

L5: Changemakers and Creating Value

ACCA5033 Assignment 1: Innovation and research

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BSc Data and Information Systems

Link to notebook:
https://uowtsd-my.sharepoint.com/:o:/g/personal/2306723_student_uwtsd_ac_uk/EpnFmU5_NkBBm6Lk7IjUfLQBB4bSIk_ZFWf4R2zZqVIArq?e=9U4I29

Mind map on innovation in society



Task 1 - Ideation and Mind Map: Question 2

Select a project idea to take forward and add to the mind map

Choosing a project should align with how innovation drives human progress. Technological advances, like artificial intelligence (AI) and big data, are shaping the next industrial wave [6], focused on health, sustainability, and wellbeing. Projects that improve access to healthcare align with enlightenment values of reason, science, and humanism, as highlighted by thinkers like Steven Pinker [2].

The project to take forward is the use of AI to forecast waiting times and improve access to healthcare. Using AI to forecast demand or automate processes can enhance efficiency and equity, especially at the local level. Combining “high concept” (creativity, pattern recognition) and “high touch” (empathy, emotional intelligence) ensures solutions are both innovative and human-centred [1].

Big data and feedback loops enable continuous improvement, while sustainable technologies address environmental challenges. Historical patterns also show that technology developed for strategic purposes often transforms life and strong projects blend emerging technologies with social impact, creativity, and compassion to create meaningful, futureproof solutions.

Task 2 - Aim and objectives and research area:

Question 1

Create and document a single aim and several objectives for your project

Project:

Sophisticated demand and capacity waiting list management tool within healthcare.

Aim

To develop a sophisticated waiting list modelling tool using artificial intelligence, machine learning and big data to empower leaders to make accurate and informed operational, reporting and planning decisions in healthcare.

Objectives

- Analyse current processes and constraints to identify waiting list inefficiencies.
- Review global best practices, focusing on UK-comparable systems.
- Conduct staff surveys to evaluate current tools' accuracy and availability.
- Centralise and assess existing waiting list data.
- Develop and pilot a basic demand-capacity forecasting tool.
- Validate forecasts against six months of actual data.
- Build and test an advanced, AI-driven modelling tool for wider use.
- Re-survey staff to assess tool impact and usability.
- Produce standard operating procedures and user guide for long-term adoption.

Task 2 - Aim and objectives and research area: Question 2

Identify an appropriate research philosophy for your project

Critical realism provides an appropriate philosophy for this project. It bridges the gap between positivist and interpretivist paradigms [11], acknowledging objective reality while recognising that our understanding of it is socially constructed and fallible [12] [13].

Critical realism presents a stratified ontology, which differentiates the empirical (what is observed), actual (what happens) and real (underlying causes) [12]. In waiting list management, this allows analysis of waiting time data along with deeper system inefficiencies, such as workforce limitations, important when creating tools that integrate with ever-changing dynamics within a complex organisation.

In terms of epistemology, critical realism promotes epistemic relativism, the idea that knowledge is always provisional and mediated through social or historical contexts [13]. Within this project, this recognises that artificial intelligence and machine learning are not completely objective but shaped by collection and interpretation of data. This project uses an abductive reasoning strategy to move between data, theory and emerging insights. In line with Saunders et al. [14], this helps identify causation and influences both model design and implementation.

Critical realism supports a mixed-method approach to find performance outcomes (quantitative) and interpretations (qualitative), particularly relevant to this project as it allows for data analysis combined with stakeholder engagement [15] [16]. Interviews can give qualitative insights into user perceptions while data analysis with potential machine learning testing can provide validation of the tool's performance.

This research philosophy benefits the project in terms of producing a robust, accurate tool aligned with complex operational realities, while embracing user-feedback.

Task 2 - Aim and objectives and research area: Question 3

Document appropriate search tools, research databases and search strategies to identify relevant research related to your project

Research databases

Given the wide scope of project topics, using high-quality academic databases is essential. Key sources include:

- **UWTSD Library:** Free student access to books and academic resources, online and in print.
- **IEEE Xplore:** Strong in artificial intelligence and information systems, with technical and standards-based content.
- **JSTOR:** Covers social sciences and philosophy; useful for qualitative methods and theoretical debates.
- **Web of Science:** High-quality journals; ideal for systematic reviews and healthcare modelling.
- **Scopus:** Large database of peer-reviewed research; good for trend analysis.
- **Google Scholar:** Quick searches; verify results with more reliable sources.

Search strategies

Boolean logic is essential for systematic literature searches and are used to broaden, narrow or refine results using logical operators [17], including:

- **AND** – Require all terms
- **OR** - Allow any terms
- **NOT** – Exclude items
- **Quotations (“”)** – Exact phrases
- **Parentheses ()** – For grouping

The CRAAP qualitative evaluation tool (figure 1) is used for assessing the relevance and credibility of sources, particularly useful when evaluating web-based or mixed-quality resources [18].

C	Currency: The timeliness of the info
R	Relevance: How the info fits your needs
A	Authority: The source of the info
A	Accuracy: Reliability and correctness of the info
P	Purpose: The reason the info exists

Figure 1: CRAAP test [18]

Relevant research

This project contains “known-knowns”, clearly defined parameters which are critical inputs of observable and measurable components [14], including data on:

- Waiting lists
- Appointment capacity
- Staffing

Critical realism aims to go beyond surface data and explore causation, including “known-unknowns” (unmeasurable variables), “unknown-unknowns” (emerging behaviours) and structural inefficiencies [12]. Project research for these causations can lead to uncovering delay reasons and improve decision-making.

A concept map (figure 2) is a visual tool outlining and organising key ideas, variables and relationships. Key features of a concept map include:

- **Research focus** – positioning main points helps anchor related themes [14].
- **Branch related concepts** – identifies key themes and subtopics. Arrows show relationships [19].
- **Identify scope** – define literature boundaries and research objectives [20].
- **Support theory and methodology** – highlights links to theoretical frameworks and potential data sources, aligning philosophy, methods and objectives [14].
- **Flexible and iterative** – evolves as understanding deepens and new findings emerge [19].

Combining these techniques ensures appropriate topics for the project are fully researched. Searching for information on artificial intelligence in healthcare by looking for evidence of existing research in Web of Science journals, which contain many studies on healthcare modelling, along with searching for specific terms identified through a concept map using Boolean logic will open up potential opportunities to discover unknown unknowns and enable innovative change. This is the first phase of the research plan for this project.

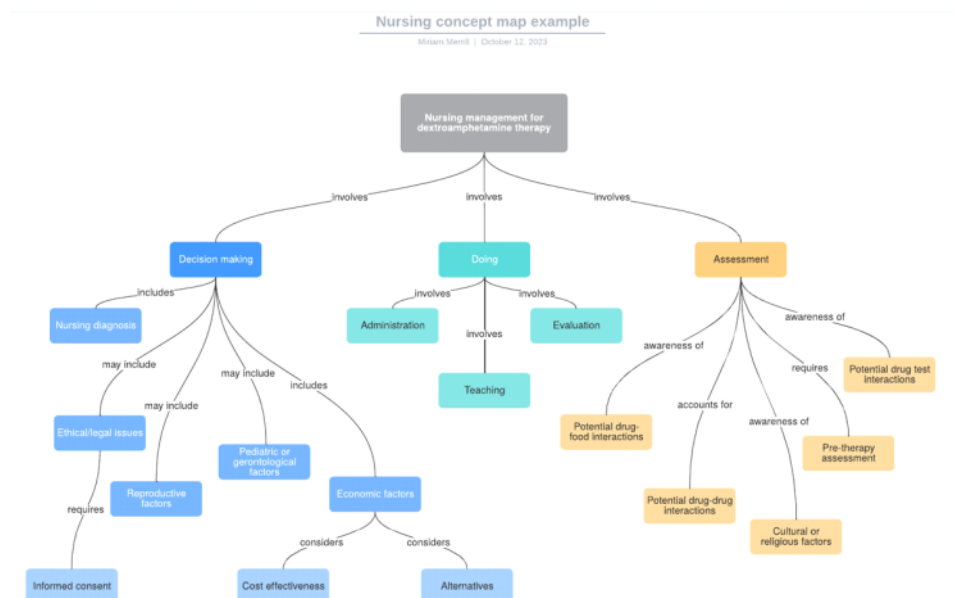


Figure 2: Example of a concept map [23]

Task 3 - Research strategies: Question 1

Consider and document strategies to enhance validity, reliability, generalisability and ethical considerations

Saunders et al research choices framework [14] suggests that a mixed-method approach, collecting both quantitative and qualitative data, is most appropriate for this project. This is because quantitative data such as historical waiting lists can help to validate the artificial intelligence model. Alongside this, and essential under critical realism [12], qualitative data captures organisational nuances and human behaviour via the use of surveys.

Applying the CRAAP test to data sources will help evaluate the quality of research resources [18]. Research for this project should consider the CRAAP test:

- **Current** – Use recent waiting list data.
- **Relevance** – Focus on healthcare comparable to the UK (like New Zealand).
- **Accuracy** – Check data against validated internal systems.
- **Authority** – Use authorised systems and peer-reviewed or academic sources.
- **Purpose** – Consider if documents are for decision-making or promotion.

With data collected for this project, it is important to address the Henry Landsberger Hawthorne Effect, which suggests that people change their behaviour when they know they are being studied, which can skew data from surveys or observations [21]. To mitigate this, it is important to ensure surveys are anonymous, reassure participants that there is no judgement, conduct follow up studies, and compare behaviour both before and after implementation to assess the impact.

Using a mixed-method data collection approach, the CRAAP test, and encompassing the Hawthorne Effect ensures:

- **Validity** is enhanced. Mixed methods of data collection allow triangulation [14] where critical realism captures observable data and causations [12].
- **Reliability** is enhanced by using structured surveys and consistent methods of data collection along with standard operating procedures allowing repeatability [14].
- **Generalisability** is improved by using qualitative data to generalise against comparable healthcare settings [20].
- **Ethical integrity** is covered with anonymised data, consent and attention to the Hawthorne Effect, which reduces bias [21], while evaluating sources with the CRAAP test ensures the use of ethical data [18].

Task 3 - Research strategies: Question 2

Select research strategies or data collection methods to use to collect data for your project. Design a pilot data collection method and acquire some feedback

One of the research strategies used in this project is a pre and post implementation survey that will be circulated to staff within the organisation. The survey is designed to understand current waiting list processes, identify issues and inefficiencies with current processes, attain staff perspective on what needs improvement and inform the design of the waiting list modelling tool. The survey aligns with critical realism by exploring both observable practices and causation, CRAAP principles by asking targeted and purposeful questions, whilst maintaining awareness of the Hawthorne Effect by offering anonymity and neutrality.

An example of the pilot data collection survey can be found in appendix A, the questions within which are designed to attain credible responses and feedback for improvement.

Task 3 - Research strategies: Question 3

Outline some different types of quantitative and qualitative analysis

By applying both quantitative and qualitative analysis to this project, a comprehensive understanding of organisational context, user attitude and system effectiveness can be attained.

Quantitative analysis is useful for measuring variables such as forecasting accuracy. This can be broken down into two main areas:

- **Descriptive statistics** – Summarise data with mean, median, standard deviation such as average wait times before and after project implementation. Tools include Excel, Tableau, SPSS, Python.
- **Inferential statistics** – Make generalisations from samples to the wider organisation, allowing correlations to be identified [22], such as staff levels vs digital competence. Tools that provide confidence intervals and determination of statistical significance include R, SPSS, Python [11].

Samples should be representative of staff roles, departments to generalise findings. Sampling bias should be avoided by including a broad range of departments and contexts. An example of quantitative data for this project is shown in figure 3.

Method	Purpose	CRAAP application	Hawthorne Effect
Historic data analysis	Train/test forecasting models	Check currency, accuracy, and relevance of datasets [18]	Not directly affected
Forecast accuracy testing	Compare predictions to actual outcomes	Evaluate accuracy and purpose of system logs [18]	N/A

Figure 3: Quantitative data collection methods

Qualitative analysis is used to interpret non-numeric data from surveys or observations and can be categorised as [14]:

- **Thematic analysis** – Identify patterns about current processes from staff feedback.
- **Content analysis** – Including coding free text responses for frequency.
- **Narrative analysis** – provide an understanding of challenges and blockages.
- **Framework analysis** – Map experiences against policies or frameworks.

An example of qualitative data for this project is shown in figure 4.

Method	Purpose	CRAAP application	Hawthorne Effect
Structured interviews	Understand user perceptions	Ensure relevance and authority of participants [18]	Participants may give forced answers if they feel observed [21]

Focus groups	Compare experiences across teams	Evaluate claims based on accuracy and currency [18]	Peer influence may enhance the Hawthorne effect [21]
Field observations	Study tool use in real time	Evaluate relevance to the research context [18]	High risk of behaviour modification due to being observed [21]
Structured surveys	Pre and post implementation feedback	Assess purpose and authority of survey [18]	Respondents may show bias if they know their performance is monitored [21]

Figure 4: Qualitative data collection methods

Appendix A – Qualitative data collection

A Pre-implementation survey created to gather qualitative data. A follow up post-implementation survey will be used to enhance the product by effective use of feedback.

The screenshot shows a web-based survey interface. At the top left, there is a 'Back' button. The main heading is 'Understanding current waiting list management processes'. Below this, there is an introductory paragraph: 'This survey aims to understand how waiting lists are currently managed across the organisation and identify areas for improvement.' followed by 'Your responses will help inform the development of an AI-based modelling tool to support more efficient and accurate waiting list decisions.' and 'The survey is **anonymous**. No identifiable data is collected.' A personalized message follows: 'Hi, David. When you submit this form, the owner will see your name and email address.' Below this is a '* Required' label. The first question is '1. What is your job role? *' with a small icon. It has four radio button options: 'Administrator', 'Clinical', 'Management', and 'Other'. The 'Other' option is followed by a text input field. Below the first question is a 'Back' button. The second question is '2. Which department or service area do you primarily support? *' with a small icon. It has a text input field with the placeholder 'Enter your answer'. The third question is '3. How long have you worked in this area? *' with a small icon. It has four radio button options: 'Less than 1 year', '1 - 3 years', '4 - 6 years', and '7+ years'. The fourth question is '4. How are waiting lists currently managed in your area (e.g., manually, using spreadsheets, software systems)? *' with a small icon. It has a text input field with the placeholder 'Enter your answer'.

Back

Understanding current waiting list management processes

This survey aims to understand how waiting lists are currently managed across the organisation and identify areas for improvement.

Your responses will help inform the development of an AI-based modelling tool to support more efficient and accurate waiting list decisions.

The survey is **anonymous**. No identifiable data is collected.

Hi, David. When you submit this form, the owner will see your name and email address.

* Required

1. What is your job role? * 

☐ Administrator

☐ Clinical

☐ Management

☐ Other

Back

2. Which department or service area do you primarily support? * 

Enter your answer

3. How long have you worked in this area? * 

☐ Less than 1 year

☐ 1 - 3 years

☐ 4 - 6 years

☐ 7+ years

4. How are waiting lists currently managed in your area (e.g., manually, using spreadsheets, software systems)? * 

Enter your answer

Back

5. Who is primarily responsible for managing the waiting list? 

Enter your answer

6. What systems or tools do you currently use for:

- a. Scheduling
- b. Capacity planning
- c. Reporting or forecasting demand



Enter your answer

7. What do you see as the **main strengths** of your current waiting list processes? 

Enter your answer

Back

8. What are the **biggest challenges or inefficiencies** you encounter? 

Enter your answer

9. How would you describe the quality and availability of waiting list data in your area? * 

- ☐ High quality
- ☐ Good
- ☐ Average
- ☐ Poor
- ☐ Very poor

Back

10. How confident are you in the **accuracy of existing forecasts or plans** based on current data? *



- ☐ Extremely confident
- ☐ Somewhat confident
- ☐ Neutral
- ☐ Somewhat not confident
- ☐ Extremely not confident

11. How are operational or planning decisions currently made in relation to waiting lists?

* 

Enter your answer

Back

12. What kinds of insights or capabilities would be most useful from a future tool to support your role?

*

Enter your answer

13. What features or outputs would improve planning or resource management in your department?

*

Enter your answer

14. What concerns would you have about using AI or predictive tools in your area?

*

Enter your answer

Back

15. Do you have any suggestions that could help us design a tool that fits your team's needs and workflow better?

*

Enter your answer

Submit

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Appendix B – Tutorial answers and engagement with Moodle

Unit 1 topic 1 section1 forum questions

Reflection

Which invention do you think has had the biggest impact on society as we know it today?

I would say Electricity, without which we would not have a foundation for most of the technology of our times.

After digesting the content, do you still agree that this invention has had the biggest impact on the development of society?

On reflection, I would think it is possible that medicine has had the greatest impact on society today. Welfare, standards of living and life expectancy have all improved considerably in the last one hundred years and much of this is due to innovations in medicines that we all take for granted. These innovations are still ongoing to this day, where there is an endless pursuit of potential cures to the worst illnesses, as evidenced in the innovative response in creating a vaccine to the global COVID-19 pandemic, considerably reducing the hospitalisation and death rates due to the virus and allowing society to get back to normal and even become a more efficient society with innovative technological solutions being rolled out and scaled up as a direct result of the pandemic.

Unit 1 topic 1 section 2 forum questions:

Apply

Of the technologies listed by the World Economic Forum, which, if any, do you think will have the biggest impact in your discipline area in the next 3-5 years?

I think the biggest impact in my discipline area, my employment in the National Health Service, over the next 3-5 years is digital health. The World Economic Forum outlines the Digital Healthcare Transformation Initiative, which aims to create a global platform to accelerate public-private collaboration in digital health, AI and data by sharing insights, driving action, and building regional innovation capacity to achieve maximised outcomes, access and efficiency. They offer workstream strategies that should work together:

1. Global Insight Exchange – global collaboration to advance infrastructure, funding models and adoption of AI/frontier technology in healthcare.
2. Regional activators – mobilising public and private partners in healthcare, technology and finance industries and use digital, data and AI to solve local solutions.

Within the NHS, I already see some of these innovations being introduced, with digital health being a key strategy of my health board. Data is seen as a powerful tool to unlock some of the key challenges faced by the NHS and close work between health care and other sectors are being used to make the best use of resources. Another innovation already starting to be evidenced in the real world is a focus of health care provisions on demographics of the population to allow best use of resources and improve patient outcomes. This involves analysis of areas of deprivation and other similar factors to influence planning of healthcare on a local/regional basis. It also, on a larger scale, allows researchers to understand patterns and connections in diseases to speed up innovations in health technologies

and try to manage a greater range of common conditions before they need resource intensive medical intervention.

Unit 1 topic 1 section 2 checks:

Check

Drag the revolution to the correct definition.

a. Steam, water and mechanical means of production	First Industrial Revolution
d. Cyber physical systems	Fourth Industrial Revolution

These are the correct definitions for the first and fourth industrial revolutions.
If you'd like to remind yourself of the definitions of each, let's [revisit that slide](#).

Check

By 2025, what percentage of people are expected to be wearing clothes connected to the internet?

☐ 5% ☒ 10% ☐ 15%

Within the next decade, how many sensors are estimated to be connected in the Internet of Things?

☐ One billion ☐ One million ☒ One trillion

Submit

Unit 1 topic 1 section 3 forum questions

Apply

Do you consider yourself to be a creative person?

In some ways yes, in some ways no. For example, I am not very artistic, but one of my strengths is problem solving and thinking about innovative/creative solutions to problems. After watching the video "We need a Bigger Definition of Creativity", I haven't really changed the way I think about creativity, but it has reaffirmed my original notion. I am a creative person in the way that I like to try new things with a different spin to establish if I can be more efficient or improve a process for example. Describe an experience from your past where you feel you were discouraged/encouraged to be creative and how this might have affected how you feel about your levels of creativity?

In the past, I believed creativity was only about the stereotypical form of the word i.e. being artistic. I was always terrible at drawing, and this discouraged me from thinking I was creative until more recently, in my latest job role, where I realised that I am quite creative and innovative in terms of finding solutions to problems.

Why is creativity important in your subject area? What might you be asked to do that might involve the need for you to be creative?

Creativity is extremely important in a complex industry such as healthcare. If nobody tried anything new, systems would soon become out of date and in the end, patient outcomes, efficiencies and finances will all be negatively impacted due to the ever-increasing need for health care as the population ages. In my job role, I may be asked to produce a graphic that tells a story of how a certain part of the organisation is performing against targets. I often need to be creative to ensure the correct story is being told through the data – for example if you took 2 months of data and one is better than the other you, could say that performance is improving or deteriorating. However, you would need to be creative and look a bit further back to understand the full story by looking over time, perhaps over 12 months or longer, and investigate seasonality. This is a generalisation of the creativity that is required in my discipline, however, there is scope for much greater depth in reality.

 **Unit 1 Topic 1 completed!**

You should now:

- Recognise the evolutionary positive impact, importance and benefit of creativity and innovation in society.
- Identify concepts used to describe the progress of technology and innovation.
- Think of yourself as someone capable of being creative (if you don't already)

If you have taken notes using the in-built notebook, you can now export them.

[Export my notes ↑](#)

[Back](#)

[Exit ✕](#)

Here are listed the references that are used in this topic.

[References ↗](#)

Unit 1 Topic 2 section1 forum questions

The importance of creativity – Reflect

Describe the last time you felt as though you were being creative. How did it make you feel?

The last time I felt I was being creative was when I built some shelving out of an old crib. This recycled a well-used piece of furniture, destined for the tip, and solved a storage issue. This bit of creativity made me feel very positive and worthwhile, a sense of achievement.

Topic 2 section 1 checks

Check

Using creativity to **avoid stress** is:

- ✕ A contemplation tool
- ✓ A distraction tool
- ✕ A means of self-development to face challenges by building up self-esteem and confidence

Correct!

When we use creativity simply to avoid something challenging or ignore something we find stressful, it is a **distraction tool**.

Only when we use creativity to give us the mind space to reassess problems in our lives and make plans can we consider it a **contemplation tool**.

Unit 1 Topic 2 section 2 checks

Check

Correct

That's right! You selected the correct response.

Axiology is the study of what is valuable.
Epistemology is the study of knowledge.
Ontology is the study of being.

Continue

Unit 1 Topic 2 section 3 reflection

Reflect

As you are reading each of the different sorts of research philosophy, it is likely you will be drawn to it or not. Choose how you feel about the following research philosophies. **Is there an outright winner for you?**

	Support	Indifferent	Against
Positivism	☒	☐	☐
Critical Realism	☒	☐	☐
Interpretivism	☐	☐	☒
Postmodernism	☐	☒	☐
Pragmatism	☐	☒	☐

My choices are outlined above. I believe the critical realism research philosophy to be the most important, it draws me in. To have scientific, factual quantitative data is important to provide the most accurate research, however, you must be mindful of other factors that can impact a research area, and these may or may not be proven scientifically. For example, if science is telling us that the sun always shines during daylight hours, if we consider other factors, such as a solar eclipse, or an apocalyptic climate event, where the sun may not be shining on the ground, we can add a critical thinking argument that acknowledges that whilst the scientific theory is usually correct, there are occasions that it's not correct, and therefore research can factor this into the theory. This approach is more objective than the interpretism, postmodernism and pragmatism choices and provides greater scope for straying away from the scientific facts than positivism.

Unit 1 Topic 3 section1 forum reflect

Yes, I use this	Name	Information	Reflect
☐	ERIC: Education Resources Information Center		Here is a list of some of the most popular databases for academic study. Which ones do you use? Select the buttons of that you do use. For databases that you don't know, click their name to see more. Can you think of any other databases? Share any that aren't listed here on your Moodle forum. You can also share any comments about the websites here and how you find their usability.
☒	Google Scholar and Google Books	Semantic Scholar is a search engine designed for academic publications.	
☐	Internet Archive Scholar	It began as a database containing publications about computer science, geoscience and neuroscience; however, as of 2021, they now include publications from all fields of science. As of 2020, it had indexed 190 million papers and has seven million users a month.	
☒	JSTOR		
☐	Project Gutenberg		
☐	PubMed		
☐	ResearchGate		
☐	Semantic Scholar		

I have used the UWTSD library for academic study. There is a wide range of books/journals etc. available and having access to the ebook for free is a quick and cost-effective way of accessing research. There is also the ability to check stock of the physical book if needed. I find the JSTOR website easy to use, with a logical layout and handy advanced search function.

Unit 1 Topic 3 section 2 check

Check

1. A keyword is like a...

- ☐ A word that unlocks others.
- ☐ A word like a hashtag that summarises the meaning of a sentence.
- ☐ A way of distilling meaning that can be used to search databases.
- ☒ All of the above.

Correct!

A keyword is all of these descriptions.

Check

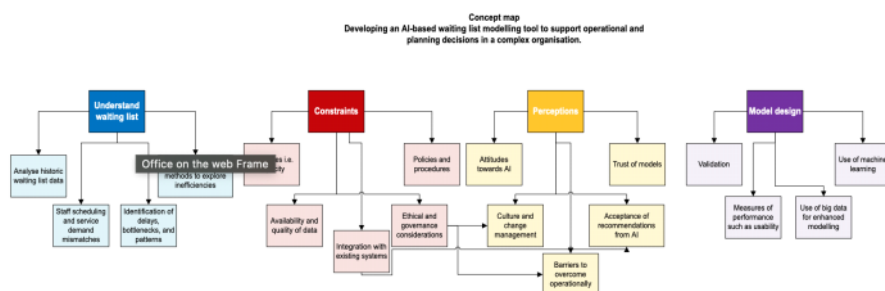
2. We can locate the keywords in our research by...

- ☐ Asking the library staff
- ☐ Using a piece of software
- ☒ Remove all superfluous words

Correct!

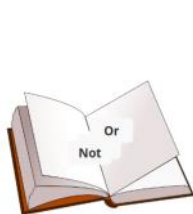
Unit 1 Topic 3 section 3 – apply

Create your own concept map (Look at Lucis Software video for tips). Try to identify propositions and crosslinks, and how these would apply to how you research.



Check

3. Drag all the correct common Boolean operations to the book. Drag the incorrect options into the bin.



Correct

Unit 1 Topic 3 section 3 reflect

Consider your research assignment. Can you think of a focus question that you could outline what is going to be in or out of scope for your research?

Central Focus

Developing an AI-based waiting list modelling tool informed by critical realism to support operational and planning decisions in a complex organisation.

In Scope

Understanding Waiting List Inefficiencies

- Analysis of historical waiting list data
- Identification of delays, bottlenecks, and patterns
- Staff scheduling and service demand mismatches
- Use of qualitative methods to explore inefficiencies

Structural Constraints Affecting AI Model Effectiveness

- Organisational policies and procedures
- Resource availability (e.g., beds, staff, equipment)
- Data quality and availability for AI input
- Workflow design and system integration challenges
- Ethical and governance constraints affecting implementation

Leader Perceptions and Use of AI

- Attitudes towards AI/ML decision support tools
- Trust, interpretability, and transparency of models
- Organisational culture and change management factors
- How AI recommendations are used or disregarded
- Barriers to adoption of AI tools in operational contexts

Model Design and Evaluation

- Use of machine learning for prediction and pattern recognition
- Integration of big data for enhanced modelling
- Validation through real-world use cases or simulations
- Performance metrics (accuracy, efficiency, usability)

Out of Scope

Broader AI/ML Theory

- General theoretical development of AI algorithms
- Advanced ML model comparison not specific to the organisation
- Technical details beyond applied modelling (e.g., neural network architectures)

Clinical or Non-Operational Outcomes

- Direct patient outcomes (e.g., clinical quality, safety)
- Psychological impacts on staff or patients
- Research on waiting list fairness or prioritisation ethics

Full Implementation & Deployment

- End-to-end software engineering or deployment processes
- User interface or user experience (UI/UX) design
- Long-term post-deployment system monitoring or updates

Unit 2 topic 2 Section 1 network and teamwork:

Network

Given an appreciation of the different approaches to data collection, **can you think of a way of collecting data** that would be appropriate for your next assignment?

If any aspect of your research involves people's responses, **how will you account for the Hawthorne Effect?**

Note down your approach on the **forum**.

I like the idea of taking an existing data source and expand on that to answer a question that was previously not covered. It may be possible to create a qualitative survey, for example in my demand and capacity project, to ask end users or management a series of questions to gain insight into whether the tool I develop has made their jobs easier. It would be very important to account for the Hawthorne effect in my research however, because any positive or negative effect of the implementation of a demand and capacity tool may be related to end users feeling that they are being watched and this has an impact on how the impact on performance as observed by management.

Unit 2 topic 2 Section 2 checks

Check

In this knowledge check activity you will be presented with three research questions.

Question 1 of 3

What do we call it when we reduce the data of the population into a smaller manageable unit? We call it a...

- ☒ Sample
- ☐ Snowball

Correct!

A sample is a group of people, objects, or items that are taken from a larger population for measurement. The sample should be representative of the population to ensure that we can generalise the findings from the research sample to the population as a whole (Bineham, 2006).

Check

Question 2 of 3

Which of the following are relevant reasons for why we have to reduce the data we research into a smaller unit? (Choose which ones you think apply)

- ☒ Your time and resources may be stretched
- ☒ There are limited people who have experiences you are studying
- ☒ There are limited people/results with the relevance to the area you are studying

Correct!

If your sample size is large, it may limit your ability to produce findings that represent your population as a whole. It is therefore good practice for triangulation purposes to recruit a variety of respondents (e.g., children, adults, service users and providers).

Check

Question 3 of 3

When you select a sample from the population by picking the names out of a hat, what type of sampling are you conducting?

- ☐ Unusual sampling
- ☒ Random sampling
- ☐ Stratified sampling

Correct!

In this approach, every piece of data is considered to be equally relevant. This means if you include it in your research it is based on a random chance whether it's included or excluded from the sample you study.

Unit 2 topic 2 Section 3 reflect

Reflect

Take some time to **critically analyse and evaluate** the data collection plan for your research project. Remember to include:

- The type of collection,
- size of sample,
- and how you would go about collecting the data.

Remember you can make notes and export them using the in-built feature below.

Learning from this section has opened up my eyes to the approach I should take with my research. For my demand and capacity research, I would like to capture some probability sampling by creating a survey using the Likert scale to capture user feedback on the effectiveness of managing waiting lists both before and after the introduction of the demand and capacity tool that I plan on developing. I would select a range of staff at random, from all types of job role, for senior management, clinical staff, admin staff – this should provide an unbiased representation of the data.

The sample should be taken from the initial pilot within Podiatry and could be around 50 people. The survey could be completed electronically via Microsoft Forms. Response rate will be monitored. This approach should provide a representative population indicator to monitor the effectiveness of the process.

Following this pilot, I will have scope to upscale and utilise the same survey across other areas of the roll-out which will hopefully provide an indicator towards the success of the project. I plan to back this up with a concrete analysis of the data from known data sources to understand whether there is a factual relationship between the use of demand of capacity modelling and a reduction in waiting lists.

Unit 2 topic 2 Section 3 checks

Check

Question 1 of 2

If you wanted to understand the general characteristics or opinions of a group of people you would use a...

- ☒ Survey
- ☐ Interview
- ☐ Experiment

Correct!

This method will be based on you conducting a survey that can be distributed online, or in person over a phone or in a live meeting. It can produce mixed data (quantitative and qualitative) based upon how the questions are framed.

Check

Question 2 of 2

A 'Likert scale' is?

- ☒ Respondents specify their level of agreement or disagreement on a symmetric agree-disagree scale for a series of statements
- ☐ A way of confirming the validity of experimental research invented by Donald Likert in 1967

Correct!

A good solution to measure success would be to consider a 'Likert scale'. A Likert scale is a five-point answer like the one you have used in the previous 'research approach' activity.

Unit 4 topic 1 Section 1 checks

Check

Question 1 of 2

Would a survey of 300 students, chosen at random, from your university and asking them the question: "On a scale from 1-5, how satisfied are you with your professors?" be a good sample?

☒ Yes

☐ No

Correct!

The survey has been conducted at random to avoid any bias. The survey will of course have some bias as it is a sample of the entire university, but it has mitigated this by randomising the trial.



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Check

Question 2 of 2

Could research of the recovery of people from Covid living on the island of Jersey be used be applied to people living in the city of New Delhi, India?

☐ Yes

☐ No

☒ It depends

Correct!

It depends. Do you think that the people living in Jersey are comparable to the people who live in New Dehli? If yes then the research is valid, if not then the research should not be used in the New Delhi context.



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Unit 4 Topic 1 completed!

You should now:

- Be able to imply a numerical precision to arguments in a casual way that brings a lack of precision to our work.
- Be able to analyse data using different examples of graphs and charts and present data using a variety of methods.
- Have a deeper understanding of creating charts that communicate in the best way possible.

[Back](#)

[Exit](#) 

If you have taken notes using the in-built notebook, you can now export them.

[Export my notes](#) 

Here are listed the references that are used in this topic.

[References](#) 



Appendix C – Teamworking

Evidence of discussing the assignment with fellow students

The image shows a screenshot of a Microsoft Word document and a Zoom meeting interface. The Word document is titled 'LEVEL 5 ASSESSMENT SPECIFICATION' and contains the following table:

Student name:	Student ID number:
Programme:	Changemakers: Creativity and Value Creation
Module code:	ACCA5033
Lecturer:	James MG Williams
Assignment Title:	Assignment 1: Innovation & Research.
Submission deadline:	August 2025 (see moodle for exact date)
Submission method:	All written assessments, where practical and possible, must be submitted via Turnitin unless otherwise instructed by the Lecturer. (Please DO NOT put this assessment specification into Turnitin or it will match many similarities with other students' submissions.)
Academic honesty:	Academic honesty is required. In the main body of your submission you must give credit to authors on whose research and ideas your work is based. Append

The Zoom meeting interface shows a video call in progress. The participants are listed as BT, JJ, and AS. The video feed shows a person speaking.

References

- [1] D. Pink, *A Whole New Mind: Why Right-Brainers Will Rule the Future*, New York, USA: Riverhead Books, 2005.
- [2] S. Pinker, *Enlightenment Now: The Case for Reason, Science, Humanism, and Progress*, New York, USA: Viking, 2018.
- [3] World Economic Forum, "Top 10 Emerging Technologies 2016," World Economic Forum, 2016. [Online]. Available: https://www3.weforum.org/docs/GAC16_Top10_Emerging_Technologies_2016_report.pdf. [Accessed 2 August 2025].
- [4] L. Nefiodow and S. Nefiodow, *The Sixth Kondratieff: The New Long Wave of the World Economy*, Sankt Augustin, Germany: Rhein-Sieg-Verlag, 2014.
- [5] E. Griffin, *A Short History of the Industrial Revolution*, 2nd ed., UK: Palgrave Macmillan, 2013.
- [6] K. Schwab, *The Fourth Industrial Revolution*, World Economic Forum, 2016.
- [7] R. C. Allen, *The Industrial Revolution: A Very Short Introduction*, Oxford, UK: Oxford University Press, 2017.
- [8] Encyclopaedia Britannica, "Industrial Revolution," Encyclopaedia Britannica, 2023. [Online]. Available: <https://www.britannica.com/event/Industrial-Revolution>. [Accessed 2 August 2025].
- [9] R. Descartes, *The Passions of the Soul*, New York, USA: Bobbs-Merrill, 1969.
- [10] A. Rajkumar, J. Dean and I. Kohane, "Machine learning in medicine," *New England Journal of Medicine*, vol. 380, no. 14, pp. 1347-1358, 2019.
- [11] J. Creswell and D. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 5th ed., California: Sage, 2018.
- [12] R. Bhaskar, *A Realist Theory of Science*, London, UK: Routledge, 2008.
- [13] A. Sayer, *Method in Social Science: A Realist Approach*, 2nd ed., London, UK: Routledge, 1992.
- [14] M. Saunders, P. Lewis and A. Thornhill, *Research Methods for Business Students*, 7th ed., Harlow, UK: Pearson Education, 2019.
- [15] G. Easton, "Critical realism in case study research," *Ind. Market. Manage.*, vol. 39, no. 1, pp. 118-128, 2010.
- [16] D. Wynn and C. Williams, "Principles for conducting critical realist case study research in information systems," *MIS Quarterly*, vol. 36, no. 3, pp. 787-810, 2012.
- [17] A. Booth, A. Sutton and D. Papaioannou, *Systematic Approaches to a Successful Literature Review*, 2nd ed., London, UK: Sage, 2016.
- [18] Chicago University, "Evaluating resources and misinformation: The CRAAP Test," California State University, Chico, 30 June 2025. [Online]. Available: <https://guides.lib.uchicago.edu/c.php?g=1241077&p=9082343>. [Accessed 5 August 2025].
- [19] J. Novak and B. D. Gowin, *Learning How to Learn*, Cambridge, UK: Cambridge University Press, 1984.
- [20] A. Bryman and E. Bell, *Business Research Methods*, 4th ed., Oxford, UK: Oxford University Press, 2015.
- [21] H. Landsberger, *Hawthorne Revisited: Management and the Worker, Its Critics, and Developments in Human Relations in Industry*, New York: Cornell University, 1958.
- [22] A. Field, *Discovering Statistics Using IBM SPSS Statistics*, 5th ed., London, UK: Sage, 2018.
- [23] Lucidchart, "How to make a concept map", Lucidchart, 2025. [Online]. Available: <https://www.lucidchart.com/blog/how-to-make-a-concept-map>. [Accessed 12 August 2025].