GEN 4905 Data Analytics for Business Optimization

Guide to Conducting Quantitative Research and Analytical Reporting

Ongoing Project (15%)

Step 1: Define Your Topic and Formulate a Hypothesis or Research Question

Choose a Broad Topic Area:

Select a research area that aligns with available data. Avoid starting with overly narrow topics that might limit data accessibility. Instead, identify a broad domain and explore data availability.

Identify Relevant Data Sources:

For specific industries like hospitality, platforms such as **Statista, Kaggle**, or **Euromonitor** offer rich datasets. For macroeconomic analyses, use reliable databases like the **World Bank World Development Indicators**, which provide comprehensive historical and recent data.

Refine Your Scope:

Once you identify consistent and relevant data, narrow the research focus. At this stage, articulate a clear research question or hypothesis that your analysis aims to address. Ensure that your conclusions will stem strictly from the data and results.

Step 2: Prepare Your Data for Analysis

Download and Review Datasets:

Select the final datasets that align with your research objectives. Make sure to insert them into the **Template** available under the Assessment Strategy of the Moodle course page.

Filter and Organize Data:

Structure the data into clear rows and columns.

Label variables, timelines, units of measurement, and ensure numeric values are accurate to two decimal places. Offer the original sources in each case including the **full reference in APA7 style** under the last spreadsheet of the template.

Remove unnecessary entries or duplicate records.

Ensure Consistency:

For advanced methods like multiple linear regression analysis, verify that all variables are available for the same timeframe and there are no missing values. Gaps in data can compromise the reliability of your analysis.

Step 3: Select Appropriate Quantitative Methods

Choose your methods based on the research question and data characteristics. The process involves descriptive and inferential statistics.

Descriptive Statistics:

Summarize and visualize the data to identify trends, patterns, and distributions. Recommended tools include:

- Frequency Analysis: Use absolute, relative, or cumulative frequencies.
- Graphical Tools: Histograms, line graphs, bar charts, pie charts, and scatter plots.
- Statistical Summaries: Use tools like Excel's Data Analysis ToolPak to generate descriptive outputs such as mean, variance, and standard deviation.

Inferential Statistics:

Test relationships, make predictions, and validate hypotheses. Core methods include:

- Hypothesis Testing: For comparing means or distributions.
- Correlation Analysis: To identify relationships between variables.
- Multiple Regression Analysis: To assess the effect of independent variables on a dependent variable.
- Forecasting Models: For predictive insights based on historical data.

Step 4: Analyze and Interpret Results

Stay Objective:

Interpret findings in direct relation to your research question or hypothesis. Avoid drawing unsupported conclusions or overstating results.

Use Professional Terminology:

Clearly explain key findings using statistical terms, e.g., "The correlation coefficient of 0.78 indicates a strong positive relationship between X and Y." Avoid generalizations without providing specific data points or context.

Be Concise and Insightful:

Focus on explaining the implications of your findings rather than merely describing charts or tables. For example, if your analysis shows a positive correlation, explain its significance and how it aligns with the research context.

Step 5: Present Results Effectively:

Deliver a structured and articulate presentation. Begin with a brief overview of the research topic and methodology, followed by detailed observations and key findings.

Avoid reading directly from slides or notes. Engage the audience by maintaining eye contact and using a confident tone.

Time your presentation appropriately (appr. 7 minutes) and include only essential details to ensure clarity and focus. Both team members must participate in the presentation rounds.

Final Notes:

Maintain a professional demeanor and format throughout your analysis and presentation.

Use visuals strategically to enhance understanding but ensure they are clear and directly tied to your conclusions.

Practice your presentation to ensure it is polished, well-paced, and impactful.

Good luck with your research and analysis!