



# How artificial intelligence has answered the UnGoogleable exam question and what happens next

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[Wonder - AI generated image]

“A non-googleable question is one that cannot be easily answered through a single click in an internet search engine. When written well, they create intellectual challenge and require interpretation and inquiry.”





[https://docs.google.com/document/d/1o0JkgkqrNS4aejO162kXHHYA82\\_mH0kxzp4zJ4tZ-hA/edit?usp=sharing](https://docs.google.com/document/d/1o0JkgkqrNS4aejO162kXHHYA82_mH0kxzp4zJ4tZ-hA/edit?usp=sharing)

**Traditional exam/essay style questions** ask students to draw on knowledge and discuss against a title.



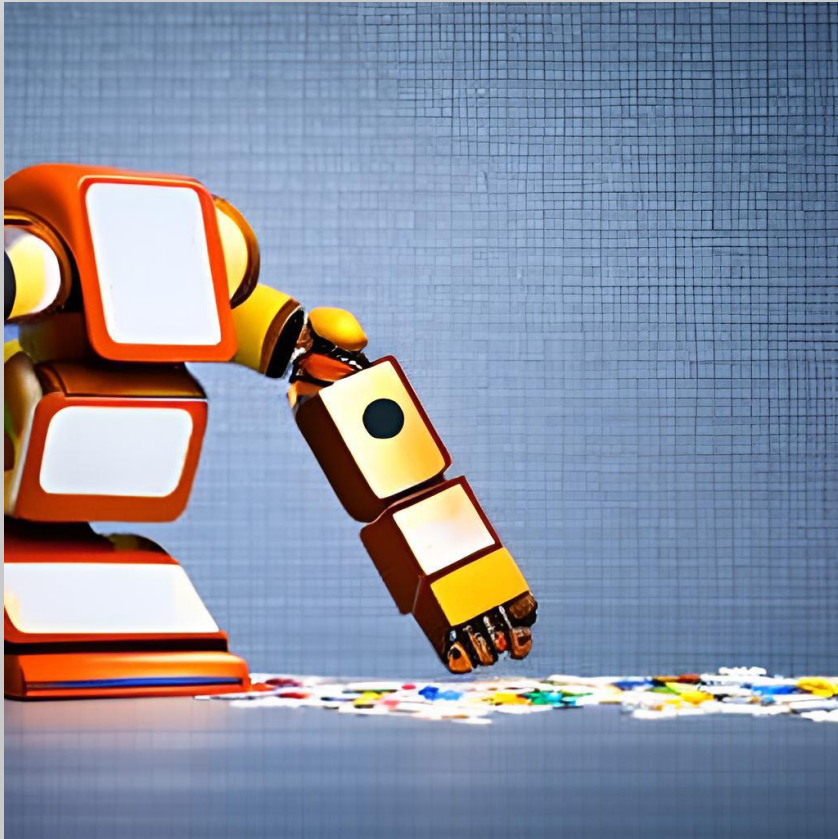
**Feedback:** Your answer ChatGPT showed a reasonable level of specific knowledge, the information was correct and multiple points were brought together. However, the text was vague in the way it was discussed and lacked depth in understanding.

**Short answer questions** probe knowledge and understanding but don't always draw on analysis skills. They are found in exams and workbooks, etc:

**Feedback:** Your ability to directly recall facial information is impressive. You should concentrate on fact checking your response and providing robust citations.



**Problem-solving questions** give students a situation to apply knowledge and develop a solution.



[Wonder - AI generated image]

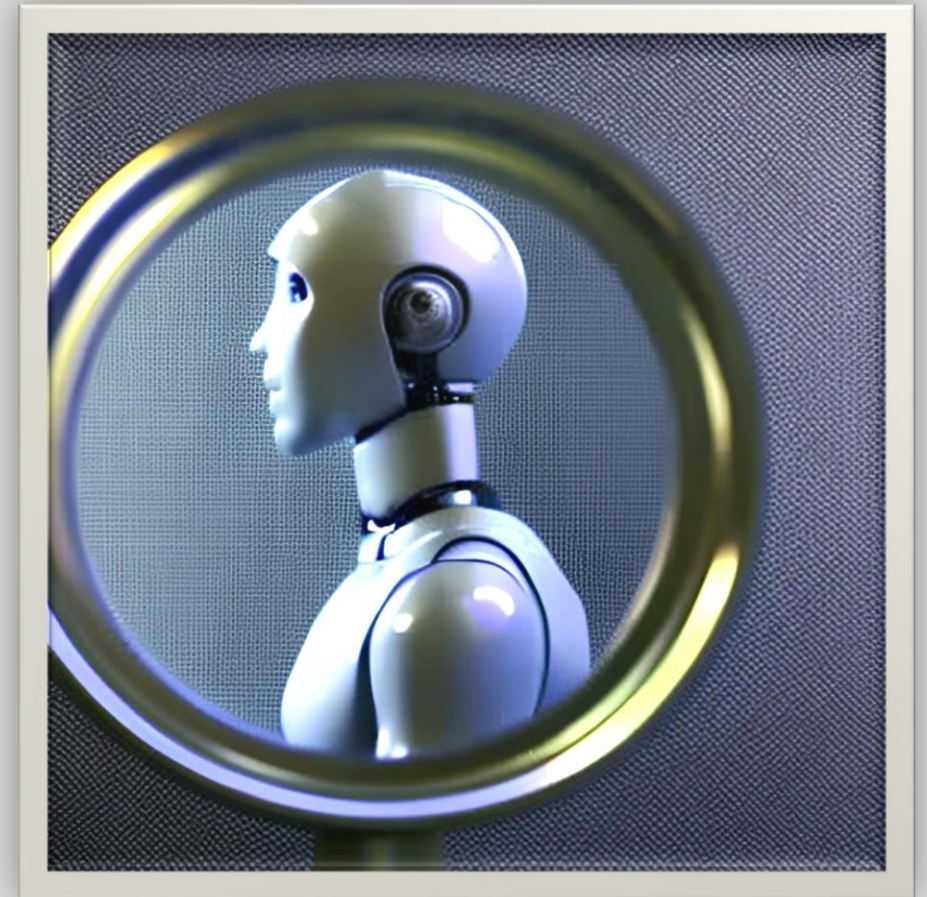
**Feedback:** You have provide a feasible plan against a prompt. The answer was again unfocused, and some of the information was not correctly applied or fully appropriate.

In future look at what you are proposing and critique if the idea is appropriate.

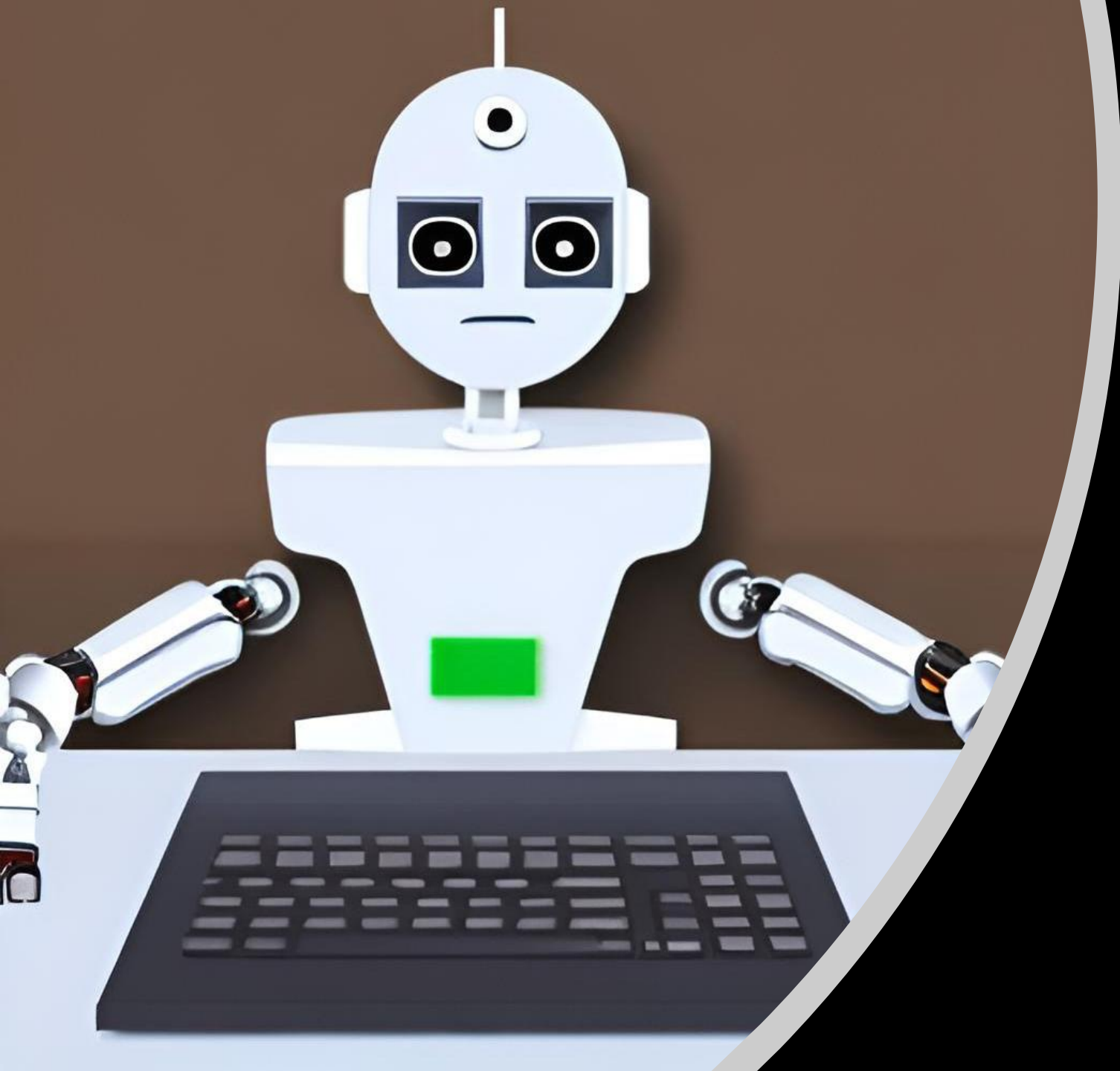
**Reflections** assessments simply take a reflective learning exercise and use it as a tool to assess the learning of the learner.

**Feedback:** You have drawn on generic skills personal and employability skills.

The answer dose not draw on personal examples though, next steps or future action planning. In future think about what you would do to developed your skills in a tangible way.



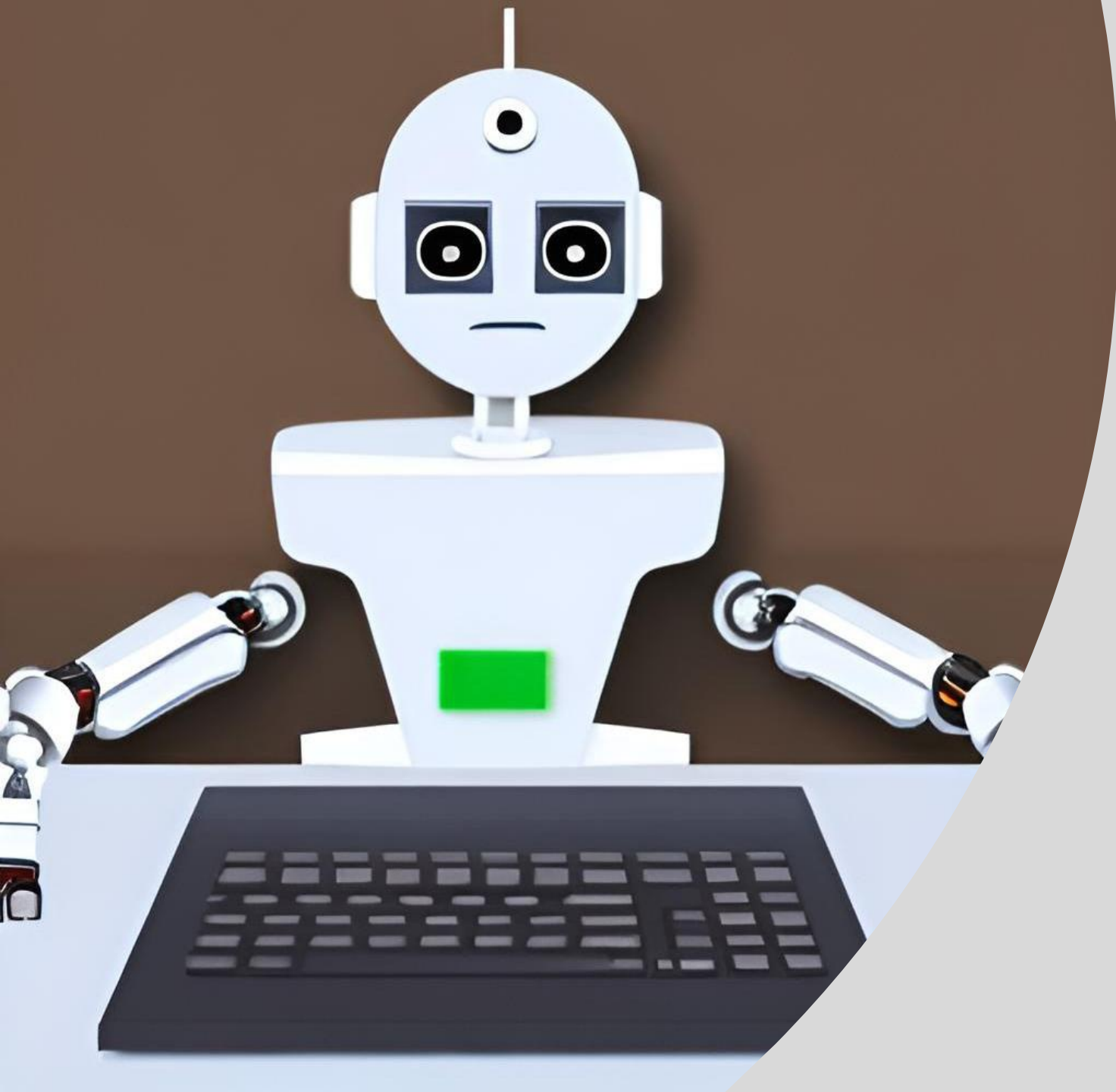
[Wonder - AI generated image]



Dear ChatGPT,

You have been called to this meeting as we have reason to believe this work is not your own.





# The voice is noticeable.

**There are tells:**

- no spelling / grammar errors
- content that has not be covered in class
- methods and ideas not covered

# What is the future for assessments then?

- ChatGPT answers are vague, bland and can lack depth.  
(depth can be gained through iteration)
- Turnitin can detect **#apparently**  
(but the voice change is noticeable).
- Reflective writing lacks personal aspects.
- AI cannot (currently) complete assessments requiring creativity or intuition, moral or subjective judgment.



Rubbish In



Rubbish Out



Writing Prompts is the new Digital Skill

# Prompts often need iteration or refining



Write a tweet about this website

[https://portlandpress.com/biochemist/article/doi/10.1042/bio\\_2023\\_110/232780/A-beginner-s-guide-to-evidencing-your-teaching](https://portlandpress.com/biochemist/article/doi/10.1042/bio_2023_110/232780/A-beginner-s-guide-to-evidencing-your-teaching)



"Just discovered a great resource for educators! Check out this beginner's guide to evidencing your teaching from @PortlandPress #teaching #education #professionaldevelopment"



Can you make it engaging and use content



Sure, here's an engaging tweet using a content-based approach:



"Attention all teachers! 🎓📚🍎 Want to level up your teaching game? Check out @PortlandPress's beginner's guide to evidencing your teaching. 😊 Learn how to showcase your skills and make your impact in the classroom known. Let's show the world what we're made of! 🙌 #teachingtips #education"



Like it but can we be more professional



Absolutely, here's a more professional version:



"Are you looking for a resource to help you showcase your teaching skills? Check out the beginner's guide to evidencing your teaching from @PortlandPress. Discover best practices for documenting and presenting evidence of your teaching effectiveness. #teaching #education #professionaldevelopment"

Regenerate response

# Writing Prompts is the new Digital Skill

ChatGPT used to get a broad overview.

- Quick in class answers
- Revision Notes
- Idea generation

**But is it correct?**



[Wonder - AI generated image]



Lactate dehydrogenase (LDH) is an enzyme that plays a crucial role in energy metabolism, specifically in the conversion of pyruvate to lactate. There are five different isoforms of LDH, which are composed of different combinations of two subunits, LDH-A and LDH-B. The expression and balance of these isoforms can vary between different cell types and under different physiological conditions.

The balance of LDH isoforms is primarily regulated at the gene expression level. The expression of the LDH-A and LDH-B genes is regulated by a variety of transcription factors and signaling pathways that respond to changes in the cellular environment. For example, hypoxia-inducible factor-1 (HIF-1) is a transcription factor that is activated under conditions of low oxygen and can upregulate the expression of LDH-A, leading to a shift towards anaerobic metabolism and increased lactate production.

In addition to transcriptional regulation, post-transcriptional and post-translational modifications can also affect the balance of LDH isoforms. For example, microRNAs can bind to the mRNA transcripts of LDH isoforms and regulate their stability and translation. Additionally, alternative splicing of the LDH-A and LDH-B pre-mRNA transcripts can lead to the production of different isoforms with different enzymatic properties.

Overall, the balance of LDH isoforms is a complex and dynamic process that is regulated at multiple levels in response to the cellular environment and physiological conditions.



# AI will/has become part of writing.

(assess the process not the product)



General points from ChatGPT 3.5



Expansion of text and references from Jenni



Editing and proofing in Grammarly



## Get started



Enter an instruction or select a preset, and watch the API respond with a [completion](#) that attempts to match the context or pattern you provided.

You can control which [model](#) completes your request by changing the model.

### KEEP IN MIND

- 📌 Use good judgment when sharing outputs, and attribute them to your name or company. [Learn more.](#)
- 🔒 Requests submitted to our API will not be used to train or improve future models. [Learn more.](#)
- 📅 Our default models' training data cuts off in 2021, so they may not have knowledge of current events.

## Playground

Write an essay plan about data-dependent acquisition

### I. Introduction

A. Definition of data-dependent acquisition

B. Overview of the benefits and drawbacks of data-dependent acquisition

### II. Benefits

A. Increased efficiency and accuracy

B. Reduced costs

C. Improved decision-making

### III. Drawbacks

A. Dependence on data accuracy

B. Difficulty in verifying data sources

C. Possibility of data manipulation

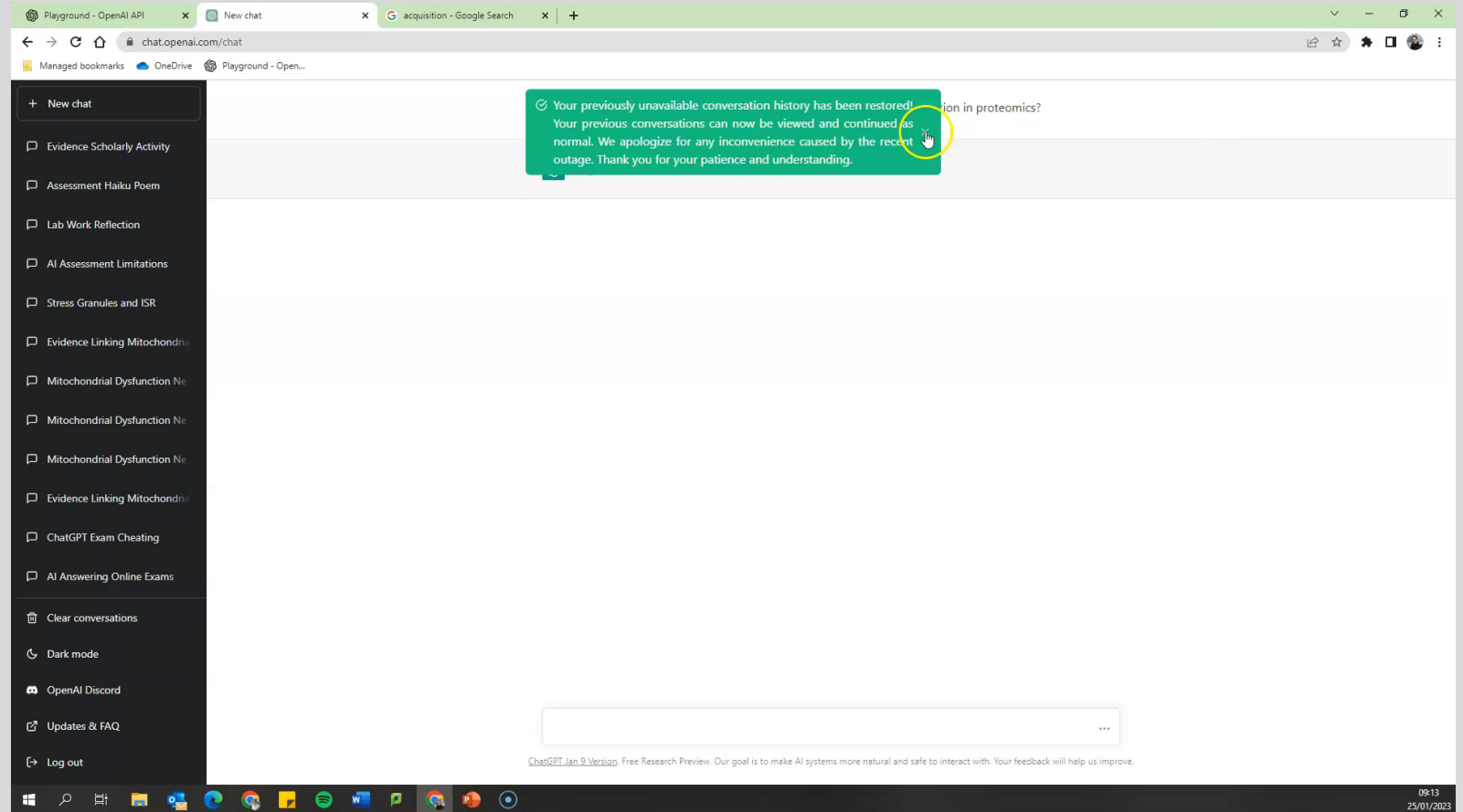
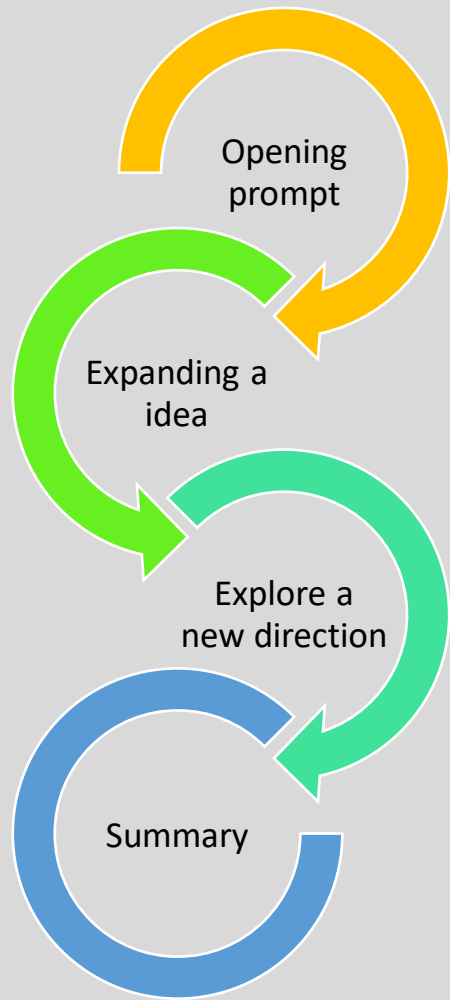
### IV. Conclusion

A. Summary of the benefits and drawbacks of data-dependent acquisition

B. Summary of the importance of data accuracy and verification when using data-dependent acquisition



# Prompts iteration can generate an initial body of text





expansion with Jenni



### Do you have examples of DDA being used?

Yes, data-dependent acquisition (DDA) is widely used in proteomics for the identification and quantification of proteins. It is the most common method used for shotgun proteomics, which is a technique for analyzing complex mixtures of proteins.

Some examples of DDA applications in proteomics include:

- Identifying proteins in complex biological samples such as cell lysates, tissue homogenates, or body fluids
- Identifying proteins in environmental samples such as soil, water, or air
- Identifying proteins in food and agricultural products
- Identifying proteins in industrial samples such as fermentation broths or bioprocessing samples

Data-dependent acquisition (DDA) is a popular proteomic approach that facilitates the identification and quantitation of proteins. This technique finds extensive application in shotgun proteomics, which involves analyzing intricate protein mixtures. DDA's versatility makes it suitable for various purposes in the field of proteomics, such as:

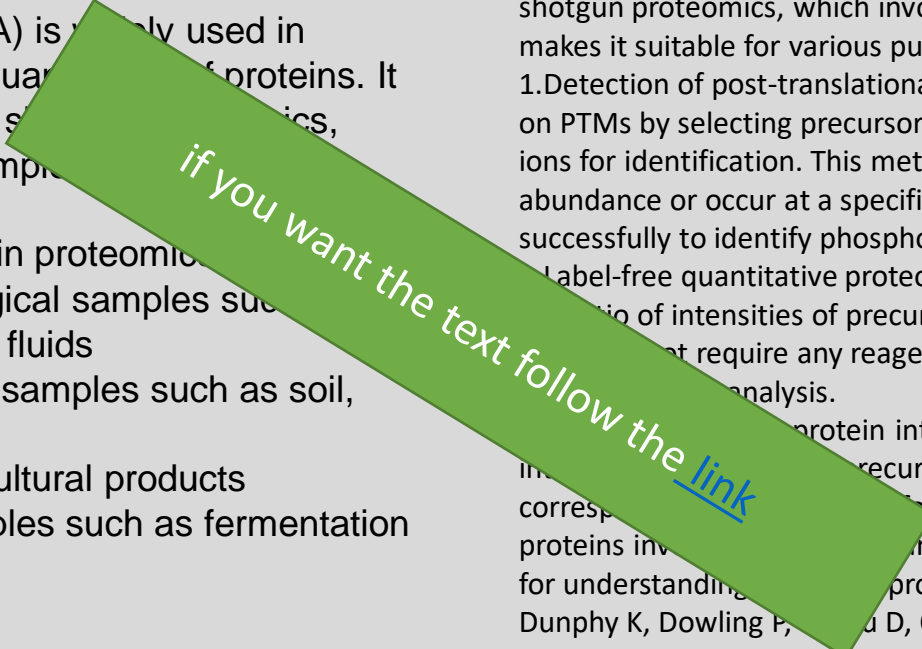
1. Detection of post-translational modifications (PTMs): DDA can provide detailed information on PTMs by selecting precursor ions with specific m/z values and their corresponding fragment ions for identification. This method is particularly useful for detecting PTMs that are low in abundance or occur at a specific site of the protein sequence. For example, DDA has been used successfully to identify phosphorylation sites on proteins (Dunphy et al 2021).

Label-free quantitative proteomics: DDA can be used for label-free quantitation by comparing the relative intensities of precursor ions between two samples. This approach is simple to apply and does not require any reagents or specialized equipment, making it a cost-effective option for large-scale proteomic analysis.

Protein-protein interactions: DDA can be used to study protein-protein interactions by identifying precursor ions corresponding to interacting proteins and their corresponding fragment ions for identification. This approach can provide information on the proteins involved in a specific complex or pathway and their interactions, which can be useful for understanding cellular processes. (Podobnik et al 2016)

Dunphy K, Dowling P, O'Gorman D, O'Gorman P. Current Methods of Post-Translational Modification Analysis and Their Applications in Blood Cancers. *Cancers (Basel)*. 2021 Apr 16;13(8):1930. doi: 10.3390/cancers13081930. PMID: 33923680; PMCID: PMC8072572.

Podobnik M, Kraševac N, Bedina Zavec A, Naneh O, Flašker A, Caserman S, Hodnik V, Anderluh G. How to Study Protein-protein Interactions. *Acta Chim Slov*. 2016;63(3):424-39. doi: 10.17344/acsi.2016.2419. PMID: 27640371.



## Assessment Grid Criteria



### Knowledge and Understanding

Excellent knowledge and understanding evidenced by some clear independent insight and critical awareness of relevant concepts some of which are at the forefront of the discipline.

### Arguments and Evaluation

Arguments and explanations show a competent understanding of all of the relevant content. A sustained academic approach to most aspects of the tasks is evidenced.



Advanced Research Practice - Literature Review

AUTHOR		Date	
Student Number			

Scientific Question / Area

SEARCH STRATEGY

Terms used to guide the search strategy
•

	Databases Searched	Search Terms (AND/OR/NOT)	Limits Used
1			
2			
3			

[add more lines as required but a minimum of three searches is expected]

	AI	What prompt(s) did you use.
1		
2		
3		

Describe how you will use these outputs in your final review:

# Template for Peer Review Papers

SUMMARY OF BEST EVIDENCE	
<b>Paper 1: Description and appraisal of:</b>	
	<i>Full citation to be inserted here.</i>
<b>Aim/Objective of the Study/Systematic Review:</b>	
<b>Experimental Design</b>	
<b>Outcomes Measured</b>	
<b>Main Findings</b>	
<b>Original Authors' Conclusions</b>	
	[paraphrase as required. If providing a direct quote, add page number]
<b>Critical Appraisal</b>	
<b>Validity</b>	
<b>Interpretation of Results</b>	
<b>Summary/Conclusion</b>	

# Template for Generative AI

<b>Which AI did you use?</b>
<ul style="list-style-type: none"> <li>• <i>Include a copy of your prompts here.</i></li> </ul>
<b>Paste the original output(s) here.</b>
<b>Comment on the quality, depth, and rigour of the output(s)</b>
<ul style="list-style-type: none"> <li>• Consider information – (is the text correct?)</li> <li>• Bias in the information – (is there an alternative viewpoint?)</li> <li>• Identify omission – (is all the information present?)</li> </ul>
<b>Detail how you have fact checked the output. Include peer reviewed references</b>
<b>How have you used the output to help write your literature review.</b>
<b>Justify your contribution to the final text.</b>

# What is the future for written assessments then?

## **Current versions of the tool give basic knowledge**

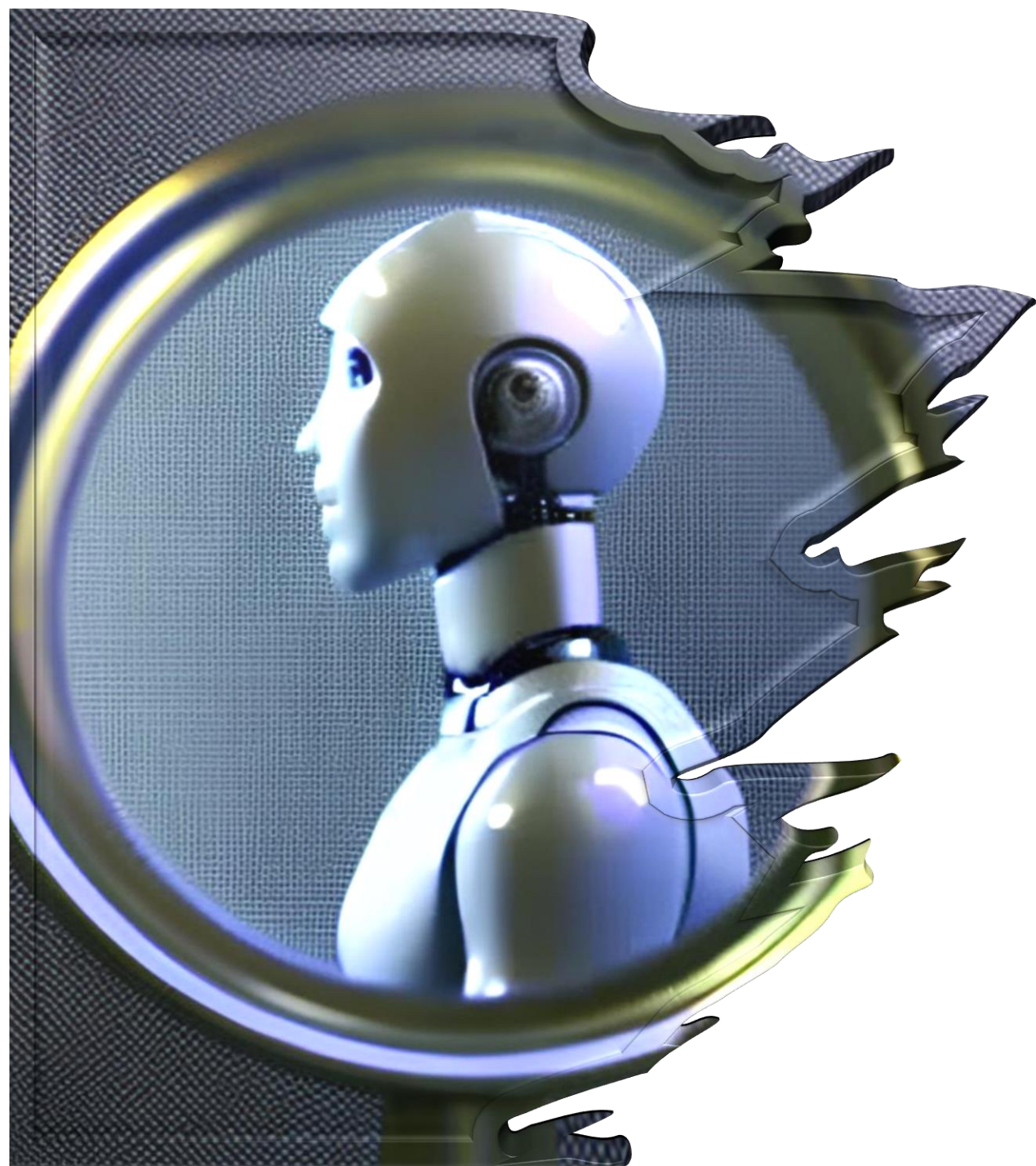
- Fact checking
- Can be biased

## **Can be used to generate structures and plans**

- Gives broad outlines quickly that can be built on.
  - Personal perspectives
  - Judgment on information.

## **Assess the process as well as the product**






# What is the future for reflections?

**Reflective writing lacks personal aspects when AI generated?**

Make the reflection writing formative and assess on the next steps:

- Actionable
- Achievable for the individual
- Is the evidence personal?



What is the future for  
other assessments?

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## **Inclusive assessment / personal assessment**

- Examinations???
- Reports
- Practical assessments
- Portfolios / Skills development
- Posters / Presentations / Viva
- Data analysis (numerical / image)







# Beware the Digital Divide

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[Wonder - AI generated image]



[AI generated image]

# Q and A

(No AI promise)

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Student submits question to chatbot and copies output into answer

Student submits question to chatbot, edits output and submits

Student creates multiple prompts based on question, and compiles answer from outputs

Student writes draft and submits to chatbot to improve grammar and style

Student asks chatbot for key themes then writes draft



