



MIS771 – Descriptive Analytics and Visualisation – Trimester 2 2024

Assessment Task 1 – Data Analysis & Report – Individual

DUE DATE: Saturday, 11th August, by 8:00 pm (Melbourne time)
PERCENTAGE OF FINAL GRADE: 30%
WORD COUNT: Part B: 1500 words

Tasks

Assignment one is an individual assignment with three tasks. The first task is to plan and deliver the assessment task on time. The second task is to analyse the given dataset and draw conclusions. Finally, the third task is to convey the findings and conclusions in a written report to a person with very little or no knowledge of Business Analytics.

To complete the assignment, you must use the dataset file named T22024A1.xlsx and apply the techniques covered in Module 1.

Specific Requirements

Case Study: Electric Vehicle (EV) Ownership

There is a lot of interest in Electric Vehicles (EVs) in Australia. Many believe EVs will be critical in achieving net zero emissions. However, vocal critics argue that there is insufficient information about who buys EVs, used for what activities, and how they are charged. Subsequently, the Sustainable Futures Research Centre secured a government grant to investigate EV Ownership in Australia.

Methodology:

A survey ($n = 102$) was conducted to collect data on EV owner demographics, charging behaviour and cost savings. The survey included questions on demographic information such as age, location and household type of the EV owner. It also included questions on use, distance travelled and charging frequencies. A brief description of the dataset is on page 2.

You are a Data Analyst at the Sustainable Futures Research Centre. Your team leader – Edmond Kendrick, has asked you to analyse the collected data. In particular, you are expected to perform descriptive and inferential analyses and produce a report based on your findings. Edmond's email to you is reproduced on page 3.

The dataset below contains numerous variables and details about EV owners.

Variable Name	Description
State	The state in which the EV owner normally resides
Locality	EV owners live in the city (Metro) or in the country (Regional)
Age	EV owner's Age (in years)
Household_Type	Household Type (Single Person, Single Parent, Couple with Children, Couple with no Children)
Annual_KM	Estimate of EV Km travelled per year (Km).
Trip_Type	What type of trips is EV used for? (Work, Private, Holiday)
Reason	Reason to buy the EV (Technology, Environment, Economic, Fuel Security, Health)
EV_Towing	EV is/can be used for Towing (Yes or No)
Charge_at_work	Number of times charging at work per week
Charge_at_Home	Number of times charging at home per week
Calculate_Savings	EV owner actively calculates fuel/Maintenance savings (Yes or No)
Fuel_Savings	Estimate of Annual Fuel Saving (\$)
Maintenance_Savings	Estimate of Annual Maintenance Savings (\$)

Email from Edmond Kendrick

To: <<Your Name>>

From: Edmond Kendrick

Subject: Electric Vehicle (EV) Ownerships

Hi <Your Name>,

I have the following questions/issues relating to the EV Ownership dataset.

1. Do metro EV owners travel further than their regional counterparts?
2. Are fewer EV owners in metro areas using their vehicles for towing than those in regional areas?
3. Does the average fuel cost savings significantly differ across the household type?
4. Is there a difference in the proportion of EV owners who charge their vehicles at home more than five times per week based on their motivation (reason) for purchasing an EV?
5. Design an experiment to see the impact of locality and types of trips on the distances travelled in EVs. Please use the data in the 'Experiment' worksheet for this experiment.
6. A separate study investigated the changing attitude of EV owners towards public EV charging infrastructure. An Attitude Index was used to measure the level of support for the government's approach, where higher values indicated greater support. The attitude of 12 EV owners was measured in 2022 and was again in 2023. Is there a change in the attitude? Please use the data from the 'Attitude' worksheet for this task.

I look forward to your response on or before 11th April 2024.

Regards

Eddie

Submission

The assignment consists of **three** parts: **Assignment Planning and Execution Tables, Analysis and Report**. You must submit all three (your plan, data analysis and written report).

1. Guidelines for Assignment Planning and Execution Tables

This practical task aims to help you keep track of your assignment progress and submit it on time. To report how you plan your project and turn the plan into action, you must complete the tables provided in dot points as clearly as possible. Note that effective planning, execution, and completing given tasks on time are essential self-management skills.

Note: Dot point writing requires you to use 'point form', not complete sentences.

Before filling in the tables, you are strongly encouraged to watch the pre-recorded workshop 'How to plan an assignment and turn the plan into action?'

Note: Give the assignment planning and execution file the following name
A1_Planning_YourStudentID.docx

2. Guidelines for Data Analysis

Read the case study and questions asked by Edmond carefully. Then spend some time reviewing the data to understand the context. The analysis required for this assignment involves material covered in **Module 1**, with the corresponding tutorials being a helpful guide. Start the analysis by translating the worded business problems into testable propositions.

You can complete all data analysis using the Excel templates provided in the practicals. In choosing the technique to apply for a given question, keep the following in mind:

- Are we dealing with a numerical variable or a categorical variable?
- Are we dealing with one population, two populations or more than two populations?
- Are we dealing with an independent population or a dependent population?
- Each question must be answered using the most appropriate technique(s) and justify your decision where applicable.
- Please formulate the hypotheses, and state them clearly in both notation and words in the Excel file.
- Even though a question(s) leads you to inferential techniques, consider conducting a descriptive analysis of the data first.

For all questions in the email, assume that:

- **95 % confidence level** is appropriate for confidence intervals and;
- **5.0 % level of significance** (i.e. $\alpha = 0.05$) is appropriate for any hypothesis tests.

ATTENTION!

- We expect you to estimate and report the difference if you have established a difference between two means or proportions.
- Suppose you have established a difference between two or more means or proportions. In that case, we expect you to follow up with an appropriate multiple-comparison procedure.

You may need to make assumptions about the dataset to answer some questions. There will be technical/statistical assumptions that you need to make, for example, whether to use an equal or an unequal variance test. You need to consider and incorporate any violations of assumptions such as unequal sample sizes as limitations of your analysis in both Excel and the report.

Each question from the email should be analysed in a separate worksheet (e.g. Q1, Q2 ...). Therefore, you need to add these extra tabs.

Before submitting your analysis, ensure it is logically organised and remove any incorrect or unnecessary output. Marks will be penalised for poor presentation, disorganised/incorrect results, or unnecessary output.

Note: Name your Excel file in format **A1_YourStudentID.xlsx** (use a short file name while analysing).

3. Guidelines for the Report

Your report consists of three sections: **Introduction**, **Main Body**, and **Conclusion**. The report should be around 1,500 words.

The introduction begins by highlighting the primary purpose(s) of the analysis and concludes by explaining the report's structure (i.e., subsequent sections).

The report's main body summarises the key findings for each question, specifically addressing Edmond's questions. Use simple English to convey your conclusion and avoid statistical jargon. Use proper headings and exclude Excel output from the report.

The conclusion should highlight the key findings of the analyses and **explain the main limitations** (if any).

When you have completed the report, it is a useful exercise to leave it for a day, return to it and then re-read it. Does it flow easily? Does it make sense? Often, on re-reading, you become aware that you have made some points clumsily, and you find that you can re-phrase them much more clearly.

Note: Give the report the following name **A1_YourStudentID.docx** or **pdf**.

Learning Outcomes

This task allows you to demonstrate your achievement towards the Unit Learning Outcomes (ULOs) which have been aligned to the [Deakin Graduate Learning Outcomes](#) (GLOs). Deakin GLOs describe the knowledge and capabilities graduates acquire and can demonstrate on completion of their course. This assessment task is an important tool in determining your achievement of the ULOs. If you do not demonstrate achievement of the ULOs you will not be successful in this unit. You are advised to familiarise yourself with these ULOs and GLOs as they will inform you on what you are expected to demonstrate for successful completion of this unit.

The learning outcomes that are aligned to this assessment task are:

Unit Learning Outcomes (ULOs)		Graduate Learning Outcomes (GLOs)
ULO 1	Apply quantitative reasoning skills to solve complex problems.	GLO1: Discipline-specific knowledge and capabilities - appropriate to the level of study related to a discipline or profession. GLO5: Problem Solving - creating solutions to authentic (real-world and ill-defined) problems.
ULO 2	Plan, monitor, and evaluate own learning as a data analyst.	GLO6: Self-Management - working and learning independently, and taking responsibility for personal actions
ULO 3	Deduce clear and unambiguous solutions in a form that they useful for decision-making and research purposes and for communication to the wider public.	GLO1: Discipline-specific knowledge and capabilities - appropriate to the level of study related to a discipline or profession. GLO2: Communication - using oral, written and interpersonal communication to inform, motivate and effect change

Marking and feedback

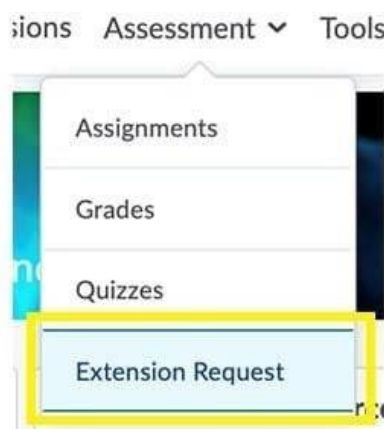
The marking rubric indicates the assessment criteria for this task. It is available at the end of this document. The criteria act as a boundary around the task and help specify what assessors are looking for in your submission. They are drawn from the ULOs and align with the GLOs. Before completing and submitting this task, you should familiarise yourself with the assessment criteria.

Students who submit their work by the due date will receive their marks and feedback on CloudDeakin 15 working days after the submission date.

Extensions

Extensions can only be granted for exceptional and/or unavoidable circumstances outside of your control. Requests for extensions must be made by 12 noon on the submission date using the online Extension Request form under the Assessment tab on the unit CloudDeakin site. All requests

for extensions should be supported by appropriate evidence (e.g., a medical certificate for ill health) and a draft of the assessment (work done to date).



Applications for extensions after 12 noon on the submission date require University level [special consideration](#) and these applications must be submitted via StudentConnect in your DeakinSync site.

Late submission penalties

If you submit an assessment task after the due date without an approved extension or special consideration, 5% will be deducted from the available marks for each day after the due date up to seven days*. Work submitted more than seven days after the due date will not be marked and will receive 0% for the task. The Unit Chair may refuse to accept a late submission where it is unreasonable or impracticable to assess the task after the due date. *'Day' means calendar day for electronic submissions and working day for paper submissions.

An **example** of how the calculation of the late penalty based on an assignment being due on a Thursday at 8:00pm is as follows:

- 1 day late: submitted after Thursday 11:59pm and before Friday 11:59pm – 5% penalty.
- 2 days late: submitted after Friday 11:59pm and before Saturday 11:59pm – 10% penalty.
- 3 days late: submitted after Saturday 11:59pm and before Sunday 11:59pm – 15% penalty.
- 4 days late: submitted after Sunday 11:59pm and before Monday 11:59pm – 20% penalty.
- 5 days late: submitted after Monday 11:59pm and before Tuesday 11:59pm – 25% penalty.
- 6 days late: submitted after Tuesday 11:59pm and before Wednesday 11:59pm – 30% penalty.
- 7 days late: submitted after Wednesday 11:59pm and before Thursday 11:59pm – 35% penalty.

The Dropbox closes on Sunday after 11:59pm AEST/AEDT time.

Support

The Division of Student Life provides a range of [Study Support](#) resources and services available throughout the academic year, including Writing Mentor and Maths Mentor online drop-ins and the SmartThinking 24-hour writing feedback service at [this link](#). If you prefer more in-depth and tailored support, [make an appointment online with a Language and Learning Adviser](#).

Referencing and Academic Integrity

Deakin takes academic integrity very seriously. It is important that complete your own work in every assessment task. Any material used in this assignment that is not your original work must be acknowledged as such and appropriately referenced. You can find information about referencing (and avoiding breaching academic integrity) and other study support resources at the following website: <http://www.deakin.edu.au/students/study-support>

Your rights and responsibilities as a student

As a student, you have both rights and responsibilities. Please refer to the document ***Your Rights and Responsibilities as a Student*** in the Unit Guide & Information section in the Content area on the CloudDeakin unit site.

Rubric

PERFORMANCE	YET TO ACHIEVE MINIMUM STANDARD		MEETS STANDARD		EXCEEDS STANDARD	
Criteria	Not Attempted	Needs Improvement	Satisfactory	Good	Very Good	Exemplary
Analysis (Marks: 35%) GLO 1 GLO 5	Explores topic at a surface level and rarely uses appropriate data analysis tools. 0 – 10.4	Explores topic at a limited level and often uses irrelevant or inappropriate techniques to analyse data and/or there are many errors in the analysis. 10.5 – 17.4	Independently pursues substantial knowledge, explores topics in some depth and uses appropriate descriptive analysis and visualisation tools to analyse the data but there are some errors in the analysis. 17.5 – 20.9	Independently pursues substantial, additional knowledge, and explores a topic in-depth, yielding mostly rich analysis using appropriate techniques but there are minor errors in the analysis. Some assumptions / limitations are considered. 21 – 24.4	Learning interests exist outside classroom requirements. Explores a topic in-depth and produces a very comprehensive analysis of the data using the most appropriate techniques. Consistent use of correct Inferential analysis methods to answer questions. All assumptions / limitations are considered and communicated. 24.5-27.9	Learning interests exist and flourish outside classroom requirements. Explores a topic in-depth and produces a skilful and comprehensive analysis of the data using many different techniques. All assumptions / limitations are addressed. 28-35
Interpretation (Marks: 45%) GLO 1 GLO 2	Does not communicate any of the main findings of the analysis in an accurate or useful way. Provide no insight and/or information beyond basic facts. 0 – 10.4	Interpretation and communication of findings is at a basic level or do not adequately explain the main findings of the analysis. Provide little insight and/or information beyond basic facts. 10.5 – 17.4	Explains most of the main findings of the analysis accurately. Shows evidence of independently applying learning to demonstrate comprehension in familiar and novel situations. 17.5 – 20.9	Provides a reasonable and accurate description of the most important features of the analysis along with appropriately qualified conclusions. Shows evidence of independently and creatively applying learning to demonstrate comprehension in familiar and novel situations. 21 – 24.4	Provides a very detailed and accurate description of the most important features of the analysis in the appropriate language. The report clearly addresses the main research questions asked in the assignment. Shows evidence of independently and creatively applying learning to demonstrate a high level of comprehension in familiar and novel situations. 24.5-27.9	Provides an outstanding description and inference of results. Conclusions are explained in clear language and are insightful. The entire report is aimed to address the main research questions. Shows evidence of independently and expertly applying learning to demonstrate an outstanding level of comprehension in familiar and novel situations. 28-35
	The report is poorly structured and/or few sections missing with a poor use of language. 0 – 2.9	The report is poorly structured. Only few analysis insights are considered. Language is difficult to follow with many grammatical errors noted. 3 – 4.9	The report is clear and easy to follow. The 3 main elements of a well-structured statement (i.e., claim + evidence + conclusion) is considered across the entire report. 5 – 5.9	The report is well-structured with all sections included. All relevant insights are in the report. Communication is clear with NO grammatical errors noted. 6 – 6.9	The report is on par with a professional report. All relevant analysis insights are included in the report. Written communication is clear, easy to follow and has a structure. 7 – 7.9	The report is masterfully structured. All relevant analysis insights are included. Report follows a consistent formatting style. Language is truly professional and easy to follow. 8 – 10
Assignment Planning and Execution (Marks: 20%) GLO 6	Takes no responsibility for maintaining accurate evidence of learning achievements. 0 – 5.9	Takes little responsibility for maintaining accurate evidence of learning achievements. 6 – 9.9	Takes responsibility for seeking improved learning and maintaining evidence of learning, although there is some inconsistency in the application. 10 – 11.9	Consistently takes responsibility for seeking improved learning and maintaining evidence of learning achievements from within formal course experiences. 12 – 13.9	Consistently takes responsibility for maintaining accurate and detailed evidence of learning achievements from within and beyond formal course experiences. 14 – 15.9	Consistently takes responsibility for maintaining accurate and compelling evidence of learning achievements from within and beyond formal course experiences. 16 – 20
Overall Description	Or Equivalent Fail (N) 0 – 49%		Or Equivalent Pass (P) 50% – 59%	Or Equivalent Credit (C) 60% – 69%	Or Equivalent Distinction (D) 70% – 79%	Or Equivalent High Distinction (HD) 80% – 100%