



Changemakers: Creativity and Value Creation

Assignment 1

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18/08/25

ACCA5033

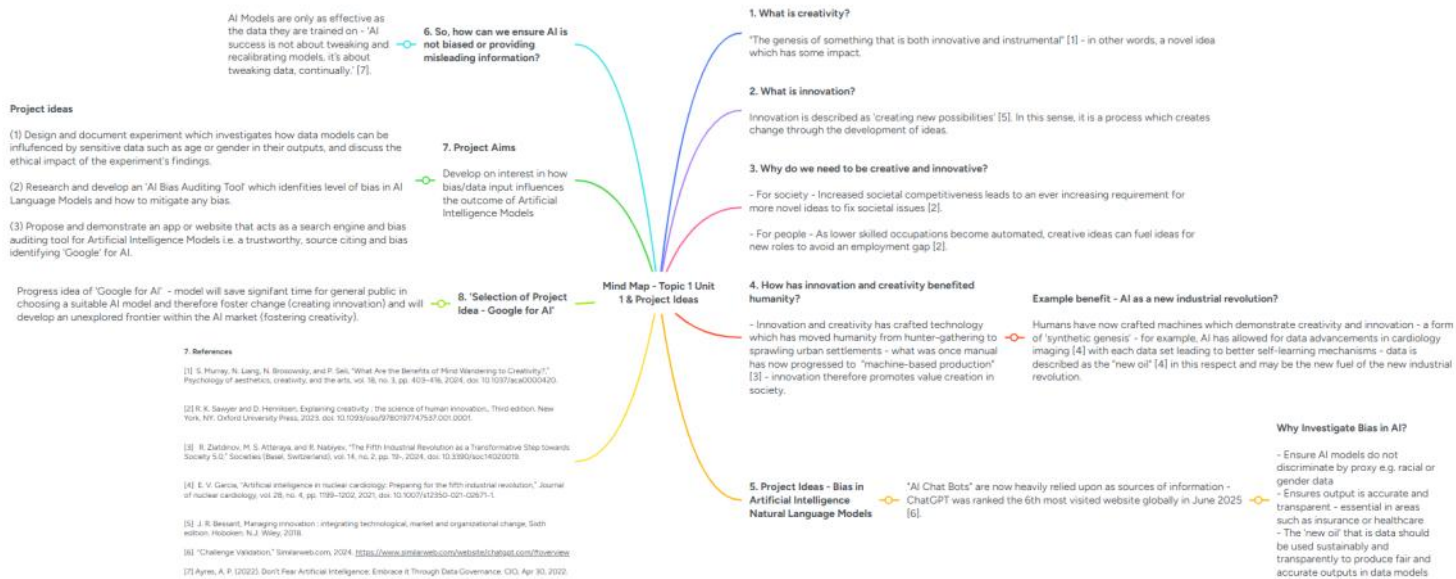
Task 1 - Ideation and Mind Map

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Section 1.1 - Link to Mind Map

<https://mm.tt/map/3726242656?t=PyZHR8lc4T>

Section 1.2 - Screenshot of Mind Map



Task 2 - Aims, Objectives, and Research Area

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Question 1 - Aim & Objectives for Project

Project Aim:

Propose and demonstrate an Artificial Intelligence model which allows users to query multiple Natural Language Processing ('NLP') models, provides an assessment of the bias/accuracy of the answers given, and provides a recommended answer that is both the most accurate and least biased.

Project Objectives:

1. Research how NLP models produce natural language results from data input/programming and how bias and inaccuracy can be introduced.
2. Define and document types of inaccuracy and bias in NLP outputs.
3. Propose methods for detecting, ranking, and reducing identified bias and inaccuracies.
4. Suggest approach for displaying NLP model results to users, including answer sources, recommended answer, and bias and accuracy metrics.
5. Discuss ethical and legal considerations of project and deployment methods.

Consideration of SMART objectives for project aims

The below table details how SMART aims can apply to this project. Each objective above is assessed on its specificity, measurability, achievability, relevancy, and time specificity to ensure the project remains grounded insofar as outcomes are clearly defined.

SMART	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Specific	Review 15-30 academic resources concerning bias in NLP models	Define at least 5 ways data can be inaccurate and biased	Propose 3 methods for output detecting, ranking and reducing bias and inaccuracies	Wireframe a simple app or website with 3-5 pages showcasing the design for output of data to users	Outline 5-10 total ethical and legal considerations, and 3 deployment methods
Measurable	Measured on conclusion of review of academic resources	Measured once definitions set within timeframe	Total of 9 methods (3 for each) within timeframe	Measured on completion of wireframe	Measured on completion of outline within timeframe
Achievable	3 weeks to conduct research is ample/provide summaries and conclusions etc	2 weeks allows for deep consideration of research conducted and solid definitions to be set	1 week for each (detection/ranking/reduction) allows time to digest prior material	3 weeks allows for some research into design methods/user interface considerations	3 weeks allowed to conduct legal research and suitable methods of deploying project
Relevant	Essential to develop project further and	Key definitions will feed into how AI defines	3 methods will feed into how users receive	Wireframe design essential to provide	Real world impact and implementation

	understand how bias/inaccuracy is introduced	and displays bias and inaccuracies	results - essential for project	practical implementation of project later	considered - essential for effective output of project
Time-bound	Conduct review in first 3 weeks of project	Complete definitions in weeks 3-5 of project	Complete within weeks 5-8 of project	Complete within weeks 8-11 of project	Complete within weeks 11-14 of project

Question 2 - Identify a research philosophy

Section 2.1 - Overview of research philosophies

Various research philosophies exist, each presenting a differing approach for "knowledge management" [1], defined as the determination of how understanding is generated when conducting research.

The leading philosophies include positivism, which deals with "observable and quantifiable" [2] findings independent from the researcher and as such is an objective approach. In contrast, interpretivism argues that "truth and knowledge are subjective" [3], focusing on knowledge gained from measuring experience and understanding rather than the fixed and quantifiable.

Realism takes a deeper approach to generating knowledge by recognising that what is observable may be driven by "unobservable, real.. and internal mechanisms" [4], thereby encouraging researchers to explore the underlying causes behind what is observed, Postmodernism disputes absolute truth altogether, and replaces it with "a more personalised sense of truth" [5]. Finally, pragmatism blends knowledge and practice by utilising 'innovative and dynamic' [6] approaches to refining knowledge through practical implementation, problem solving, and feedback.

Section 2.2 - Chosen project philosophy

The objectives outlined for my project include creating objective measures for AI bias and accuracy, alongside defined ranking methods for results. Given the focus of quantifiable analysis, the approach of positivism is appealing given I am setting defined and quantifiable metrics within my project. I would reject utilising a purely interpretivist approach for this reason.

However, the scope of my project later develops beyond the distinctly measurable, as user experience comes into play when developing how the results of bias and accuracy rankings will be displayed to users. As such, elements of realism, postmodernism and interpretivism may come into play given the uniqueness of each user experience and the social aspect of how results are interpreted.

Ultimately, I would propose using a pragmatic research philosophy for my project. This research approach utilises multiple philosophical approaches, dictated by the phase and flow of the project itself. A pragmatic approach sets problem solving as a priority within the methodology, which suits the end goal of identifying and communicating bias and accuracy in AI outputs to end users of the platform.

Question 3 - Search databases, tools, and strategies

Section 3.1 - Research tools and databases

The selected project involves conducting research into bias and accuracy within AI. The following research databases are identified:

- UWTSD eResources Library - <https://www.uwtsd.ac.uk/library>
- Google Scholar - <https://scholar.google.co.uk/>
- UWTSD Y Fform physical library, located at Heol Ynys, Kings Road, Swansea, SA1 8EW

- ResearchGate - <https://www.researchgate.net/>
- JSTOR - <https://www.jstor.org/>

These databases blend resources specific to my educational institution (UWTSD eResources) with external sources to ensure a broad range of academic research can be accessed. All electronic academic databases cited allow for access to high quality, peer-reviewed journals, articles and literature to assist with research. Access to a physical library complements the electronic sources listed by allowing for on hand physical resources and printing or scanning where required.

Section 3.2 - Research strategies

In order to effectively search the databases listed, specific techniques which can be utilised, as outlined by Davis [7], are:

- Searching with discipline specific terms - e.g. "proxy bias in artificial intelligence" vs "AI bias"
- Utilising search restrictions and filters, such as by year or journal type
- Using 'AND' 'OR' keywords to focus results

Section 3.3 - Research identified

The below demonstrates searching for a specific topic within AI bias on the UWTSD eResources library.

Through the use of filters and keywords, a specific results relating to proxy bias is provided which is highly relevant to the project scope.

Figure 1 - Search Criteria

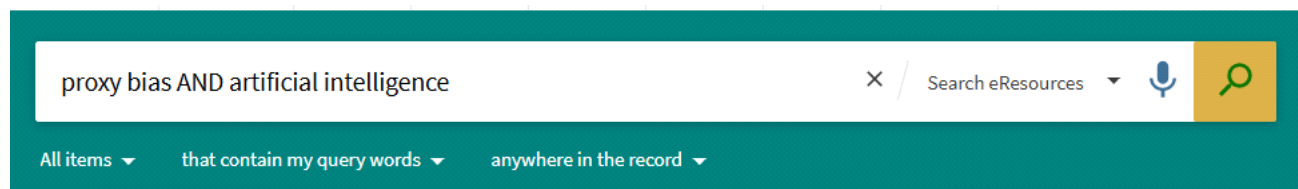


Figure 2 - First filter applied to search

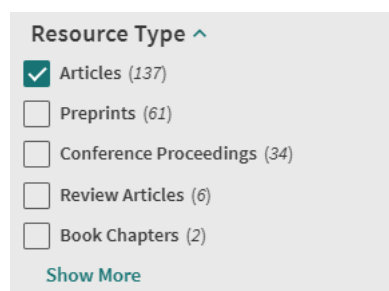


Figure 3 - Second filter applied to search

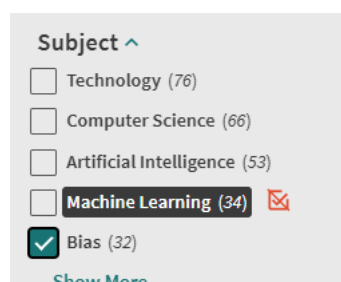


Figure 4 - Final filter applied to search

Creation Date ^

☐

From

2020

To

2025

[Refine](#)

Figure 5 - Sum of results

☐ 0 selected

PAGE 1

1-10 of 23 Results ▾

☐ Personalize

Figure 6 - Relevant research article identified



ARTICLE

Assessing Racial and Ethnic Bias in Text Generation by Large Language Models for Health Care–Related Tasks: Cross-Sectional Study

Hanna, John J ; Wakene, Abdi D ; Johnson, Andrew O ; Lehmann, Christoph U ; Medford, Richard J
Canada: Gunther Eysenbach MD MPH, Associate Professor; Journal of medical Internet research, 2025-03, Vol.27, p.e57257

“ Racial and ethnic bias in large language models (LLMs) used for health care tasks is a growing concern, as it may contribute to health disparities...”

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Task 3 - Research Strategies

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Question 1 - Validity, Reliability, Generalisability, and Ethics

Section 1.1. - Validity considerations

The following considerations will ensure the project is conducted with validity in mind:

- Focusing research to specific subject areas of bias, natural language processing AI, and accuracy in AI to avoid invalid research influencing the project
- Ensuring criteria for defining and identifying bias and accuracy are clear, measurable, and rooted in research conducted
- Define bias and accuracy indexing methods by creating clear and repeatable rating factors for both, to allow for rating method to be meaningful to end users in practice

Section 1.2 - Reliability considerations

The following will ensure the project is conducted reliably:

- Ensure research gathered is from peer-reviewed, up-to-date (2020-2025) journals, books, and other academic resources to avoid unreliable data sources influencing project
- Carry out testing in similar conditions of any proposed rating system to ensure results can be repeated across different AI inputs
- Ensure consistency of questions and format if any questionnaires are used to gather feedback on the project

Section 1.3 - Generalisability considerations

Ensuring the project is applicable on a wide-reaching basis can be achieved by the following:

- Once defined, bias and accuracy to be tested across multiple AI models to ensure approach does not favour any one model
- Ensure user feedback is sought from a reasonable cross-section of users across various age and socio-economic brackets
- Outline, if required, where generalisability is limited by the project scope, e.g. limited models used, limited feedback sought, or limits to academic research

Section 1.4 - Ethical considerations

- As a prime ethical focus, ensure the underlying bias and accuracy indexing decisions are clearly explained to end users in search results
- Ensure any data stored as part of the project (from example, surveys) is processed according to GDPR requirements
- Consider 'meta-bias' in project scope i.e. the model's own bias in rating and how this could be mitigated
- Ensure any source referencing displayed as a result of accuracy checking is displayed according to copyright laws and credit is clearly given for source material

Question 2 - Data Collection methods and pilot method

Several methods of data collection could be utilised to further the objectives of this project, including:

1. Once bias and accuracy of generative AI outputs are defined, a AI model output sampling test could be conducted to, for example, run the same questions through multiple models to rate answers against the bias/accuracy rubric created
2. In order to best present and rank the bias and accuracy of outputs of generative AI, a survey could be used to collect both qualitative and quantitative data from prospective end users
3. Once the bias/accuracy tool is created, a survey could be taken from end users to refine the tool by, for example, asking users to rate their perceived effectiveness of the ranking used and trust of the model's output

With reference to point 2 above, a pilot questionnaire has been designed to secure feedback from users on their perception and use of generative AI.

The survey can be accessed via the following link:

<https://forms.cloud.microsoft/e/RnNuwmSV1J>

In order to secure a range of responses from persons of varying ages, occupations, and academic backgrounds, the survey could be disseminated to students within University of Wales Trinity Saint David. but also disseminated in public places such as via library posters containing a scannable link to the data, or via public forums. This approach favours a convenience sampling approach [8] and whilst the results may not represent a truly random population sample, this can be counterbalanced by the ease of data collection and the desire to gain opinions from a wide range of participants, with an increased likelihood that those completing the survey represent persons interested in, and therefore users, of, generative AI.

A copy of the survey and a result from a member of the public (Miss Furlong) will be included in the Appendix. The feedback provided by Miss Furlong is, generally, negative insofar that it views answers provided by generative AI as biased and untrustworthy. Miss Furlong suggests that generative AI could list its sources following providing an answer, which is an idea that could be developed further in the project as both a ranking method of effective accuracy of AI outputs and as a presentation method of outputs to end users.

Question 3 - Types of analysis

Various data analysis methods may assist in the project, which seek to analyse the two main data types - quantitative data, which is typically numerical data, and qualitative data, which is typically opinion based or descriptive information [9].

3 types of quantitative analysis are as follows:

1. Comparative analysis, such as ranking the accuracy of generative AI outputs on a specific, number based rubric
2. Inferential statistics, such as utilising t-testing to confirm which AI model generates more bias in its answers.
3. Descriptive statistics, such as creating a mean accuracy score for a specific AI model.

3 types of qualitative analysis are as follows:

1. Thematic analysis - Involves "interpretation of patterns of meaning within a given data set" [10] - this could be achieved through grouping opinions on ranked AI outputs to find trends in opinions/feedback.
2. Content analysis - Involves finding meaning behind qualitative data - such as searching for or counting specific terms such as 'trust' from survey data to infer the success of this project.
3. Narrative analysis - Involves interpreting the relationships between sets of qualitative data - for example, assessing how the user's relationship with the AI ranking model develops over

time with survey data.

Appendices - Supplementary Information

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References

- [1] Everest Turyahikayo and | |, "Philosophical paradigms as the bases for knowledge management research and practice," *Knowledge management & e-learning*, vol. 13, no. 2, pp. 209–224, 2021, doi: 10.34105/j.kmel.2021.13.012.
- [2] J. Dudovskiy, "Positivism - Research Methodology," *Business Research Methodology*, 2020.
<https://research-methodology.net/research-philosophy/positivism/>
- [3] G. Ryan, "Introduction to positivism, interpretivism and critical theory," *Nurse researcher*, vol. 25, no. 4, pp. 14–20, 2018, doi: 10.7748/nr.2018.e1466.
- [4] G. Ryan, "Introduction to positivism, interpretivism and critical theory," *Nurse researcher*, vol. 25, no. 4, pp. 14–20, 2018, doi: 10.7748/nr.2018.e1466.
- [5] R. Farhan, "Understanding Postmodernism: Philosophy and Culture of Postmodern,"
International Journal of Social Sciences and Education, vol. 2, pp. 22–31, 2019. doi: 10.13140/RG.2.2.33590.04165.
- [6] University of Nottingham, "Understanding Pragmatic Research," www.nottingham.ac.uk, 2025.
<https://www.nottingham.ac.uk/helmopen/rlos/research-evidence-based-practice/designing-research/types-of-study/understanding-pragmatic-research/section03.html>
- [7] J. Davis, "Your Guide to Database Use in Academic Research," *BPL Database*, May 28, 2025.
<https://www.bpldatabase.org/your-guide-to-database-use-in-academic-research/>
- [8] D. P. Turner, "Sampling Methods in Research Design," *Headache*, vol. 60, no. 1, pp. 8–12, 2020, doi: 10.1111/head.13707.
- [9] BBC Bitesize, "What is quantitative and qualitative data? - BBC Bitesize," *BBC Bitesize*, Nov. 19, 2024. <https://www.bbc.co.uk/bitesize/articles/z6wb239#z4337v4>
- [10] A. J. Nicol, "Conspiritoriality in the Age of TikTok: A Thematic Analysis of #AgeofAquarius," UWTSD, Oct 14, 2024.
- [11] L. P. Davies, "Generative AI Survey on Accuracy and Bias," *Cloud.microsoft*,
<https://forms.cloud.microsoft/e/RnNuwmSV1J> (accessed Aug. 12, 2025).

Appendices

Figure 1 - Survey on Generative AI and Bias [11]

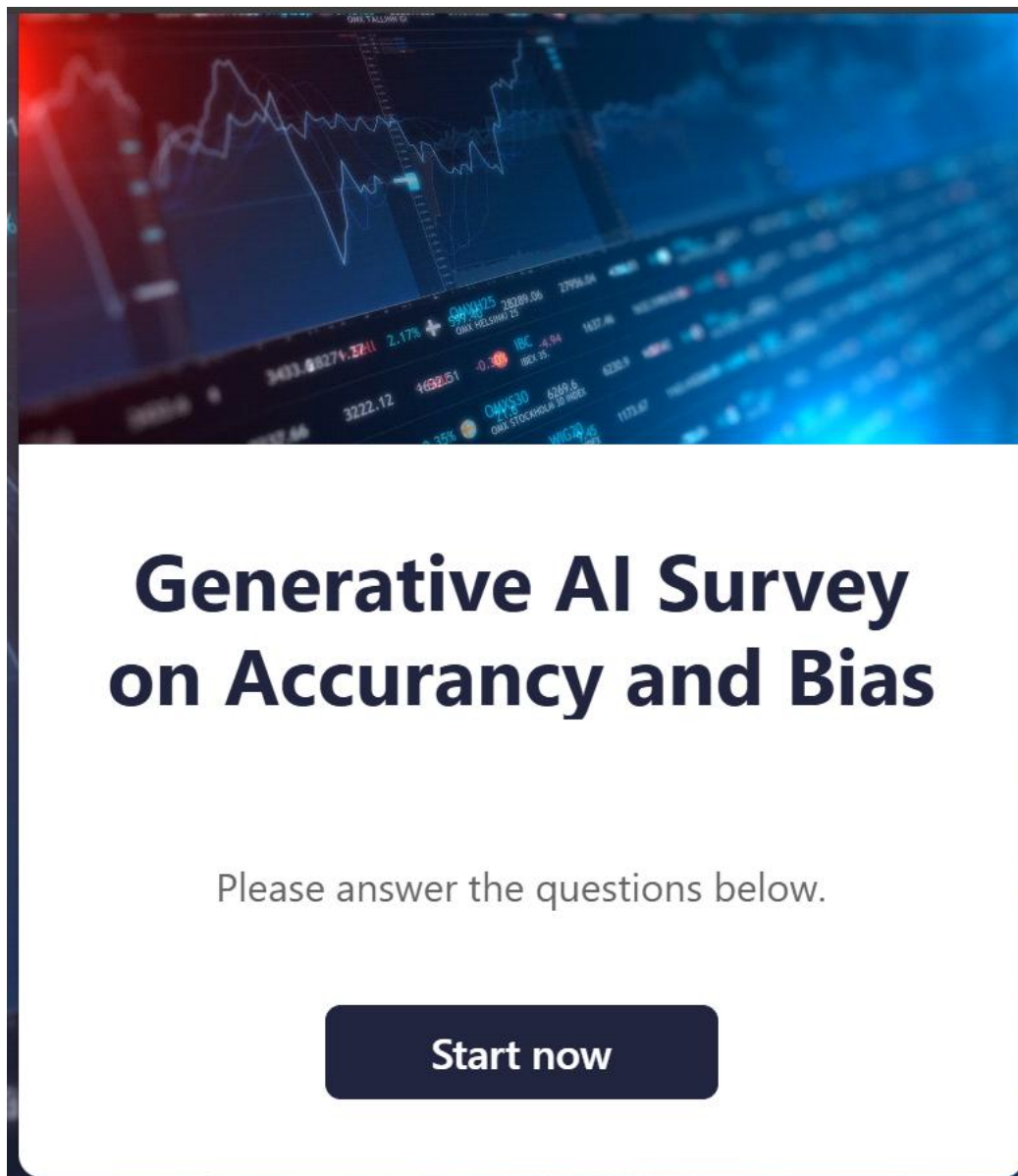


Figure 2 - Feedback obtained via survey - Part 1 [11]

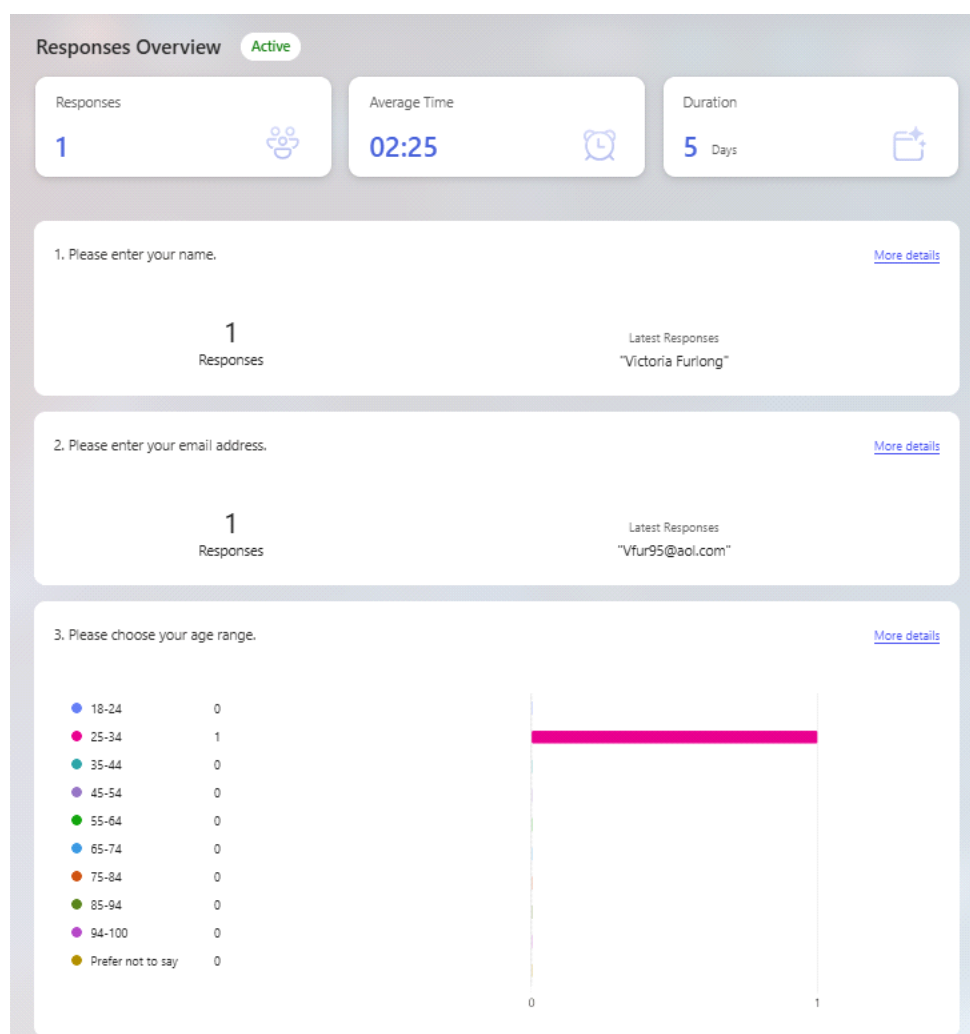


Figure 3 - Feedback obtained via survey - part 2 [11]

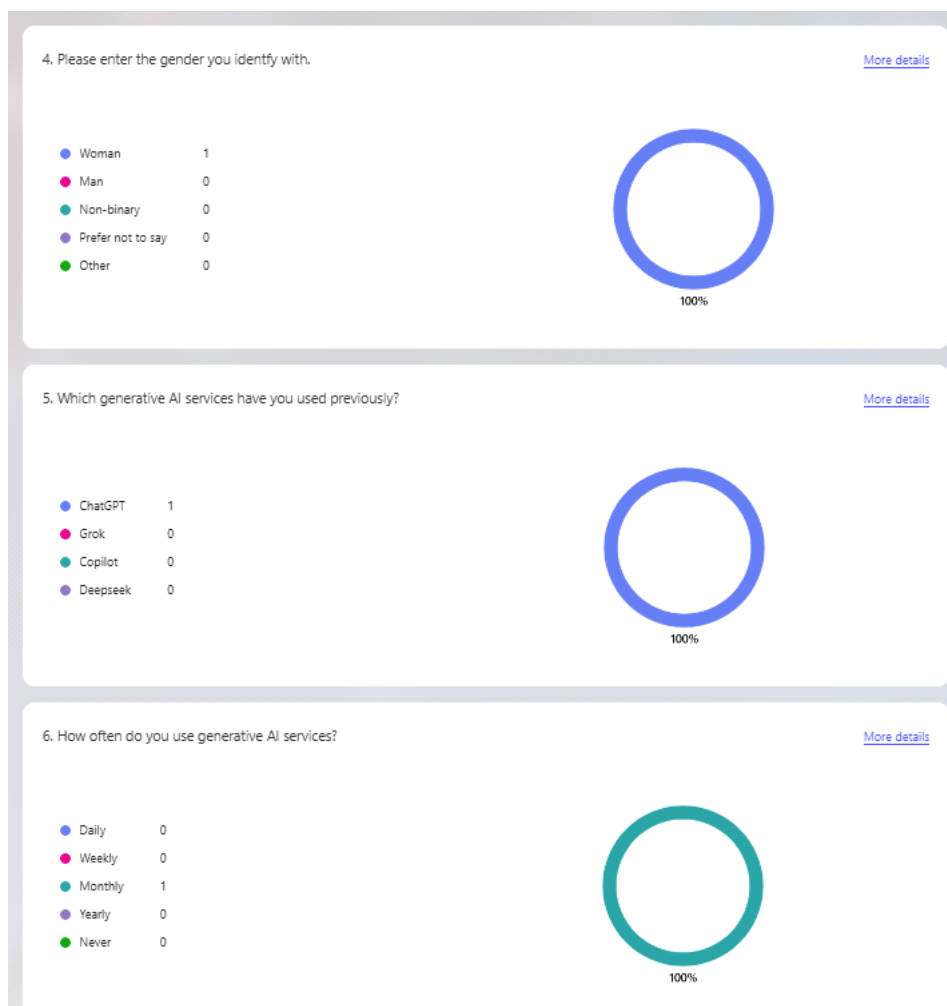


Figure 3 - Feedback obtained via survey - part 3 [11]

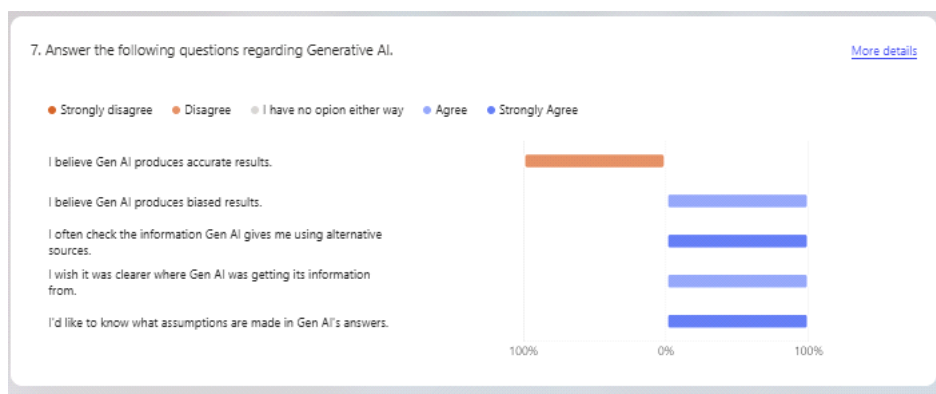


Figure 4 - Feedback obtained via survey - part 4 [11]

8. Think about your past interactions with Generative AI. What, if any, concerns did you have about the output given?

1 Responses

ID ↑	Name	Responses
1	anonymous	The accuracy of the statement and its ability to provide a nuanced answer based on the information given

Figure 5 - Feedback obtained via survey - Part 5 [11]

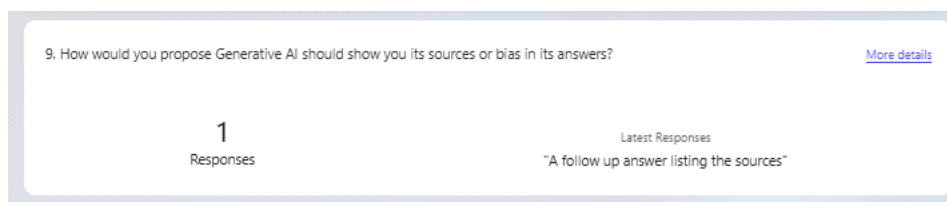


Figure 6 - Feedback obtained via survey - Part 6 [11]

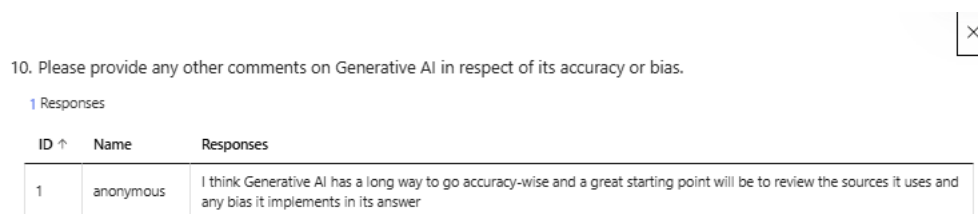


Figure 7 - Evidence of Unit Engagement



You have come to university to study a particular subject, but what is the **area of interest** that has caused you to take time to study this?

Enter your answer into the box below. You will revisit this later.

The development of Artificial Intelligence

Figure 8 - Evidence of Unit Engagement



Question 1 of 3

Which of these are good research questions?

Read each set of questions as they appear below and select which you feel is the best research question of the two.

✕ What effect does the pandemic have on people's minds?

✓ What effect has the isolation of young adults had on their mental health?

Correct!

A is not specific enough. What effect? What people? Which pandemic? You can see with question B that data can be collected from primary and secondary sources and that the targets are clearly defined.

Figure 9 - Evidence of Unit Engagement



Unit 1 Topic 4 completed!

You should now:

- Have a systematic way to walk through the literature on your chosen subject, which leads to the direction of your research.
- Understand how to create a series of testable questions.
- Use feedback to improve the focus of your problem statement/research question.

Back

Exit ✕

Figure 10 - Evidence of Unit Engagement



Reflect

Think back to when you made a purchase of something valuable. Maybe it was a pair of glasses, a car, a prom dress or suit. Reflect on the process that makes you decide whether to purchase it or not.

What did you do before parting with your money?



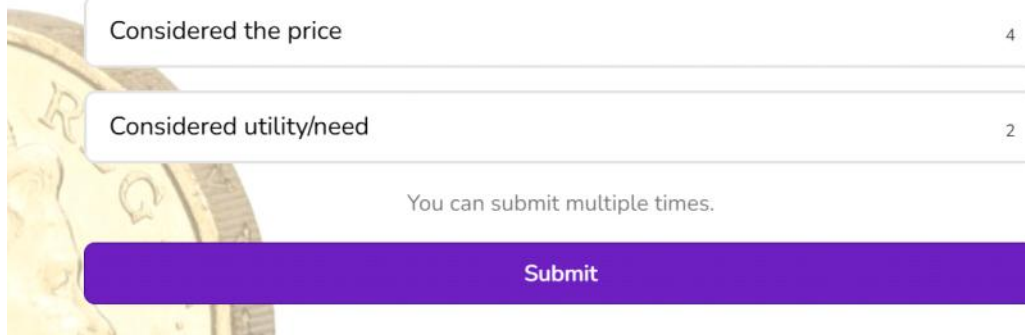
Submit your answers to the Word Cloud.



Review all answers on the World Cloud.

Figure 11- Evidence of Unit Engagement

What did you do before parting with your money?



Considered the price	4
Considered utility/need	2

You can submit multiple times.

Submit

Figure 12 - Evidence of Unit Engagement

Apply

Take sometime to think of **appropriate questions** to this scenario. Keeley is attending an interview for a job at UWTSD as a trainee librarian. Imagine that you are the person interviewing her. Can you...

- Think of a **qualitative question** that would give you some data on her librarian skills?
- Think of a **quantitative question** that would reveal relevant data on her suitability as a person who knows about books?

Use the skills you have developed in this topic to further your own research. Remember to also use the **library database** to identify suitable research methods for your subject area. Ask your tutor for some recommendations.

Answers to above question

Qualitative question – Do you enjoy assisting people of all ages? Why or why not?

Quantitative question – How many genres of books can you name?

Figure 13 - Evidence of Unit Engagement



You should now:

- Be familiar with different methods for collecting and analysing qualitative data including data sampling.
- Be able to consider how the acquisition of your data will impact your research.
- Understand your approach to collecting data for your research.



Figure 14 - Evidence of Unit Engagement

 **Reflect**

Spend some time thinking of the ideas that you admire. These could be products or technology. They could be new ways of working or they could be pieces of art. Reflect on **how the idea has used the SCAMPER approach**.

Note down **three examples** that spring to mind in the notes section here. Describe how each idea has used the SCAMPER approach.

Answer to above question

Idea that I admire = Artificial Intelligence models

Substitute – Replaces human jobs with AI e.g. chatbots replacing customer service representatives

Combine – Human interaction combined with machine learning to create natural language models

Adapt – Models adapt to user's needs e.g. memory of conversations, provide research assistance for students etc

Modify, minify or magnify – Models magnify user's abilities to conduct research or ask for answers

Put to another use – AI is being used in many industries to good use i.e. music generation, writing novels

Eliminate or elaborate – Removes excess in researching for students by providing summaries of research papers

Reverse – Eventually, AI may teach people key skills whereas we are currently programming AI

Figure 15 - Evidence of Unit Engagement

Reflect

Take a moment to think of a famous person who you know is a **divergent thinker**.

This could be somebody like musician Lady Gaga, inventor James Dyson or artist Pablo Picasso.

Answer to above question

My favourite divergent thinker is Nikola Tesla – he pioneered ideas such as wireless communication which had not been conceived previously [1]. Tesla is reported as saying that:

"A new idea must not be judged by its immediate results."
[2]

This demonstrates that divergent thinking requires time and effort to see the seed of a divergent idea bear fruit – quite inspiring!

[1] Wikipedia Contributors, "Nikola Tesla," *Wikipedia*, Feb. 03, 2019. https://en.wikipedia.org/wiki/Nikola_Tesla

[2] C. to, "American inventor," *Wikiquote.org*, Oct. 31, 2003. https://en.wikiquote.org/wiki/Nikola_Tesla