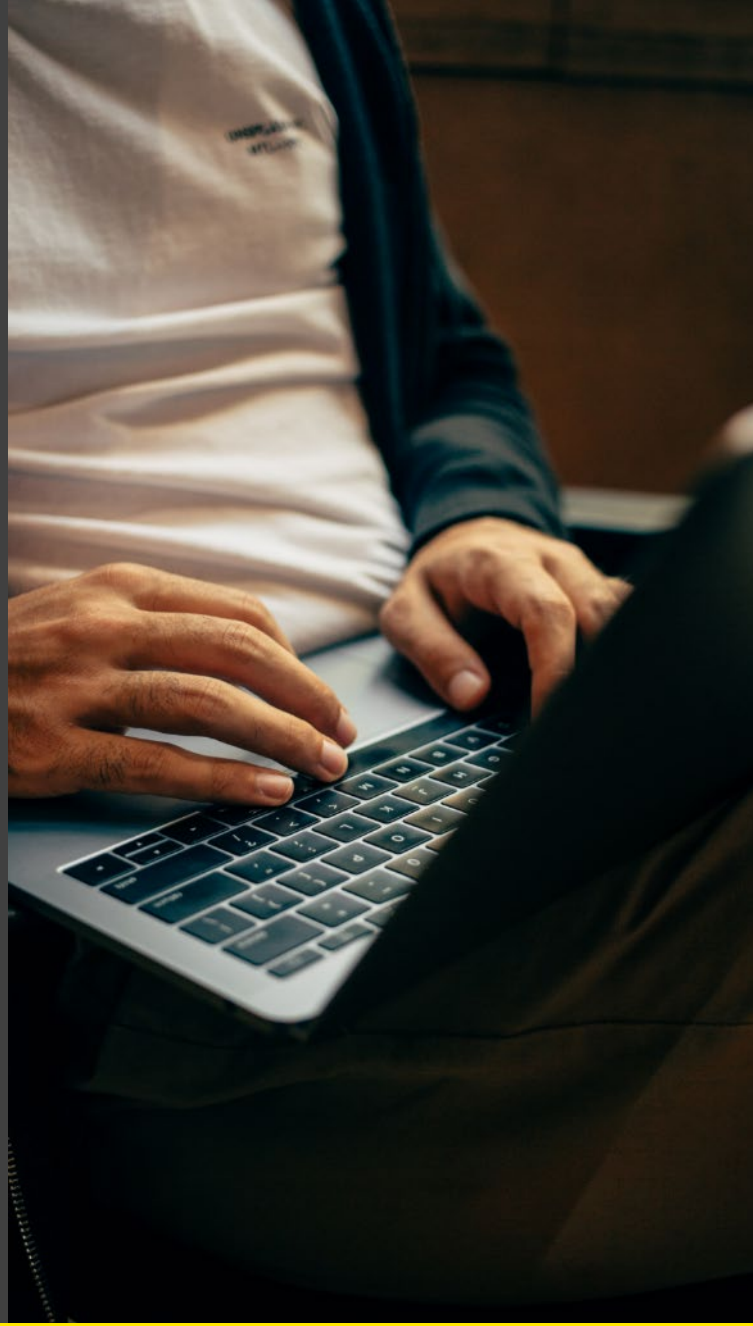
Assignment Webinar: ZZCA6510 Decision Making in Analytics Thursday, 9th of February 2023

- Your hosts are Dr. Ripon K. Chakrabortty and Dr Sumana Biswas
- We'll be starting at 6:00pm
- In preparation for this webinar please check that your microphone is muted.
- We'll be taking question by chat.

This webinar will be recorded which can be accessed via the Collaborate Session.



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Research defined…

The systematic and objective process of generating information to aid decision-making through:

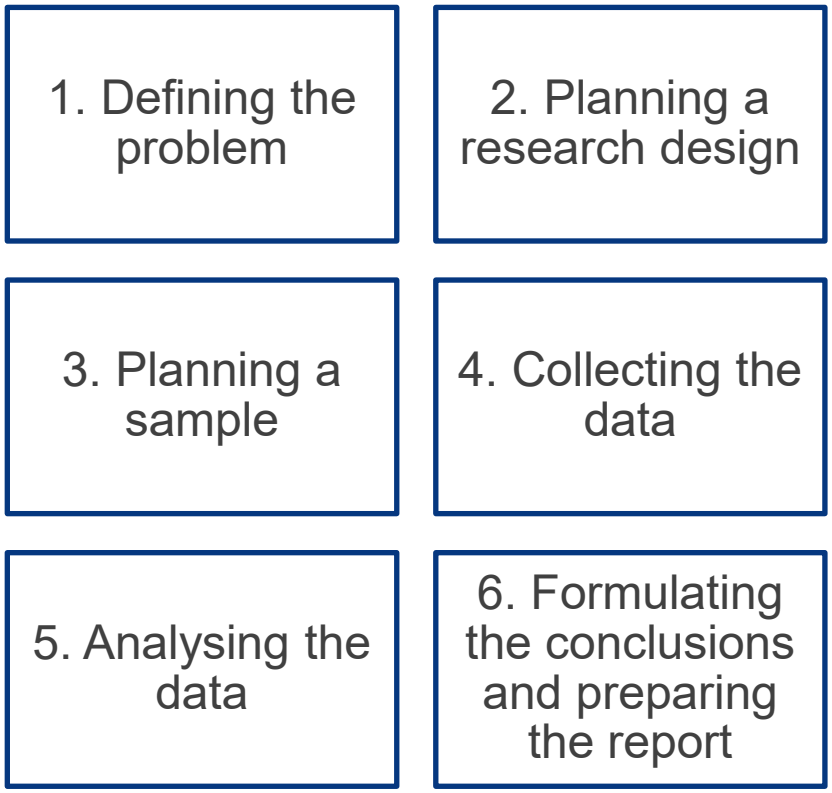
- specifying the information required to address managerial decision-making
- designing the method/s for collecting information
- managing and implementing the data-collection process
- analysing the results
- communicating the findings and their implications.

Basic research and applied research

Basic research	Applied research
Expand the limits of knowledge and to learn more about a certain concept	Conducted when a decision must be made about a specific real-life problem
Not necessarily aimed at solving a particular problem	Aimed to understand and answer questions about specific problems
Verify the acceptability of a given theory	Undertaken to make decisions about particular courses of action or policies

Stages in the research process

The systematic inquiry of research requires careful planning of an orderly investigation. The interrelated stages are:



Defining the problem

The research process begins with problem discovery.

- Often, only symptoms of the problem may be apparent.
- Example: sales may be declining, but management may not know the exact nature of the problem.

Problem definition stage

- The stage in which management seeks to identify a clear-cut statement of the problem or opportunity.
- Allows the researcher to set the proper research objectives.

defining the problem (continued)

An orderly definition of the research problem lends a sense of direction to the investigation.

- Every marketing problem can be classified on a continuum ranging from complete certainty to absolute ambiguity.

defining the problem (continued)

Statement of research objectives

- After identifying and clarifying the problem, the researcher should make a formal statement of the problem and the research objectives.
- The best expression of a research objective is a well-formed, testable research hypothesis.
- A hypothesis is a statement that can be refuted or supported by empirical (numerical) data.

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Marking Guidelines

Task 1 (Linear programming): 15 marks
- Mathematical model: 10 marks
- Spreadsheet and Solution: 5 marks

Task 2 (Assignment Problem): 15 marks
- Mathematical model: 10 marks
- Spreadsheet and Solution: 5 marks

Task 3 (Problem for the project): 70 marks
- Abstract/Executive summary: 5marks
- Introduction/Background to the problem: 12 marks
- Problem Definition and the Model: 15 marks
- Solution Approach: 10 marks
- Interpretation of the Results: 20 marks
- Conclusion: 5 mark
- References: 3 marks

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Presentation Style

- For Tasks 1-2, prepare a brief report by documenting the LP models (showing the decision variables, objective function and constraints) and by explaining your solutions.
- The report should be succinctly presented within 4000 words (approximately 1000 words for Tasks 1 - 2 and 3000 words for Task 3), plus any accompanying spreadsheets.
- All sources of material must be quoted, and graphs and tables should be labelled appropriately.
- As a convention, "Word count includes everything in the main body of the text (including headings, citations, quotes, lists, etc.).
- The list of references, Tables, appendices and footnotes are NOT included.
- Your report should be written using correct spelling, grammar and punctuation.
- Language should be free of bias (including but not limited to race, gender, sexual orientation or disability). Harvard referencing is required.

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Report Template

1. Task 1: Answer questions 1(a) to (c)
2. Task 2: Answer questions 2(a) to (c)
3. Task 3
    - Abstract/Executive Summary (only talking about Task 3. not tasks 1-2)
    - Introduction/Background to the problem (only about Task 3)
    - Problem Identification and Selection (only about Task 3)
    - Solution Approach (only about Task 3)
    - Interpretation of the Results (only about Task 3)
    - Conclusion (only about Task 3)
    - References (only about Task 3)

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Task 3

- Explain how you identified the problem and justify why you think you have identified it correctly.
- Describe the background of the problem and the reason for its selection.
- Describe the limitations and assumptions that may need to be considered.
- You may also discuss the current practice and the existing difficulties.
- You are advised to give the reasons for the chosen Prescriptive Analytics tool/technique, the advantages & disadvantages, the resources required, and the computational time required.
- Analyse the results and provide sensitivity analysis, if any.
- Describe your computational difficulties and experiences. You may also mention the things you wanted to do but could not do due to time or other constraints.
- Ensure that the topic and/or associated material is not/cannot be security classified.

- *Notably, you need to solve your problem by using **only one** Prescriptive Analytic tool/technique (e.g., Linear Programming, Integer Programming, Goal Programming, Transportation and Assignment Problems, Network Optimisation).*

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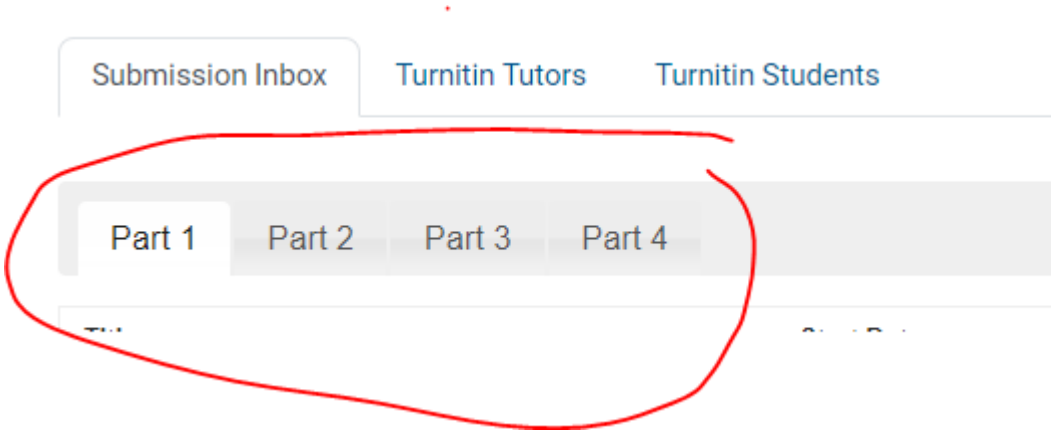
A few examples of Prescriptive Analytic Technique

- Optimising the production quantity for multiple items under varied company-wide constraints;
- finding the optimal amount of purchase quantities for multiple items under capital and capacity constraints;
- scheduling or rostering employees in a restaurant;
- finding the shortest path to transport a medical emergency product;
- determining the optimal path for transporting medical samples;
- finding the transportation network for an ambulance connecting multiple hospitals;
- conveying perishable items across multiple fresh food markets;
- buying a car without any rigid budget;
- assigning nurses for medical patience in a local hospital; and
- minimising inventory in a typical supply chain setting.

How to Submit?



- You will submit your report in Word/PDF format through the submission link under the tab **Part 1: Report**.
- You will submit your spreadsheets under the tab **Part 2: Spreadsheets.**
- You may only submit a single file to each Turnitin part.
- You may re-submit multiple times up to the due date

How to write a good Abstract/Executive Summary?– 5 marks

A brief introduction to the topic (i.e., Introducing the business)

Challenges or motivation for the work

High-level discussion?

The work performed

Key findings?

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Exemplar 1: Finding the best renewable energy source

There has been a universal focus to shift the transition to net zero emissions through the use of renewable energy sources. However, Australia lags behind the world in this transition with significant dependence remaining on traditional sources of energy, such as coal-fired power stations. The Australian Government must place significant investment in renewable energy sources to drive the transition to net zero emissions.

A plethora of alternative renewable energy options exists to achieve this transition to net zero, with each presenting differing costs and benefits to their implementation. Through the use of the Simple Multi-Attribute Decision-Making Technique (SMART) method, this paper aims to determine the most suitable renewable energy source for the Australian Government to concentrate its investment in the transition to net zero. The use of SMART will allow for a range of stakeholder views to be incorporated into decision-making and allow for an assessment of the effectiveness of renewable energy options based on the unique operating context of Australia.

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Introduction/ Background to the Problem?– 12 marks

Marking Look-up

- Explains the purpose of the report
- Describes the scope and limitations of the report
- Describes methods/sources used to gather information
- Provides necessary background information to situate readers
- Offers a preview of the findings.
- Provides a good number of academic references from recent years while documenting the research matters

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Problem Identification- 15 marks

- Addresses a wide range of articles/papers.
- Succinctly presents the findings from the review.
- Indicates that the presenter is very well versed in the topic.
- Extensive illustration on how this problem is related to the quantitative decision analytics and why.

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Solution Approach – 10 marks

- Can propose the appropriate methodology to address the problem.
- Can explain why it is appropriate and other methodologies are not suitable.
- Can explain the methodology mathematically or in words.
- Can suggest the possible results and outcomes.
- Can interpret the results.
- Do have a qualitative analysis against comparing methods or approaches

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Interpretation of the results– 20 marks

- Excellent documentation of the results.
- Different performance measures are used to validate the proposed model.
- Sensitivity analysis was carried out to justify the robustness of the models.
- Excellent comparison with the current practice and/or alternative methodologies.
- Perfect focus on achievements.
- Detailed discussion about any possible limitations of the assumed problem.

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Conclusion– 5 marks

- Conclusions and related outcomes (consequences and implications) are logical
- The conclusion is consistent with the whole report
- Future works or extensions of this work are clearly documented and justified
- A brief discussion on the limitations and significance of this study

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References– 3 marks

- Consistency!
- No firm rule or number for the references. Usually, for such assignment reports, I usually recommend having 12-15 references.
- We provide references to ground our logic and demonstrate that the body of knowledge has been followed from a source rather than just an author's hypothesis.
- Whenever we put a statement, unless that is a research hypothesis, should be justified by a citation from a relevant source.

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Examples...

Q&A