

1. Title

Tuesday, June 24, 2025 11:46 AM

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Course: Computing (Data & Information Systems)

Module: Changemakers: Creativity & Value Creation

2. Ideation & Mind Map

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Link to the Mind Map: <https://mm.tt/map/3774357935?t=NyCtk8iwyL>

3. Aims & Objectives and Research Area

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Aims & Objectives:

Aim:

To modernise legacy a data process into an optimised and scalable modern data product through the use of Visual Studio Code for development, GIT version control for efficient collaboration, and Databricks to maintain the data in a reliable manner.

Objectives:

- **Analyse legacy data process**, through the use of documentation. Create diagrams such as a flowchart, and description to highlight the data is handled and altered, as well as the data dependencies throughout the process.
- **Redesign data process**, in order to ensure optimisation. This will be done by adhering to a shared standard within each table as well as using SQL throughout instead of the previous language Python. We will also eliminate unnecessary code.
- **Implement GIT version control and Bitbucket**. This will be done to allow collaborative working amongst developers, through the use of version control and pull requests.
- **Test new data products**, to ensure that the data product is producing the correct data.
- **Deploy to data products to Databricks**, so that the tables can be connected to existing PowerBI reports.
- **Evaluate improvements**, for example, the code readability and query runtimes on the data.

Research Philosophy:

The research philosophy that I will be adhering to within my project is pragmatism. The core concept of the pragmatism is that we develop an understanding of our world and its issues by seeking to solve problems through practical application of subjective and objective methods [1]. It recognises the value of considering multiple perspectives, as well as using both quantitative and qualitative methods when solving research problems [1]. This makes it suitable for my project as it allows both measurable improvements to the data product to be assessed, along with the desired outcome of the business' needs to be met.

Pragmatism also encourages the problem-solving nature of the project. Much like the theory itself, the project will be built of frequent tests that will be conducted on the quality of the data products, along with its accuracy. Pragmatism understands that to solve an issue efficiently solutions must be test and refined based on human experiences as well as feedback [2].

This philosophy will allow me to prioritise practical solution instead of adhering to a specific methodology. This will allow to me ensure that the data product is successful and provides value to the organisation, and as a result makes pragmatism a highly effective approach when creating a modernised data product.

How will I conduct my research?

To identify relevant research related to my project, the primary databases that I will use will be Google Scholar and the Internet Archive Scholar.

Google scholar is a free to use academic search engine that consists of a plethora of resources such as scholarly books, articles and conference papers [3]. This platform will be use for my project as it contains a variety of sources based within my project area, such as data engineering and version control, all of which have been produced by experts within the industry.

The Internet Archive Scholar is a search engine that includes 35 million archived research articles [4]. This will be useful for my project as it allows older sources to be accessed, which will help to

potentially provide context on why certain processes were implemented within the legacy systems, and as a result will aid the redesign. The additional context will enable research to be made on the current alternatives, allowing effective optimisations to be made when creating the new data products.

My research strategy will include using targeted keywords in order to ensure that the most relevant sources are present in my searches. For example, "GIT version control" and "Legacy data product migration". I will also combine both google scholar and the internet archive scholar, in order to receive information on modern practices, as well as gather context on how legacy systems are structured.

References

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[2]

V. Kaushik and C. A. Walsh, "Pragmatism as a research paradigm and its implications for social work research," *Social Sciences*, vol. 8, no. 9, pp. 1–17, 2019, doi: <https://doi.org/10.3390/socsci8090255>.

[3]

S. Durgumahanthi, "What is Google Scholar and How to Use it for Research | Researcher.Life," *Researcher.Life*, Feb. 05, 2024. <https://researcher.life/blog/article/what-is-google-scholar-and-how-to-use-it-for-research/>

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4. Research Strategies

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Validity, Reliability, Generalisability and Ethical Considerations

The data will be obtained exclusively from reliable sources, in order to ensure that the projects findings validity. These sources include, qualitative data in the form of stakeholder feedback, and quantitative data in the form of legacy performance metrics, along with in industry metrics for both legacy and modern systems.

To ensure reliability, I will compare my data across a plethora of credible sources, so that I can ensure that the findings are consistent. This will allow me to identify whether there are any inconsistencies, which will indicate that the data may contain falsehoods [1].

Furthermore, taking into account the generalisability of the findings, I will design a framework for the research and applying it, that can be implemented for other legacy data products. For example, creating coding standards that can be applied throughout the data product.

To address potential ethical concerns, when gathering feedback from stakeholders, I will ensure all interviews and transcripts recorded are anonymous and can not be traced back to any individual.

Moreover, when gathering quantitative data based the legacy system, I will also ensure that the organisations data is handled sensitively and within the security policies established by the DVLA.

Data Collection & Research Strategies

In order to gather the desired findings for my project, I will conduct a mixture of both quantitative and qualitative strategies. The qualitative analysis will consist of user/ stakeholder interviews, in order to get a gage of the users experience with the project in a non-numerical format. This will involve reviews on the projects ease of use and readability [2].

For the quantitative analysis, I will gather information on the performance of the legacy system, modern system and in industry systems, so that I can gage how effective the new data product is. This will entail collecting data on the data duplications/ errors, query runtimes and deployment success rate.

When conducting the pilot study, a single legacy data product will be migrated; where the results will be compared to the legacy system, in order to identify whether the row counts match and if there have been performance improvements. These results will be shared with stakeholders in order to gain feedback and to confirm if this is an acceptable outcome, which will then help to identify if and where improvements could be made.

Quantitative & Qualitative Analysis

To gather the essential quantitative data for the project, I will be analysing the performance of the modern data product against the legacy data process. I will gather metrics such as table row counts, query runtimes, and data deployment failures over a period of time. These metrics will be stored in relevant data visualization tools such as, bar charts and scatter charts, to allow the larger datasets to be presented in visual format, that is easier to both read and interpret; this as a result will make the findings useful for decision making and recognizing patterns, subsequently allowing needed changes the be made off of them [3].

Regarding the qualitative research, this will involve gathering feedback from stakeholders such as, end users and data engineers, from interview questions. These interviews will be transcribed with the most valuable segments being highlighted, with codes that relate to whether it is positive or negative feedback. Holding interviews will benefit the project immensely as it will allow me to gather more detailed insights on the usability of the project [4], that the numeric data may not be able to convey. However, due to the limited sample size that will be collected for the interviews, the generalizability of the findings will be limited [4].

References:

[1]

L. Leung, "Validity, Reliability, and Generalizability in Qualitative Research," *Journal of Family Medicine and Primary Care*, vol. 4, no. 3, pp. 324–327, 2015, doi: <https://doi.org/10.4103/2249-4863.161306>.

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[3]

Atlan, "11 Benefits of Data Visualization You Can't Ignore in 2023," *atlan.com*, Oct. 05, 2023. <https://atlan.com/benefits-of-data-visualization/>

[4]

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Unit 1

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Unit 1: Topic 1

Make a list of 5 things that you have used or activities that you have engaged in that were not around 10 years ago:

- Advanced AI chatbots, such as ChatGPT, have allowed for questions to be quickly and concisely, through user prompts.
- Raytracing within video games has allowed for simulated and realistic light, in order to create more immersive environments.
- Ride sharing apps like uber
- Streaming services for both movies and television shows
- 5G mobile data connectivity

Which invention had the biggest impact on the development of society as we know it today?

- Electricity has had the biggest impact on our modern society. It had become something that many have become accustomed to as well as reliant. Electricity not only allows us to communicate with others efficiently, but it is also vital for many jobs.

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 personally believe that the computing capabilities within the next 3-5 years will have the biggest impact within my discipline area. As the industry matures, what is capable in terms of speed, storage capacity and processing, may change significantly. For example, between 1985 and 1988 the Cray-2 was the world's fastest computer, this being the size of a washing machine. However, the iPhone 4, which was released in 2010, has the same capabilities as this computer. This could suggest that as technology improves how we store, maintain, and process data will also improve.

Do you consider yourself to be a creative person? Justify your response.

- I do as I enjoy creative activities, such as video editing and drawing. Participating in stuff that may be deemed creative is enjoyable and fulfilling. Within my job, a lot of problem solving is required, and as a result, I am required to think of creative ways to achieve the desired results.

In a couple of sentences describe an experience from your past where you were discouraged/ encouraged to be creative and how this might have affected how you feel about your levels of creativity.

- I was encouraged to be creative when a few of my peers told me that some of the videos that I had made and posted online were entertaining. This motivated me to create more.

Why is creativity important in your subject area?

- Within data engineering, there are many instances where you will have to be creative. Whether you will have to design a pipeline to ingest and handle specific data or write a function that gathers or manipulates data. These tasks all require some form of creativity to produce a product that is useful to the business.

Unit 1: Topic 2

Describe the last time you felt as though you were being creative. For example, you might have been painting, playing a musical instrument, sewing, or cooking. How did it make you feel?

- The last time I felt that I was being creative was when I was editing a video. During this process I was compiling and cutting clips, adding music, and key framing certain scenes to move the camera in a specific way. Upon viewing the end result, I felt fulfilled and joyful with how it turned out, as I felt the time spent making it was worth it.

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	☒	☐	☐

- I am more drawn to critical realism theory, as I agree that there is a scientific approach to the development of knowledge, but I also agree that it should not be restricted by science to be proven. I believe that knowledge can also be built from life experiences as well as feelings that have been previously encountered.

Unit 1: Topic 3

Here is a list of some of the most popular databases for academic study. Which ones do you use?

Yes, I use this	Name
☐	ERIC: Education Resources Information Center
☒	Google Scholar and Google Books
☒	Internet Archive Scholar
☐	JSTOR
☐	Project Gutenberg
☐	PubMed
☐	ResearchGate
☐	Semantic Scholar

Unit 1: Topic 4

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?

- I am currently working in the DVLA, as a data engineer, where this opportunity was provided to me. I have always had an interest in Computer Science/ ICT during my educational career, so I knew I would like to work within the industry. The subject has always fascinated me and the fact that the industry is ever evolving has helped to maintain my interest.

How do you truly feel when you learn something new?

- I feel proud that I am not only expanding my knowledge, but also that I am overcoming the difficulties that I may have faced when initially trying to gain an understanding of the things that I am learning.

How do you truly feel when you're told that you're wrong?

- When I am told that I am wrong I feel disappointed with myself that I didn't correctly do what I was intending to do. I also feel slightly embarrassed as it makes me question my own knowledge and understanding.

Unit 2

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Unit 2: Topic 1

Take some time to review your best past assignments and choose which approach you took from the following:

1. Your investigation built an answer from existing evidence and then went to show its use.
2. Your investigation observed a situation and then supported it with a theory.
3. You answered your investigation by reviewing several solutions to an observation and choosing the best fit.

Which approach best describes the route that you took?

- I took the second approach when tackling a previous assignment; it allowed me to garner a clear understanding of many aspects of the situation, whilst forming my own opinions based on the research that I conducted on related topics. I was also able to formulate reliable evidence for my decisions which helped me to strengthen my points.

Look back at a piece of work that you have received a good mark for. Re-read it. Is this work a shopping list of facts and statements that you have learnt in class, or have you applied your knowledge to a problem you have observed?

- During the specific assignment, I applied my own knowledge to form more detailed and justified evidence for my points, whilst also implementing knowledge that I have gathered within my research. However, I also applied what I had learnt within class when writing the assignment.

Having read the descriptions and thinking about the course you are attending, spend a few moments contemplating these questions:

- What do you think is the predominant method of research in your subjects: quantitative or qualitative?
 - Qualitative is the most commonly used form of research amongst my subjects.
- Now think of the alternative method. What subjects would favor that sort of research?
 - Subjects that may require a combination of qualitative and quantitative research will require the alternative method. For example, statistics can be used to analyze the scenario and qualitative data such as an opinion can be used to gain an understanding of the reception to previously used methods.

Take some time 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?
 - Has there been a time where you dealt with a difficult situation, and how did you resolve the issue?
- Think of a quantitative question that would reveal relevant data on her suitability as a person who knows about books?
 - How much experience do you have as a librarian in years?

Unit 2 Topic 2:

My research is about...	Most like	Somewhat like	Neither	Somewhat unlike	Most unlike
	Score 5	Score 4	Score 3	Score 2	Score 1
Testing a causal relationship	☐	☐	☒	☐	☐
Understanding the general opinions of a group	☐	☒	☐	☐	☐
Gaining the perceptions of a group	☐	☒	☐	☐	☐
Understanding something in its natural setting	☐	☒	☐	☐	☐
Understanding the culture of a community 1st hand	☐	☐	☐	☒	☐
Understanding current or historical events or practice	☐	☒	☐	☐	☐
Analysing populations where you don't have access	☐	☐	☐	☒	☐

Unit 2 Topic 3:

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. Describe how each idea has used the SCAMPER approach.

One example of an innovation using the SCAMPER approach is Uber. Uber is a subsidiary of traditional taxi services and provides an on-demand ride sharing service. It combined a variety of features such as GPS tracking, in-app payments, and ride bookings, allowing for a more convenient means of travel.

Another example of an innovation using the SCAMPER approach is Netflix and other streaming services. It was a substitute for DVD rentals and later eliminated the need for them as a whole. It combines a wide variety of content with personalized suggestions.

Another example is Spotify as they used the SCAMPER approach to innovate in the music industry. It was a substitute for buying music and allowed access to a wide selection of music. It modified how music is discovered and managed, allowing users to create their own playlists along with in-app suggestions based on the users' preferences.

Unit 2 Topic 4:

Take a moment to review Marcus Rashford, the Manchester United Football star. Explain the value that he gives to the world in the 5 dimensions defined by Lackeus. Give a score out of 5 for each of the dimensions.

Marcus Rashford

10

Enjoyment value	4
Economic value	3
Influence value	4
Social value	4
Harmony value	2

Justify your answer by writing a description of how Rashford provides each value you chose.

Enjoyment (4): I gave Rashford a score of 4 for enjoyment value, as he is a widely popular athlete, and provides entertainment for those who support the team that he plays for.

Economic (3): I gave Rashford a score of 3 for economic value, as even though he may provide entertainment value to those who support him, he is not guaranteed to perform the best at all times, which could result in disappointment from fans.

Influence (4): I gave Rashford a score of 4 for influence value, as he is one of the most popular footballers in the world, and as a result has a pretty large influence on his team and his fans.

Social (4): I gave Rashford a score of 4. This is due to the fact that his entertainment value when participating in football matches can provide supporters with entertainment and as a result make them happier.

Harmony (2): I gave Rashford a 2 because there is not much that he can do as a footballer that can have an ecological impact.

Unit 3

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Unit 3 Topic 1

What did the video tell you about the power of networks?

- The 'Networking is not working' ted talk, highlighted that networking with people who may not be like minded or share different experiences to you, can help to form ideas and perspectives in areas that you may not have considered in your own environment.

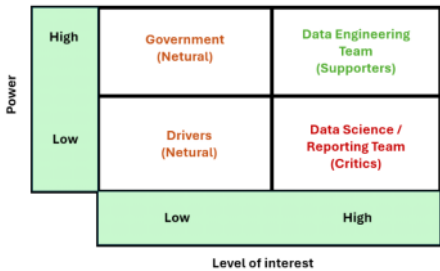
Have you, or anyone you know, been presented with opportunities through personal connections?

- Through my own personal connections I have been presented with the opportunity to widen my own network through meeting other people, who I may have never interacted with otherwise.

Apply

You should now know that a stakeholder analysis is a process of identifying these people before the project begins: grouping them according to their levels of participation, interest, and influence in the project.

Using what you have learnt so far, spend some time creating your own power/interest matrix, making sure to identify all key stakeholders and their level of support. Remember, it is key to identify potential blockers early on.



Unit 3 Topic 2

In task 1 of this module, you looked at 'the power of networks'. We explored situations where we have perhaps benefitted from a network connection or have been able to benefit others.

How does this fit within adding value?

- Networking fits in with adding value as it can help to form new opinions and perspectives that may not be accessible within the internal network. This could as a result help to develop new skills and ideas which will add value not only to the individuals within an organisation but also the operations within an organisation as new approach and resources could be brought to light.

Unit 3 Topic 4

"Prototyping is the conversation you have with your ideas" (Wujec, as quoted in Hoang, 2020) Spend some time thinking about the quote above.

What do you think is meant by this statement?

- The statement above conveys that the process of creating a prototype involves gathering a rough idea for the task ahead. This could mean weighing out potential process at a basic level, in order to understand what is needed to carry out the task.

Think back to your first year, specifically to an assignment or task where you produced an end product – good or bad. For example, an essay, presentation or physical/ digital object. Using what you have learnt about prototyping and agile thinking so far, can you identify where these techniques and processes may have improved your end product?

- There was an instance within the first year where I had to create a database that included a plethora of relationships to other databases. In order to create this database more effectively next time I could create a prototype such as an entity relationship diagram to better understand the database structure before creating it.

Unit 4

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Unit 4 Topic 1

Sometimes students will say that their subject does not require an understanding on quantitative analysis. However, qualitative data will appear in every medium. Taking your subject as a trial, use Google and type, and make note of some of the results:

"Quantitative research of data migration"

- Some results include:
 - <https://dataflowmapper.com/blog/data-migration-costs-quantitative-analysis>
 - <https://www.scirp.org/journal/paperinformation?paperid=106592>
 - https://www.ibsolution.com/academy/blog_en/data-and-analytics/data-migration/how-to-analyze-the-quality-of-your-data-before-a-data-migration

Think back to any research you have conducted, how did they present the data that they have collected? How have you presented data in the past? Do charts make data, especially complex and large volumes of data, easier to read?

- When previously conducting research, I encountered a plethora of different methods for presenting data, this includes listing statistics, bar charts, pie charts and map charts. I myself have also presented data using similar methods when displaying my own findings; where I have used tools to create bar charts, line charts and scatter charts to display large amounts of data. Using charts to display data, especially those at a large volume, is extremely effective due to it being an easy method of presenting data; not only that it is way more captivating for those who may read your findings.

What graph or chart would be best to describe the correlation between academic success to students reading age results?

- A scatter chart would be the best chart for this specific dataset. This is due to the fact that the students reading age would be presented on the x axis and the academic success would be on the y axis, with the point representing the students scores. The chart will allow you to identify what type of correlation there is between the reading age and scores of the students.

Consider the quote by Aristotle:

"The aim of art is represent not the outward appearance of things, but their inward significance"

Is this something you agree with?

- Yes I do agree with the quote, as I believe the majority of art seeks to convey feelings to those who consume it, that aren't directly presented on the surface level.

Unit 4 Topic 2

Consider why a researcher might use qualitative research methods and list some benefits and disadvantages of this.

Do qualitative methods suit all research?

What are the limitations of qualitative research methods?

- A researcher may use qualitative research methods to gauge opinions on a topic instead of measuring figures based off of it. This is usually to draw a conclusion on why certain stuff may be occurring that traditional numerical data can not present. However, this means that it is not suitable for all types of research as it will not provide you the same numerical results that some scenarios require for effective analysis
- Benefits:
 - Useful when gauging opinions and motivations
 - Can be used to predict potential future responses to a specific scenario.
- Drawbacks/ Limitations:
 - Time consuming to gather data.
 - Subjective data meaning it will be harder to analysis.

- Usually smaller sample sizes, which means results will be less accurate compared to larger datasets.

Write out a plan on how you would organize your qualitative data/

Will you adopt any of the suggestions as above?

- Yes, in order to accurately record the qualitative data, I will transcribe the conversations that I will have in regards to the changes made in the modern data product compared the legacy data product, and make note of the useful points.

Do you have any further points to add?

- No, I believe direct feedback and conversations with those who are involved with the project will be the most effective means of gathering useful qualitative data.

You may want to consider where you may store the recording files? What are the benefits of cloud storage?

- I will store my results in a word document within a trusted cloud storage drive. This is due to the fact that cloud storage will allow me to quickly access my findings anywhere, on any device as long as I have internet connection.

Create your own Theme Table template that you could use for your data.

Interviewee	Note	Code
Name of person	Valuable segments of the transcript	P (Positive), N (Negative), M (neutral)