

Pawel Waszak

Computer Networks and Cyber Security
2417221

**Changemakers: Creativity and Value
Creation**

University of Wales Trinity Saint David

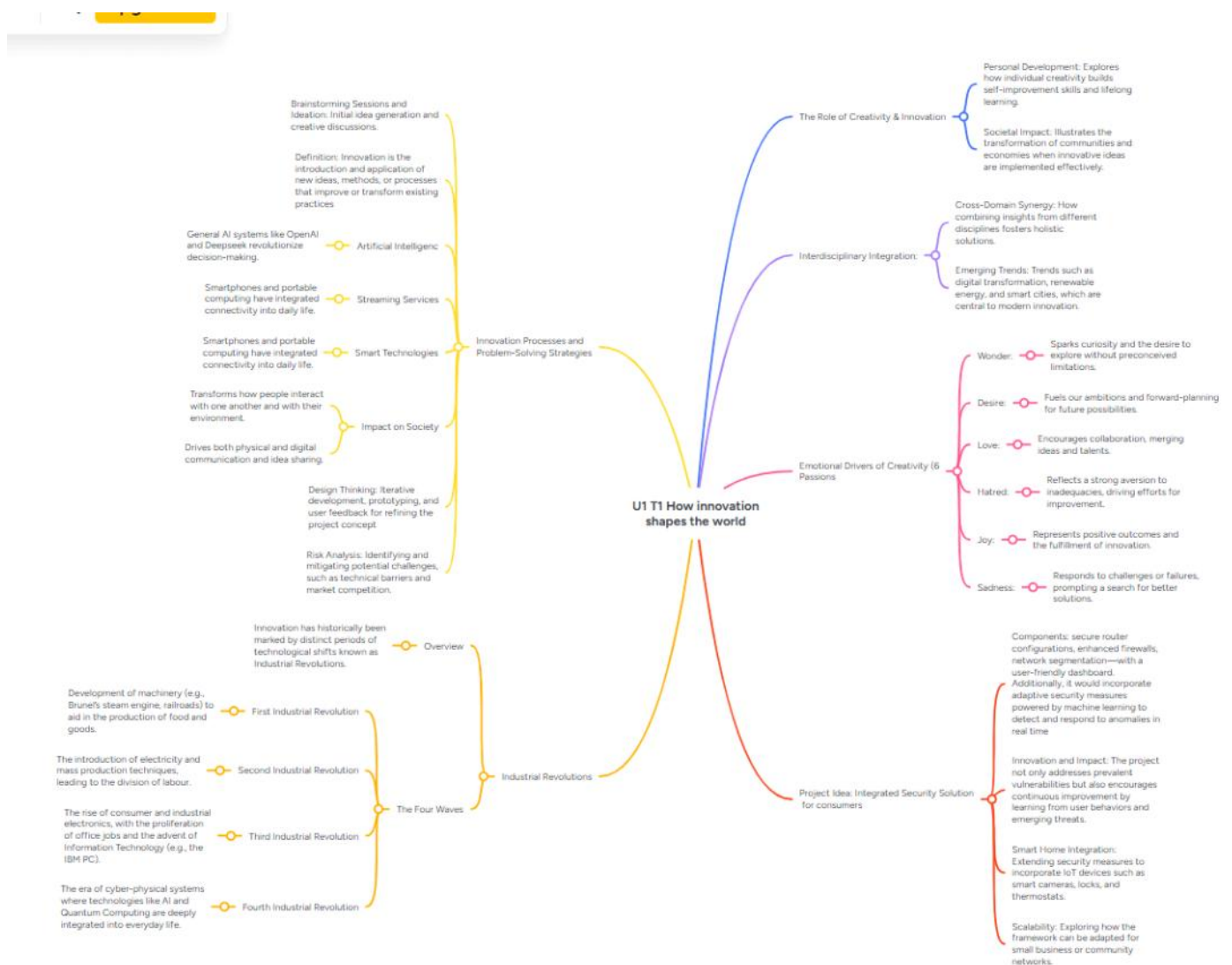
Task1

03 June 2025 11:41

Task 1: Ideation & Mind Map

Answer the following questions to create a **Mind Map**. Your mind map should be approx. 600 words, include citations and a reference list node (Approx. 4/5 sources). The mind map should be produced using freely available Mapping technology of your choice (e.g., Mindmeister.com) or an Office 365 Application. The areas covered in the following online topic can help you to answer the questions.

- **Q1.** Create a mind map that includes **some of the areas/concepts from Topic 1** of Unit 1 on Moodle and include **some project ideas** from areas of personal interest related to your programme of study.
 - Online Section: Unit 1 Topic 1 - How Innovation Shapes The World. The role that creativity and innovation plays in the development of society and self.
- **Q2.** Select a project idea that you would like to take forward and add this to the map.



Mind map Link <https://mm.tt/map/3732997391?t=Fuj37rswus>

Each branch of the mind map interconnects with others to provide a holistic view of the innovation landscape. For instance, the **Project Ideas** branch ties directly to the **Innovation Processes** by emphasizing iterative design and user-centered prototyping. Similarly, the **Interdisciplinary Integration** branch reinforces the societal impact expressed in other sections.

Reference List for Task 1:

1. Chesbrough, H. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Harvard Business School Press.
2. Cross, N. (2011). *Design Thinking: Understanding How Designers Think and Work*. Berg.
3. Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Sage.

4. Saunders, M., Lewis, P., & Thornhill, A. (2016). *Research Methods for Business Students*. Pearson Education Limited.
5. Andress, J. (2014). *The Basics of Information Security: Understanding the Fundamentals of InfoSec in Theory and Practice*. Syngress.
6. Schneier, B. (2015). *Data and Goliath: The Hidden Battles to Collect Your Data and Control Your World*. W. W. Norton & Company.
7. Stallings, W. (2017). *Network Security Essentials: Applications and Standards*. Pearson.

Task 2

03 June 2025 14:01

Task 2: Aim & Objectives and Research area

Your answers to the questions below should refer to a project/research area of your choice (related to your programme of study). This task answer should be approx. 600 words with citations and a list of references (Approx. 4/5 sources). The areas covered in the following online topics can help you answer the questions below.

- **Q1.** Create and document a single **Aim and several Objectives** for your project.
- **Q2.** Identify an appropriate **research philosophy** for your project.
 - Online section: Unit 1 Topic 2 - How Do YOU Solve a Problem?
- **Q3.** Select and document appropriate **search tools** including some specific **research databases** to identify research related to your project area and use **search strategies** to **identify relevant research** related to your project.
 - Online section: Unit 1 Topic 3 - Known Knowns.

Aim & Objectives and Research Area

Introduction

In today's interconnected world, everyday consumers are confronted with an expanding array of cybersecurity threats as more devices join the digital ecosystem [1]. This project is dedicated to developing an integrated security solution specifically designed for home networks. By merging robust technical defenses with an intuitive, user-friendly interface, the solution seeks to empower consumers to protect their digital environments with ease [2]. The overall goal is to bridge the gap between advanced cybersecurity technologies and practical application in a consumer setting, ensuring that even non-expert users can maintain a secure home network [2].

Aim

The primary aim of this project is to design, implement, and assess an integrated cybersecurity framework that significantly enhances the security and performance of consumer home networks by merging state-of-the-art security technologies with a user-centric design [3]. This aim emphasizes the dual focus on technical robustness and ease of use, ensuring that technologically advanced measures are available in a practical, accessible format for all consumers [3].

Objectives

To fulfil this aim, the project will pursue several key objectives:

1. Vulnerability Analysis & Problem Definition

- Conduct comprehensive surveys and technical evaluations across a diverse sample of home networks to identify prevalent vulnerabilities such as default passwords, outdated firmware, and inadequate network segmentation [4].
- Document real-world cybersecurity incidents affecting consumer networks to understand the scope and severity of current cyber threats [4].

2. Literature Review & Gap Analysis

- Perform an in-depth review of existing integrated security products and solutions. The focus will be on critically analysing current measures—such as secure router configurations, firewalls, intrusion detection systems, and adaptive threat response techniques—to pinpoint shortcomings in scalability, responsiveness, and user experience [5].
- Identify opportunities for innovation where current solutions fail to address emerging challenges in consumer cybersecurity [5].

3. Prototype Development

- Utilize agile development methodologies to build a working prototype. This prototype will integrate

secure network configurations, state-of-the-art intrusion detection and prevention systems, and a machine learning module designed to adapt to new and evolving threats [6].

- Develop an accessible, centralized dashboard that enables consumers to easily monitor network performance, receive security alerts, and update settings in real time [6].

4. Evaluation & Performance Analysis

- Deploy the prototype in a controlled pilot study involving a sample of 15–20 households. Collect quantitative data on performance metrics such as network throughput, latency, and the frequency of threat detection [4].
- Complement these technical measurements with qualitative feedback gathered through structured interviews, surveys, and focus groups to ensure the solution meets the practical needs and expectations of everyday users [4].
- Use statistical and thematic analysis methods to validate the effectiveness of the integrated solution and determine areas for refinement [4].

5. Dissemination of Findings

- Share the project outcomes by writing and submitting research articles to peer-reviewed cybersecurity journals and presenting the findings at industry conferences [3].
- Formulate recommendations and best practice guides for consumer cybersecurity that could benefit both product developers and policy-makers [3].

Research Philosophy

The project adopts a pragmatic research philosophy that integrates both positivist and interpretivist approaches. On one hand, quantitative measurements—such as network performance benchmarks and vulnerability metrics—provide objective, empirical data [2]. On the other hand, qualitative insights from user feedback capture the subjective experience of interacting with the security system, ensuring the solution is both technically sound and user-friendly [2].

Search Tools and Strategies

To ground this research in the current state of knowledge, a systematic review will be conducted using prominent academic databases such as IEEE Xplore, Google Scholar, Scopus, and Web of Science [1]. The search strategy will employ Boolean operators (AND, OR) to combine key phrases such as “integrated security solution,” “consumer cybersecurity,” “home network protection,” and “adaptive threat detection” [1]. Searches will be filtered to focus on studies published in the last ten years, ensuring that the research reflects recent technological advances and current industry practices [1]. Additionally, reference management tools like Zotero or Mendeley will be used to organize and manage findings, thereby maintaining a reproducible and systematic review process [1].

By melding rigorous quantitative analysis with rich qualitative insights, this research approach promises a comprehensive evaluation of an integrated security solution that is both effective and user-friendly [2].

Reference List

1. Andress, J. (2014). *The Basics of Information Security: Understanding the Fundamentals of InfoSec in Theory and Practice*. Syngress.
2. Schneier, B. (2015). *Data and Goliath: The Hidden Battles to Collect Your Data and Control Your World*. W. W. Norton & Company.
3. Stallings, W. (2017). *Network Security Essentials: Applications and Standards*. Pearson.
4. Bishop, M. (2003). *Introduction to Computer Security*. Addison-Wesley.
5. Anderson, R. (2008). *Security Engineering: A Guide to Building Dependable Distributed Systems*. Wiley.
6. Pfleeger, C. P., & Pfleeger, S. L. (2006). *Security in Computing*. Prentice Hall.

TASK 3

03 June 2025 14:11

Research Strategies

In this project focused on designing an integrated security solution for consumer home networks, robust research strategies are essential for producing credible and actionable outcomes. A combination of approaches ensures that our findings are valid, reliable, and generalizable, while also adhering to strict ethical standards.

Enhancing Validity, Reliability, Generalisability, and Ethics

To ensure high **validity**, we adopt a triangulation approach. Quantitative performance indicators—such as network throughput, latency, and response times during simulated cyber-attacks—will be systematically collected and then cross-validated with qualitative feedback gathered from user interviews and targeted surveys [1][2]. This mixed-method strategy ensures that the study captures a complete picture of both technical performance and user satisfaction.

Reliability is addressed by employing standardized data collection protocols. Every measurement instrument—whether it's a pre-defined benchmarking tool or a simulated attack scenario—will be rigorously pre-tested. Repeated trials will be conducted in controlled pilot environments to confirm that the results are consistent over time, effectively reinforcing the reproducibility of our findings [3].

To enhance **generalisability**, the study will recruit a diverse range of households using stratified random sampling. By including participants from various demographic and technological backgrounds, the results can be extrapolated to reflect the broader population of home network users [4].

Ethical considerations are integrated throughout the research design. Informed consent will be secured from every participant, and detailed explanations of data handling and privacy measures will be provided in accordance with Institutional Review Board (IRB) guidelines. All data collected will be anonymized and securely stored, ensuring the protection of participant identities and rights [5].#

Data Collection Methods and Pilot Study Design

A **mixed methods research design** forms the backbone of our data collection strategy. For the quantitative aspect, state-of-the-art network monitoring tools will continuously capture crucial performance metrics both before and after the deployment of the integrated security solution. This will occur during regular operation as well as during controlled attack simulations.

For qualitative insights, semi-structured interviews, online surveys, and focus groups will be conducted. These methods will garner detailed feedback directly from users regarding the system's usability, perceived effectiveness, and overall satisfaction [6].

A pilot study is central to our data collection plan. In this pilot phase, 15–20 households with varying demographics and network configurations will install and use the security solution over a one-month period. Prior to deployment, a baseline survey will assess current home network security awareness and satisfaction levels. During the pilot, technical performance data (such as packet loss, intrusion detection rates, and latency) will be continuously monitored, while users participate in weekly feedback sessions. Upon completing the pilot, follow-up surveys and in-depth interviews will be administered to evaluate improvements and identify areas for refinement. This iterative feedback loop will inform subsequent

enhancements of the system [6].

Quantitative and Qualitative Analysis

For the **quantitative analysis**, descriptive and inferential statistical techniques will be utilized. This includes calculating averages, standard deviations, and running regression analyses or t-tests to validate whether the observed improvements in network performance are statistically significant. These objective measures will provide robust evidence of the system's effectiveness.

In contrast, the **qualitative analysis** will involve thematic and content analyses of interview transcripts and open-ended survey responses. Codes will be developed to identify recurring themes, such as user satisfaction, ease of use, and perceived improvements in network security. This analysis will enable the research team to interpret the subjective experiences of users and correlate them with the quantitative performance data [1][2].

By combining these strategies, we ensure that the integrated security solution is evaluated comprehensively—addressing both the technical and human dimensions of cybersecurity. The rigorous data collection and analysis methods provide a solid foundation for validating improvements and guiding further system refinements. Supplementary details regarding the pilot study instruments, survey questionnaires, and team meeting records are provided in the Appendices.

Reference List

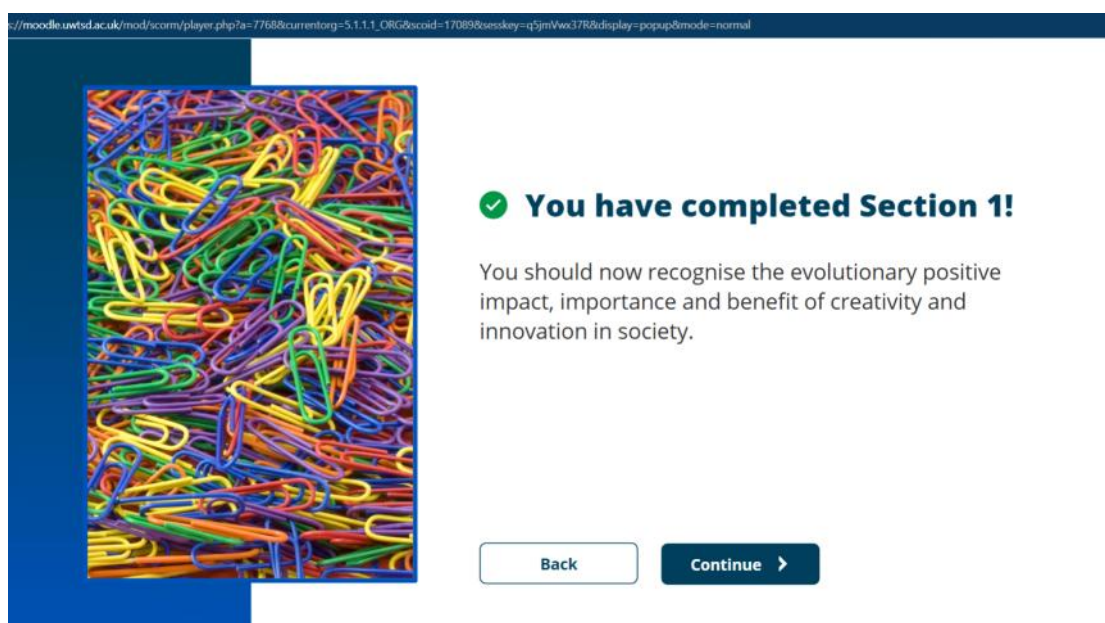
1. Andress, J. (2014). *The Basics of Information Security: Understanding the Fundamentals of InfoSec in Theory and Practice*. Syngress.
2. Schneier, B. (2015). *Data and Goliath: The Hidden Battles to Collect Your Data and Control Your World*. W. W. Norton & Company.
3. Stallings, W. (2017). *Network Security Essentials: Applications and Standards*. Pearson.
4. Bishop, M. (2003). *Introduction to Computer Security*. Addison-Wesley.
5. Anderson, R. (2008). *Security Engineering: A Guide to Building Dependable Distributed Systems*. Wiley.
6. Pfleeger, C. P., & Pfleeger, S. L. (2006). *Security in Computing*. Prentice Hall.

Appendices

01 July 2025 11:23

Below are supporting information of my engagement I have completed with the on line material

- Online Section: Unit 1 Topic 1 - How Innovation Shapes The World. The role that creativity and innovation plays in the development of society and self.



Click the cogs to view more information about the four industrial revolutions.

The Third Industrial Revolution

The third revolution in society occurs in the mid twentieth century when digital systems start to become usable.

Computers and **communications** now dominate the way society lives and works.

Information is processed and starts to be used in more sophisticated ways to manage people's work and personal life. Production starts to be increasingly **automated**, and the works force changes its direction again.

Close



24 / 57



What is the fourth Industrial Revolution?

Revolution		Year	Information
	1	1784	Steam, water, mechanical production equipment
	2	1870	Division of labour, electricity, mass production
	3	1969	Electronics, information technology, automated production
	4	?	Cyber-physical systems

Reflect

As you can see, the characteristics of each industrial revolution have changed a lot over time.

Now you have seen an overview of the fourth industrial revolution, we will look at some of the new technologies that will potentially change our way of living.



26 / 57



Check

Drag the revolution to the correct definition.

a. Steam, water and mechanical means of production First 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](#).

d. Cyber physical systems Fourth Industrial Revolution



36 / 57



You have completed Section 2!

You should now be able to identify concepts used to describe the progress of technology and innovation.

Back

Continue >

Exit ✕

References

✔ **You have completed Section 2!**

Upon completion of this sub-section, you should be able to:

- Hold a conversation that can confidently include the definitions of Ontology, Epistemology and Axiology
- Define your research philosophy using this terminology
- Understand how your philosophy can impact your investigation.

Back

Continue >

https://moodle.uwtsd.ac.uk/mod/scorm/player.php?a=7769¤torg=5.1.1.2_ORG&scoid=17091&sesskey=q5jnvwx37R&display=popup&mode=normal

Identifying your research philosophy

Definition

In simple terms, research philosophy is your belief about the ways in which you will be collecting, analysing and using data in your project.

In the last session we talked about **axiology**, **ontology** and **epistemology**, and you have created a broad understanding of your personal assumptions about the source, nature and development of the knowledge your research is going to create.

☰ ✎ ✕

24 / 29

< >

https://moodle.uwtsd.ac.uk/mod/scorm/player.php?a=7769¤torg=5.1.1.2_ORG&scoid=17091&sesskey=q5jmVw37R&display=popup&mode=normal



✔ **You have completed Section 3!**

Upon completion of this sub section, you should be able to define your research philosophy as one of five constructs.

Back Continue ➤

Online section: Unit 1 Topic 3 - Known Knowns

https://moodle.uwtsd.ac.uk/mod/scorm/player.php?a=7770¤torg=5.1.1.3_ORG&scoid=17093&sesskey=q5jmVw37R&display=popup&mode=normal

Researching the Known and the Unknown

Neil Armstrong once said that **"research is creating new knowledge"**.

Simply put, to know something means that we become aware of something unknown and understand it.

"Known knowns" relate to the knowledge for which we are all **aware** and are **certain about**.

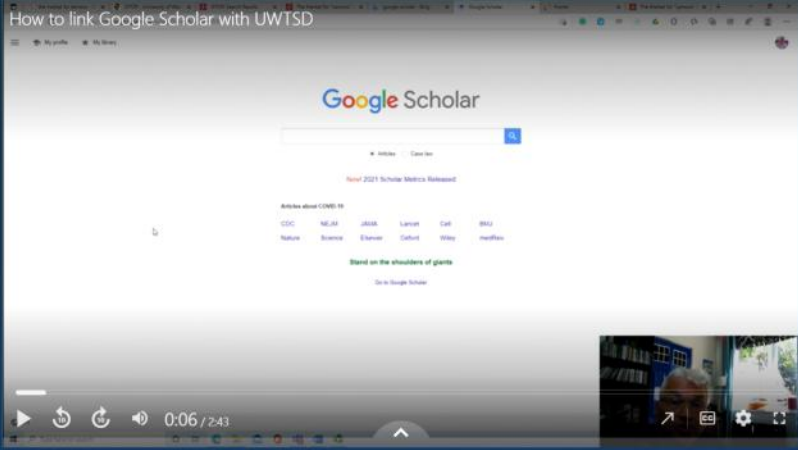
Certain facts can be made certain such as **counting how many people are in your class**. Researching something with this degree of certainty is unlikely to reveal Armstrong's "new knowledge".

On the other hand, a **"known unknown"** refers to the idea of things we know about, but we do not know the detail. So, for example, there is uncertainty about the **inner workings of the atom**. A research topic that falls into this category is likely to reveal some interesting material.



☰ ✎ ✕ 2 / 35 < >

How to link Google Scholar with UWTSD



Google Scholar

My profile My library

New! 2021 Scholar Metrics Released!

Articles about COVID-19

JAMA NEJM Lancet Cell BMJ
Nature Science Elsevier Oxford Wiley medRxiv

Stand on the shoulders of giants

Go to Google Scholar

0:06 / 2:43

Transcript

Source: How to link Google Scholar with UWTSD

8 / 35

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.

Not quite...

A keyword is all of these descriptions.

16 / 35

?

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!

☰

✎

✕

17 / 35

◀

▶

Methods for collecting and analysing qualitative and quantitative data

Collecting data for our research can be a daunting task. However, it is likely that you will have instinctively used some of the methods as part of your education to date.

The following will give insight into some of the approaches you could consider in your research. Select each of the tabs to reveal further information.











CRAAP

☰

✎

✕

3 / 35

◀

▶

Appendices Page 15



✓ You have completed Section 1!

You should now be familiar with different methods for collecting and analysing qualitative data that you can use in pursuit of your research and understand how the sample of data that you are collecting reflects on your research.

Back

Continue >

? 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

Not quite...

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.



17 / 35



Section 3

Design a data collection method appropriate to investigate a given problem

Upon completion of this section, you will be able to work out **what your approach is to collecting data** for your research.

Back

Start >



? 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.



32 / 35



✓ You have completed Section 3!

Now you have completed this resource, it is important that you take some time to reflect on what you have learnt in relation to data collection and sampling.

You should now be able to work out what your approach is to collecting data for your research.

Back

Continue >

Defining value

When applying value to our 'universal education', it is important to appreciate that just as in making dinner we need to appreciate **both approaches are logical and applicable at different times and contexts**.

By asking you to work out the 'value' of your education, we are effectively asking you what effect your education will have in the future.

A case study of how the NHS considered how it adds value to society has made it move from a **target-driven culture** towards an **outcome driven organisation**.

It has concluded that the traditional view of value introduces conflict that can have impact on the efficiency of the organisation (NHSE, 2021).



37 / 43



✓ You have completed Section 3!

You should now have an appreciation on why you should consider the principles of adding value with your project.

Back

Continue >

- Online section: Unit 4 Topic 1: It's All In The Numbers.

The reasons why we use statistics

There are broadly **two sorts of stats** that are used to analyse quantitative data. We use stats to **describe our argument** and to make **inferences from our argument**. Unsurprisingly, these are called descriptive and inferential analysis. We'll explore these next.

The graph shows two data series over five points. The yellow line starts at (1, 1), goes to (2, 2), (3, 2), (4, 2), and ends at (5, 4). The green line starts at (1, 1), goes to (2, 1.5), (3, 1.8), (4, 2.5), and ends at (5, 2.8).

4 / 34

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.

12 / 34

? 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.



13 / 34



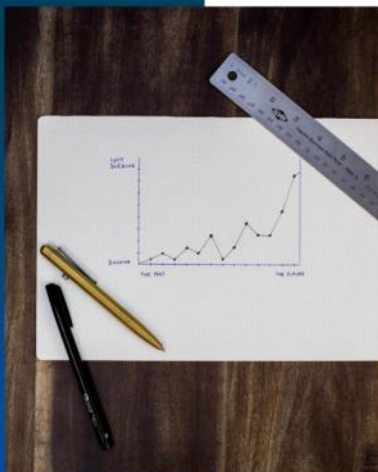
✓ You have completed Section 2!

You should be able to analyse data using different examples of graphs and charts and present data using a variety of methods.

Back

Continue >

https://moodle.uwtsd.ac.uk/mod/scorm/player.php?a=7752¤torg=GAM2022_5.1.4.1_ORG&scoid=17137&userkey=PRaajhuYz&display=popup&mode=normal



✓ You have completed Section 3!

Now you have completed this resource, it is important that you take some time to reflect on what you have learnt in relation to statistical analysis.

You should now have a deeper understanding of creating charts that communicate in the best way possible.

Back

Continue >

- Online section: Unit 4 Topic 2: There's a Theme Here.



✔ **You have completed Section 1!**

You should now have gained the knowledge of how to organise qualitative data ready for analysis.

[Back](#)
[Continue >](#)

Thematic analysis



Thematic analysis is a popular method used by researchers to identify any patterns or themes that emerge from qualitative data. Sometimes these themes are easy to spot and other times they require a little more work by the researcher to uncover them. Thematic analysis is used for data from a wide range of disciplines and fields and is effective in answering an array of research questions.

When beginning thematic analysis, it is important to remember to represent the data and your participants as honestly as possible, whether this is interviews, focus groups, etc.

The process of thematic analysis contains **six** steps.

Click the images below to read further.












10 / 25






✓ You have completed Section 2!

You should now be able to figure out the techniques to identify patterns and themes in your data.

Back

Continue >

Qualitative research software

The approach described previously is a great way to start your qualitative research journey.

It is adequate when conducting small qualitative research as demonstrated, however, it is likely to become cumbersome as the amount of data gets larger.

Click on the tabs below to read further.

Students

Researchers



23 / 25



https://modelsworld.science/myplaypage/#/dataentry/2/F42_Consolidated-1/F42_Summary-F42sign/ratingpay-popopenmode-normal



✔ You have completed Section 3!

You should now have demonstrated an understanding of the use of Excel as a qualitative analysis software.

[Back](#) [Continue >](#)

https://modelsworld.science/myplaypage/#/dataentry/2/F42_Consolidated-1/F42_Summary-F42sign/ratingpay-popopenmode-normal

✔ Unit 4 Topic 2 completed!

You should now:

- Have demonstrated knowledge and understanding of how to organise qualitative data ready for analysis.
- Have figured out some techniques to identify patterns and themes in your data.
- Have improved the understanding of the use of Excel as a qualitative analysis software.

[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 📖](#)