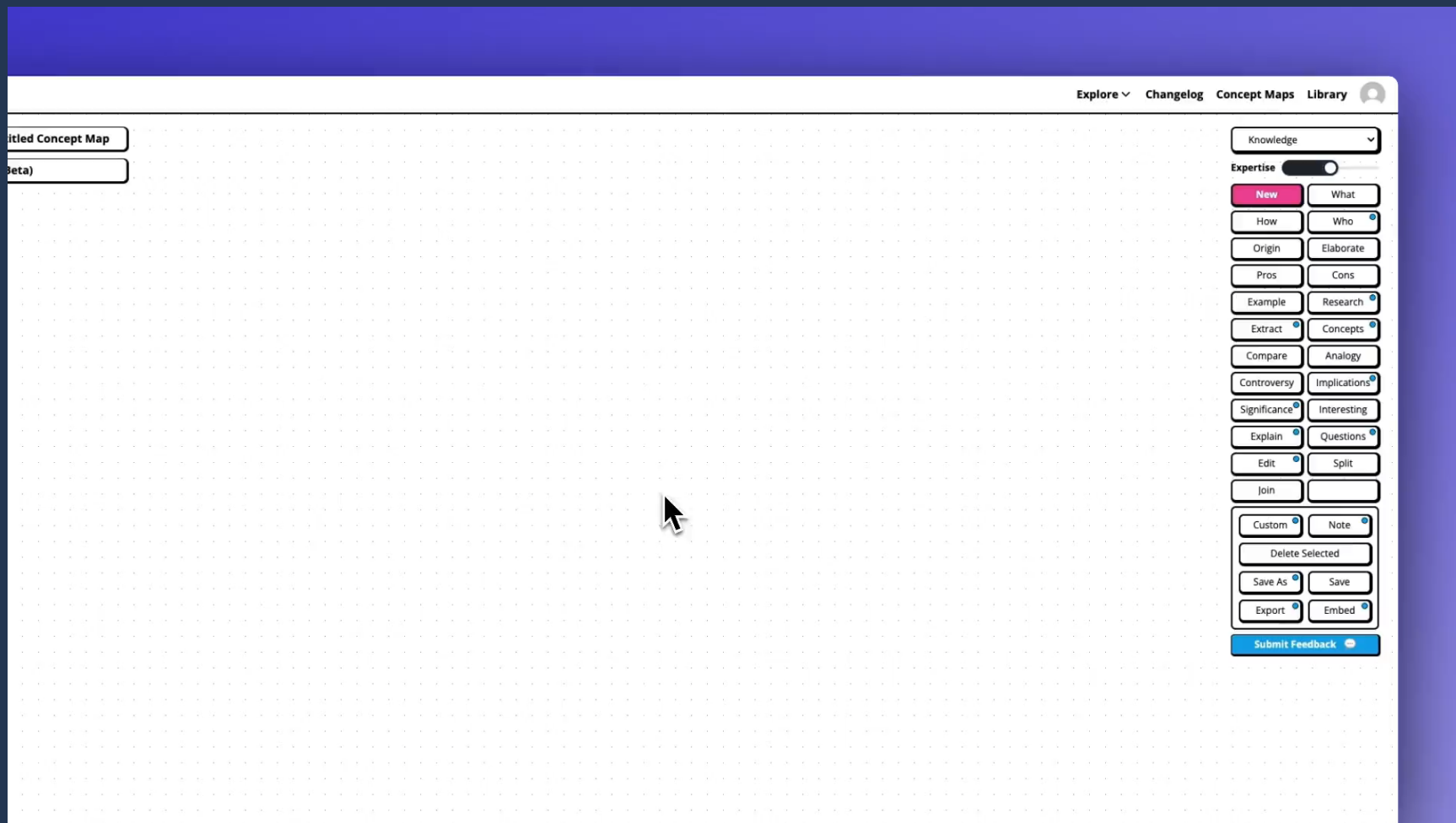
Price: Free - 3 maps, Llama 3 LLM
\$6.99 p/m for 100 maps, choice of LLMs,
includes learn & research features.



- Generates AI-powered concept maps for research.
- Integrates multiple sources (Wikipedia, arXiv, PubMed).
- Citation tracking and customisable AI responses.
- Supports media integration (videos, transcripts).



- Learning curve for first-time users.
- Learn & Research features locked behind a paid tier.





Research Rabbit

Price: Free

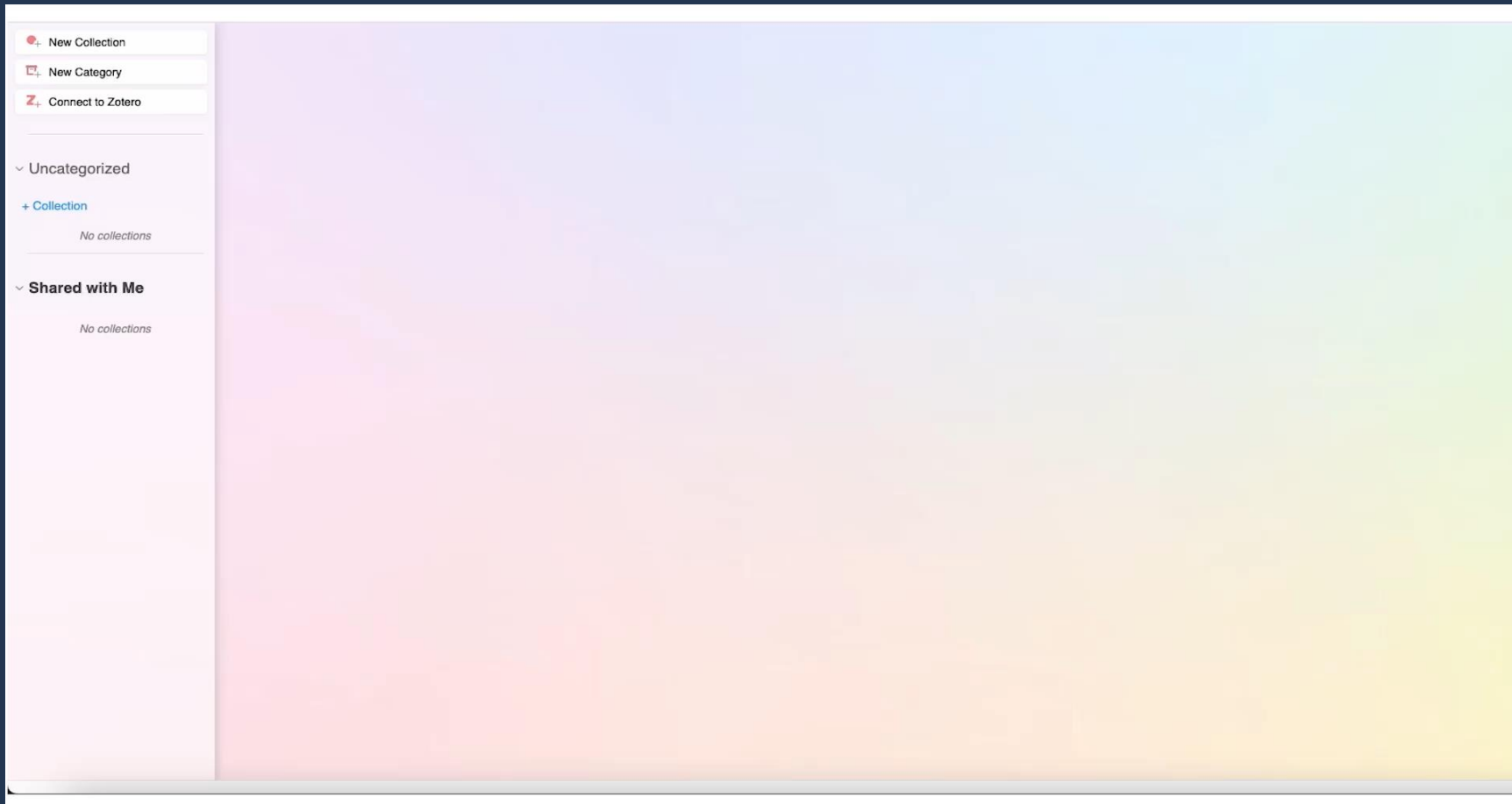
Optional link to Zotero account



- Excellent for discovering relevant academic papers.
- Maps citation networks and related works visually.
- Free for all features.
- Great for exploring references forward and backward in time.



- Doesn't summarise papers—users must still read them.
- Can miss some literature outside its databases.



[Research Rabbit FAQs](#)



Consensus

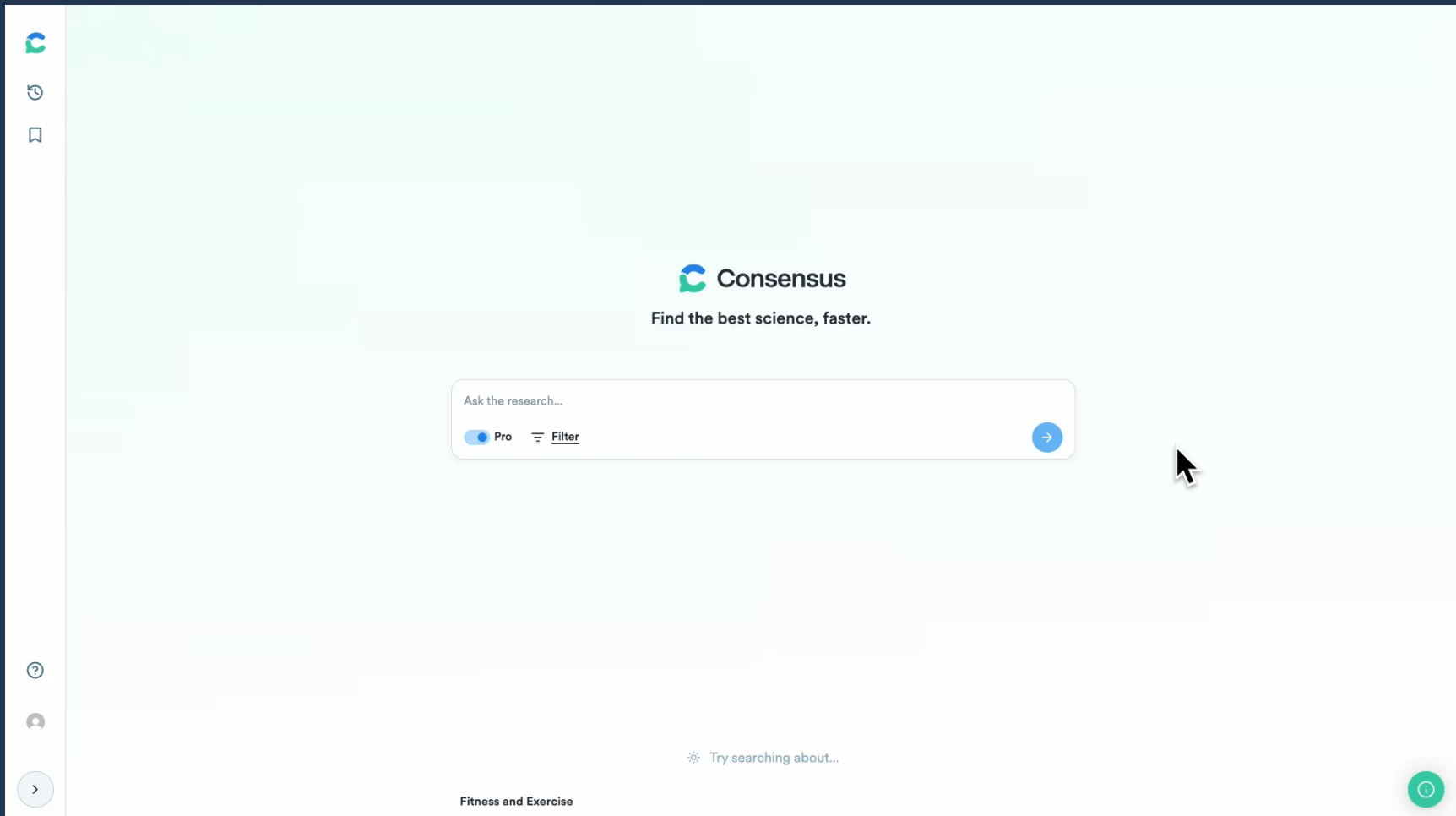
Price: Free – 10 pro analyses p/m
Plans from \$5.39 p/m for unlimited pro analyses



- Searches only peer-reviewed literature (200M+ papers).
- Provides a consensus summary across multiple studies.
- Fast and credible for research overviews.



- Limited to available abstracts and conclusions.
- May lack depth for niche research topics.
- Summaries might miss methodological nuances.





SciSpace

Price: Limited free chats and lit reviews
Paid plans from \$12 include unlimited
chats and literature reviews



- Searches and summarises 200M+ research papers.
- Allows document uploads for AI-powered analysis.
- Highlights key findings from multiple papers.
- Interactive Q&A on PDFs.



- Free version has limited queries and uses a basic AI model.
- Occasionally struggles with certain PDF formats.

The screenshot shows the SciSpace website interface. At the top, the SciSpace logo is on the left, and navigation links for 'Pricing', 'Chat with PDF', and 'My Library' are on the right. A sidebar on the left contains various icons for navigation. The main content area features the headline 'The Fastest Research Platform Ever' with the subtext 'All-in-one AI tools for students and researchers.' Below this is a search bar with the placeholder 'Enter your search query' and buttons for 'Standard', 'High Quality', and 'Deep Review'. A section titled 'Try asking or searching for:' lists several example queries. Further down, there is a video player titled 'Introducing Deep Review' with a description and a link to the 'Blog'. At the bottom, a 'Popular Tools' section highlights 'Chat with PDF' and 'AI Writer'.

Best for Researchers



Julius

Price: Limited free use
Paid plans from £7.85 (academic discount)
includes 250 msgs p/m

Julius, Your AI Data Analyst.



- Can search academic literature and perform data analysis.
- Allows statistical tests, data visualisations, and writing assistance.
- Model-switching feature (GPT-4, Claude).
- Simple chat interface for complex tasks.



- High learning curve for statistical tasks.
- Free tier has very limited queries.
- Users must verify AI-generated analysis.

AI Deep Research Tools

Process:

- Creates a structured search plan.
- Evaluates and refines search results iteratively.
- Generates a final, comprehensive report.
- Takes longer than typical AI searches.



- Creates detailed reports, great for early stages of research
- Best suited to fields with well-documented information (e.g. Law, Medicine).
- Synthesises insights from multiple sources.



- Struggles with rapidly evolving topics.
- Limited access to proprietary or database-specific content.
- May produce hallucinations (misattributed or incorrect information).



ChatGPT: Deep Research

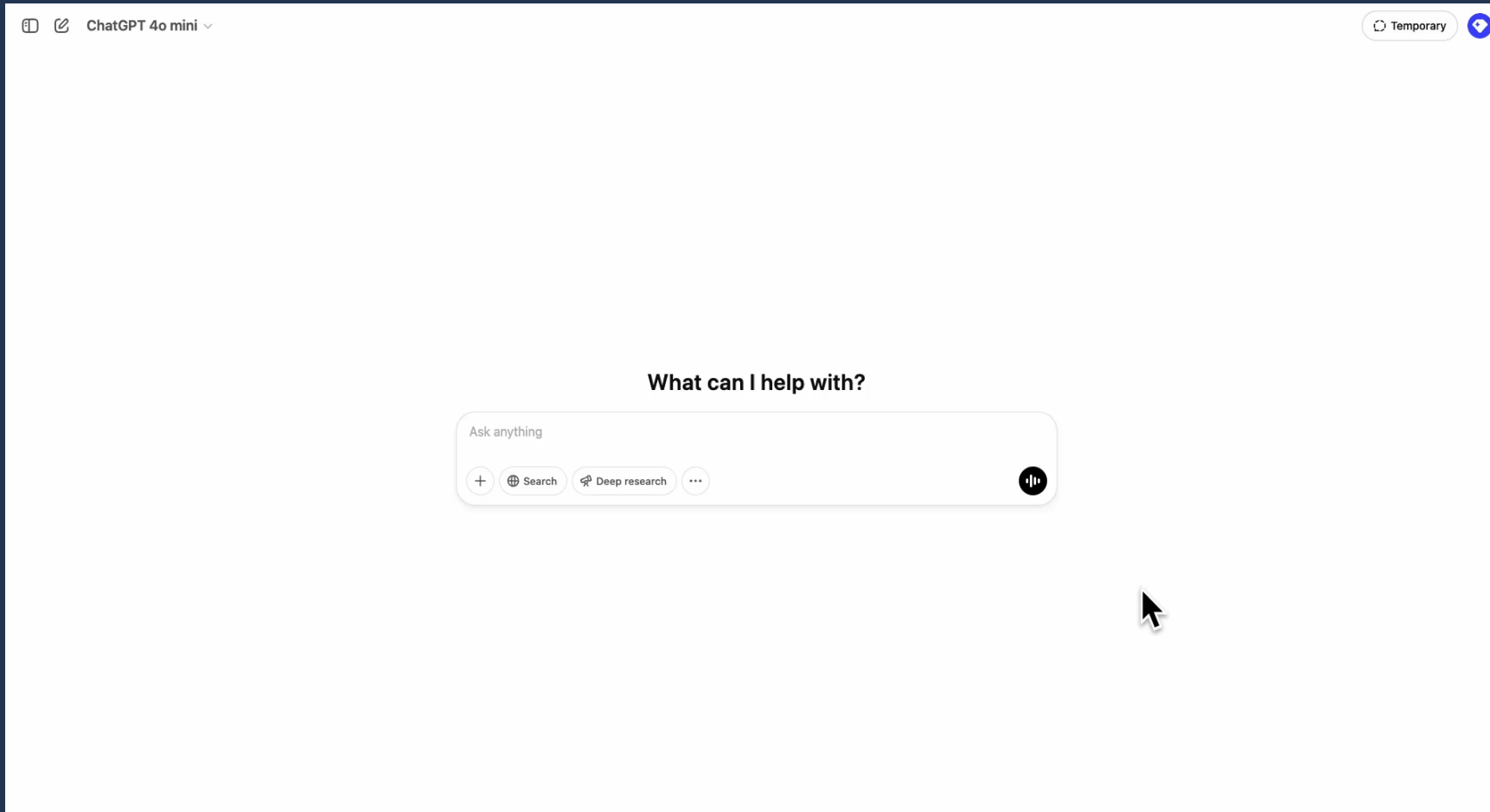
- Not available in free ChatGPT
- Plus (\$10p/m) - 10 searches p/m
- Pro (\$100p/m) - 100 searches p/m



- Autonomous web browsing with source-backed reports.
- Can read PDFs/images and cite relevant web content.
- Generates thorough multi-source reports.
- Saves time on exploratory research.



- Limited monthly uses, even at high cost.
- Occasional citation errors or misidentified source credibility.
- Slower than other tools (takes minutes per query).





Elicit

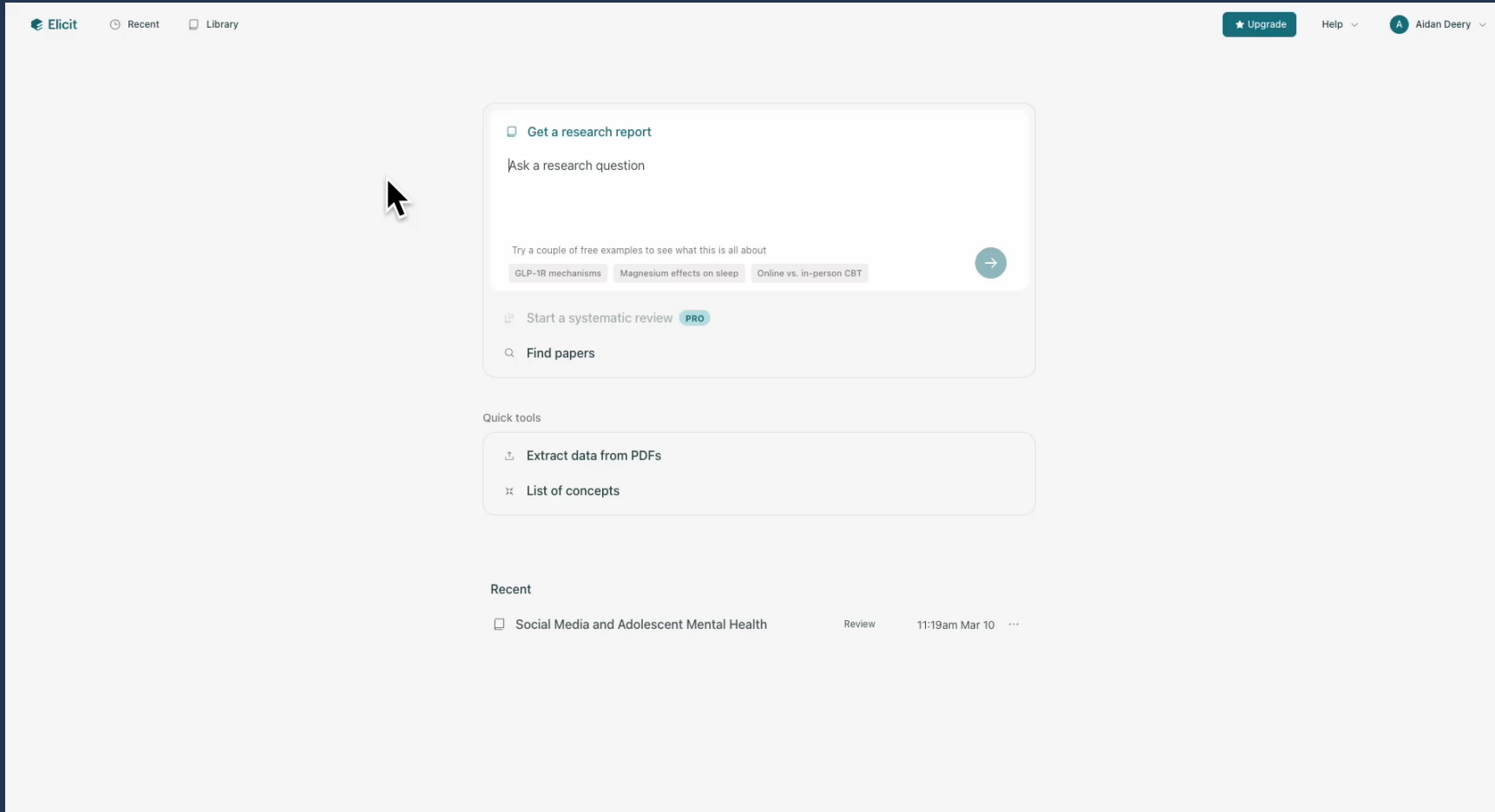
- Free Unlimited searches 125m+ papers, Data extraction for 20 PDFs p/m
- \$12 p/m: data extraction for 50 PDFs p/m, unlimited exports, high-accuracy extraction



- Automates literature search across 125M+ academic papers, plus uploaded user papers
- Extracts quantitative and qualitative data from research papers
- Summarises key findings and generates reports.



- Free tier has limited data extraction (20 papers per month).
- Summaries may oversimplify complex research methodologies.
- Higher-tier plans can be expensive for individual researchers.

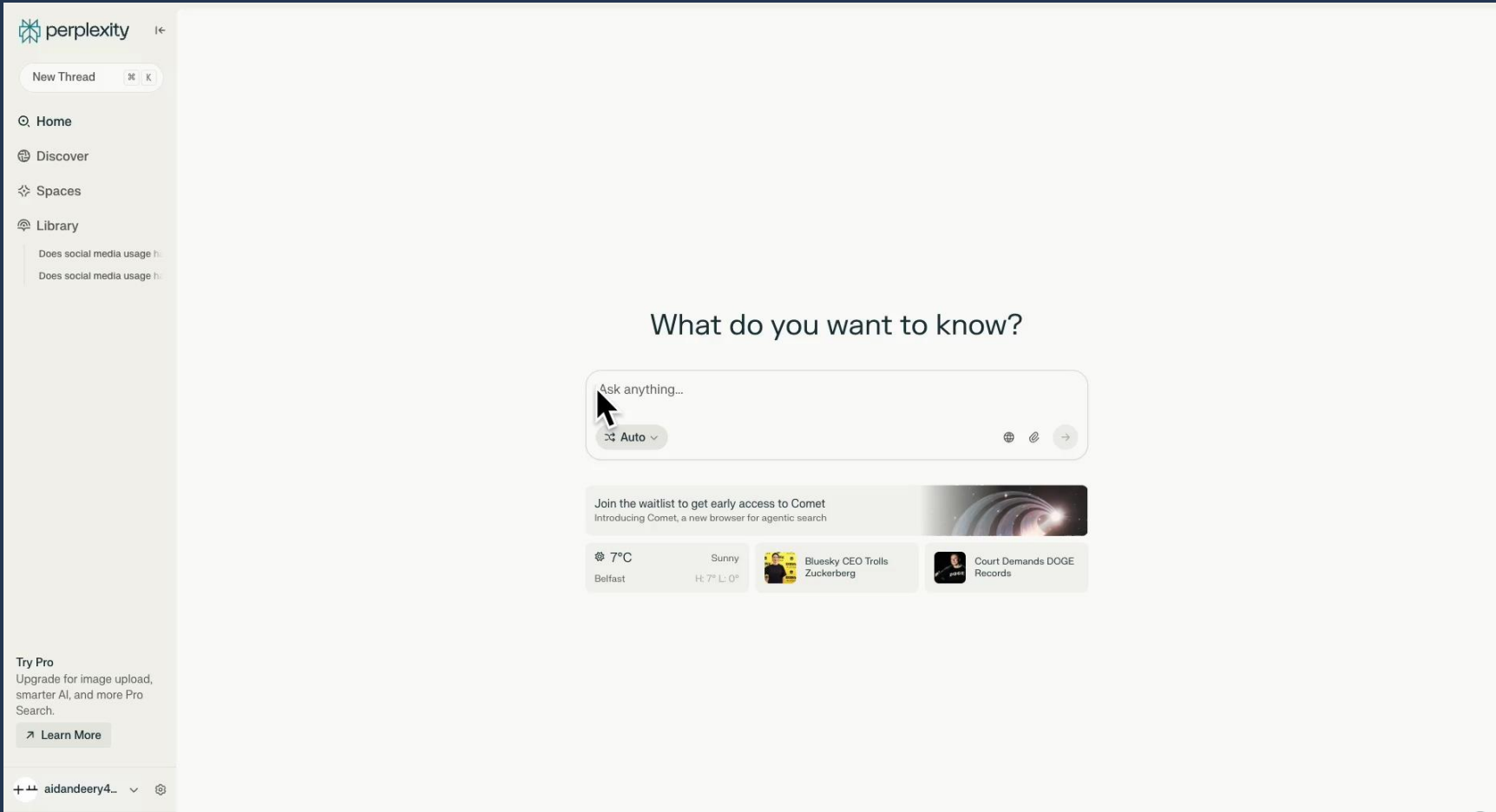


[Elicit Report Example.pdf](#)



Perplexity

- Free tier: 3 daily Pro searches
- \$20 p/m: 300+ Pro searches, access to smarter AI models



- Performs extensive searches and analyses numerous sources to provide thorough insights.
- Accesses up-to-date information
- Allows iterative refinement of queries



- May produce factual inaccuracies or hallucinations
- Cannot bypass paywalls or proprietary academic databases



Perplexity Example

Communicate
to Different
Audiences

Generate ideas

Proofreading



AI Debate:
Find Different
Perspectives

Summarising
Articles

Example Prompts



[Try the Prompt Enhancement Assistant](#)
(Opens in ChatGPT)



Generating Ideas



Ask me anything...

Act as an academic researcher specialising in {subject eg. Education Technology}. Brainstorm innovative and emerging ideas about {eg. how AI is transforming higher education, considering key areas such as personalised learning, administrative automation, assessment, and student support}. Identify gaps in current research by analysing underexplored challenges, limitations, or potential future developments. Highlight areas where further investigation is needed, referencing major studies, reports, or expert opinions where possible. Structure your response using categorised bullet points, ensuring a formal and analytical tone. Conclude by providing a list of 10 important peer reviewed academic articles.





Summarising Articles (*open-source only)



Ask me anything...

Act as a research assistant specialising in academic summarisation. Given a research paper {insert URL or upload PDF}, generate a structured summary in a table format with the following sections:

- TL;DR (One-Sentence Summary)
- Key Findings
- Methods Used
- Research Gaps Identified
- Relevant Literature Cited
- An in-text citation and a reference in {eg. Harvard referencing style}

Ensure the table is well-organised, concise, and in an academic tone.

Alternatively, you can upload a collection of abstracts from any paper and ask for a summary.





Proofreading



Ask me anything...

You are an academic writing assistant skilled in UK English. Please review the following text for spelling, grammar, clarity, and academic tone. Ensure that the writing is formal, precise, and adheres to academic conventions.

- Correct any spelling and grammatical errors.
- Improve clarity and conciseness while maintaining an academic tone.
- Suggest refinements to enhance readability and coherence.
- Ensure consistency in terminology and style.

Present the revised text first. Then, provide a list of suggested improvements, clearly explaining the changes in bullet points, and list all changes made. The explanations should highlight why the changes enhance the academic quality of the writing.

Here is the text: {insert text here}





AI Debate



Ask me anything...

You are an academic expert in [your field, e.g., political science, environmental ethics, etc.]. I will present my argument on [briefly state your argument]. Your task is to critically engage with my argument by offering counterarguments, alternative perspectives, and supporting evidence from relevant academic disciplines. Please structure your response as follows:

- **Summary of My Argument:** A concise summary to ensure understanding.
- **Counterarguments:** Identify potential weaknesses or critiques of my argument, supported by examples or evidence.
- **Alternative Perspectives:** Present other valid viewpoints from different theoretical, cultural, or disciplinary perspectives.
- **Supporting Evidence:** Provide academic or historical examples, studies, or theories that support both my argument and the counterarguments.
- **Refinement Suggestions:** Based on this debate, suggest ways I could strengthen my argument, address counterpoints, or refine my thesis.

Maintain a formal, academic tone and, where possible, reference relevant studies, theories, or historical events. If necessary, include citations or recommend sources for further reading.





Communicate to Different Audiences



Ask me anything...

You are a social media manager promoting an academic article to a general audience. Your task is to create three engaging social media posts (for Twitter/X, LinkedIn, and Instagram) that summarise and promote the article in an accessible way. Each post should be concise, attention-grabbing, and avoid jargon. Use an engaging hook and include a call to action (e.g., 'Read more here' with a link).

In addition, provide a plain English summary of the article (around 150–200 words) that explains its key points in a way that a non-expert can easily understand.



Reminder: Dos and Don'ts



Do...

- Critically analyse any AI-generated content
- Use AI research tools to identify trends and useful open-source references
- Embrace AI to find efficiencies in your research process
- Use AI to spark ideas
- Cross-check AI-generated content and citations

Do NOT...

- Assume the information is correct
- Ignore biases in AI-generated content
- Upload copyrighted material to LLMs
- Rely on AI tools for research or writing
- Forget to acknowledge AI assistance where required

Feedback Form



Please take a couple of minutes to tell us your thoughts on the session, and AI support at Queen's:

forms.office.com/e/pqf5g8jh9Z

AI Building Blocks Series

