

Mathematics of Data Management

Project 2

Organization of Data Analysis and Statistical Analysis

Academic School Year 2019 – 2020 onwards

Overall Expectations:

1. demonstrate an understanding of the role of data in statistical studies and the variability inherent in data, and distinguish different types of data;
2. describe the characteristics of a good sample, some sampling techniques, and principles of primary data collection, and collect and organize data to solve a problem.

Part 1

Your topic for developing thesis question related to statistical subjects such as health, entertainment, sports, education etc.. The word subject denotes a broad category, a general area of interest that you may wish to explore further. The word topic denotes a specific aspect of the subject that requires detailed research. Some examples of subject and topic are shown in the chart below. Copy the chart in your notebook, and then use the space provided to

Subject	Topic
Television	Rating wars Digital cable verses regular cable Cable verses satellite dishes
Medicine	Hospital closures and staff cutbacks Doctors and/or nurse shortages Health-care funding levels
Post Secondary Education	Tuition fees Entry requirements Degree requirements
Travel	Air safety Vacation destination Cost
Music	Music styles Music and sports Comparing musicians

Project Outline:

1. Decide on a topic from the topics list (a social issue, a sport or hobby, health issues, education, entertainment)
2. Create a mind map
3. Explore and formulate a thesis question
4. Look for a significant data set (Primary and secondary)
5. Create your graphs or charts to display the variables. (display data in at least two ways)

6. Write conclusions based on the graphs you create and subsequently analyze
7. To complete your Written Report must now be presented to the teacher and the class in a 10-15 minute presentation
 - Add more subject and topic related to statistical studies
 - Add one more topic for each subject given
 - List the subject and related topic that you would like to research
 - Construct the mind map related to your topic after research
 - Construct minimum five thesis questions related to your topic
 - Analyze each of the questions by applying the characteristics of good thesis question
 - Distinguish quantitative and qualitative variable in questions
 - Decide the best thesis question that fits most appropriately to your topic?
 - Identify the population and sample to collect data for your topic.
 - Choose a proper sampling technique to collect data
 - When you collect data, do you use Primary or Secondary data?
 - Identify any bias can occur while collecting the data.
 - Are the data discrete or continuous?
 - Is cross sectional or longitudinal study more appropriate for drawing conclusion about your thesis

Rubric for Unit 3 Part 1

Criteria	Level 1	Level 2	Level 3	Level 4	Mark Assigned
Knowledge/ Understanding	Analysis of data demonstrated limited understanding of concepts and relationship	Analysis of data demonstrated some understanding of concepts and relationship	Analysis of data demonstrated considerable understanding of concepts and relationship	Analysis of data demonstrated thorough understanding of concepts and relationship	____/5
Thinking/ Inquiry	Statistical analysis skills were applied with limited effectiveness	Statistical analysis skills were applied with some effectiveness	Statistical analysis skills were applied with considerable effectiveness	Statistical analysis skills were applied with high degree of effectiveness	____/5
	Analysis and interpretation was weak	Analysis and interpretation was satisfactory	Analysis and interpretation was sound	Analysis and interpretation was strong	____/5
Communication	Information has been communicated with limited effectiveness	Information has been communicated with some effectiveness	Information has been communicated with considerable effectiveness	Information has been communicated with a great degree of effectiveness	____/5
Application • making conclusions • making predictions • making connections	Ability to make conclusions, predictions and/or connections from data was limited in effectiveness	Ability to make conclusions, predictions and/or connections from data was moderately effective	Ability to make conclusions, predictions and/or connections from data was considerably effective	Insightful conclusions, predictions and/or connections from data were made throughout	____/10
Overall Achievement Level: Mark: ____/30					

GRAPHING RUBRIC

Title Checklist	• printed neatly • located at the top of page • underlined or highlighted in a box • clearly reflects the topic				____/4
Legend Checklist	• positioned in an appropriate area • quality of construction • accuracy of labels and symbols • useful to the reader of the graph				____/4
Labels Checklist	• printed neatly • aligned carefully • spelled accurately • axes and/or other features labeled				____/4
Criteria	Level 1	Level 2	Level 3	Level 4	Mark Assigned
Appearance • appropriate use of colour • use of ruler to create straight lines • use of compass and/or protractor (if applicable)	Ineffective use of colour, ruler, compass and/or protractor	Moderately effective use of colour, ruler, compass and/or protractor	Considerably effective use of colour, ruler, compass and/or protractor	Extremely effective use of colour, ruler, compass and/or protractor	____/6
Accuracy of Features Mapped	Features have been graphed with limited accuracy (more than 5 errors)	Features have been graphed with moderate accuracy (4 to 5 errors)	Features have been graphed with considerable accuracy (2 to 3 errors)	Features have been graphed with a great deal of accuracy (0 to 1 error)	____/7
Overall Achievement Level:					Mark: ____/25

INTERNET SEARCH RUBRIC

Criteria	Level 1	Level 2	Level 3	Level 4	Mark Assigned
Knowledge/ Understanding of Topic	Student has gained limited knowledge of the topic researched	Student has gained some knowledge of the topic researched	Student has gained considerable knowledge of the topic researched	Student has gained a high degree of knowledge of the topic researched	____/5
Inquiry Skills (as evident in work process*)	Process work exhibited limited quality	Process work exhibited some quality	Process work exhibited considerable quality	Process work exhibited substantial quality	____/5
Critical Thinking Skills (analysis and interpretation of information)	Information was analyzed and interpreted with limited clarity and effectiveness	Information was analyzed and interpreted with moderate clarity and effectiveness	Information was analyzed and interpreted with considerable clarity and effectiveness	Information was analyzed and interpreted with a high degree of clarity and effectiveness	____/5
Communication (through written work)	Results of research were communicated with a limited degree of accuracy and effectiveness	Results of research were communicated with some accuracy and effectiveness	Results of research were communicated with considerable accuracy and effectiveness	Results of research were communicated with a high degree of accuracy and effectiveness	____/5
Overall Achievement Level:					Mark: ____/20

	Presentation Marking Rubric (Group)				
	4	3	2	1	Mark
Visual Appeal	There are no errors in spelling, grammar and punctuation. Information is clear and concise on each slide. Visually appealing/engaging.	There are some errors in spelling, grammar and punctuation. Too much information on two or more slides. Significant visual appeal.	There are many errors in spelling, grammar and punctuation. Too much information was contained on many slides. Minimal effort made to make slides appealing or too much going on.	There are many errors in spelling, grammar and punctuation. The slides were difficult to read and too much information had been copied onto them. No visual appeal.	
Comprehension	Extensive knowledge of topic. Showed complete understanding of assignment. Accurately answered all questions posed.	Most showed a good understanding of topic. Able to answer most of audience questions.	Showed good understanding of some parts of topic. Some accurately answered questions.	Presenter didn't understand topic. Majority of questions not properly answered or majority of information incorrect.	
Presentation Skills	Regular/constant eye contact, The audience was engaged, and presenters held the audience's attention. Appropriate speaking volume & body language.	Mostly spoke to majority of audience; steady eye contact. The audience was engaged by the presentation. Spoke at a suitable volume. Some fidgeting	Focused on only part of audience. Sporadic eye contact. The audience was distracted. Speaker could be heard by only half of the audience. Body language was distracting.	Minimal eye contact or focus on small part of audience. The audience was not engaged. Spoke too quickly or quietly making it difficult to understand. Inappropriate and/or disinterested body language.	
Content	The presentation was a concise summary of the topic with all questions answered. Comprehensive and complete coverage of information.	The presentation was a good summary of the topic. Most important information covered; little irrelevant info.	The presentation was informative but several elements went unanswered. Much of the information irrelevant; coverage of some of major points.	The presentation was a brief look at the topic but many questions were left unanswered. Majority of information irrelevant and significant points left out.	
Preparedness	Presenter knew the information. Extremely prepared and rehearsed.	Members helped each other. Very well prepared.	Prepared but with some dependence on just reading off slides.	Unbalanced presentation. Evident lack of preparation/rehearsal. Dependence on slides.	
				Total	/25

Comments:

Unit 4 Statistical Analysis Project 2

Overall Expectations:

By the end of the course, students will be able:

- Analyse, interpret, and draw conclusions from one-variable data using numerical and graphical summaries
- Analyse, interpret, and draw conclusions from two-variable data using numerical, graphical and algebraic summaries
- Demonstrate an understanding of the applications of data management used by the media and the advertising and in various occupations.

Part 2

Specific Expectations:

- Analysing One-Variable Data
- Analysing Two-Variable Data
- Evaluating Validity

Guidelines: You will calculate the given tasks with or without technology in finding the following:

- Mean, Median, and Mode of Grouped and Ungrouped data
- Range, Bin width, and Variance of Grouped and Ungrouped data
- Quartiles and Interquartile
- Algebraic deviation and Absolute deviation from the mean (ADM)
- Mean Absolute Deviation (MAD), Standard deviation, Z-score and Percentile rank
- Graphs of Normal curve, skewed left, and skewed right

Tasks 1: One-Variable Data

The results of final examinations in Data Management, 30 students obtained the following marks:

85, 78, 65, 74, 86, 90, 87, 76, 68, 91
81, 92, 67, 79, 82, 83, 73, 75, 82, 86
78, 83, 90, 78, 68, 84, 88, 79, 69, 84

- a. Determine the mean, median, and mode.
- b. Determine the ADM's, and MAD
- c. Arrange the data into three class intervals, equal bin width, and frequency.
- d. Compute the range and standard deviation
- e. Find the quartiles and interquartile.
- f. Compute the Z- score when $x = 92$ and $x = 65$ and what is percentile rank for both values.
- g. Use Normal distribution to graph the data and determine whether skewed left or skewed right

Tasks 2: Two-Variable Data

The consumer price index for food and clothing as reported monthly by the National Census and Statistics Office from January to December 1990 was:

Consumer Price Index
Food and Clothing
January to December 1990

Month	Food	Clothing
January	460.4	494.0
February	458.0	497.4
March	457.5	500.3
April	459.4	502.6
May	463.1	504.8
June	468.1	507.0
July	476.9	510.0
August	477.7	513.5
September	481.8	517.9
October	486.0	526.7
November	494.2	536.0
December	506.4	545.0

- Determine the mean, median, and standard deviation.
- Is the data has correlation coefficient?
- Which month for both food and clothing that has high and low index.
- Graph the data using the following:
 - Scatter plot
 - Bar graph
 - Histogram
 - Pie chart using percentage

Statistical Analysis Rubric

Categories	5.0 – 5.9 Level 1	6.0 – 6.9 Level 2	7.0 – 7.9 Level 3	8.0 – 10 Level 4
Knowledge/ Understanding Understanding of One and Two Variable Data. (10 points)	Demonstrated statistical analysis with limited understanding of concepts and relations of one and two variable data	Demonstrated statistical analysis with some understanding of concepts and relations of one and two variable data	Demonstrated statistical analysis with considerable understanding of concepts and relations of one and two variable data	Demonstrated statistical analysis with a high degree of understanding of concepts and relations of one and two variable data
Thinking / Inquiry Analysis and Logical interpretation of One and Two Variable Data. (10 points)	Uses creative thinking skills of statistical analysis and interpretation with limited effectiveness Processing and logical skills in problem solving was weak	Uses creative thinking skills of statistical analysis and interpretation with some effectiveness Processing and logical skills in problem solving was satisfactory	Uses creative thinking skills of statistical analysis and interpretation with considerable effectiveness Processing and logical skills in problem solving was good	Uses creative thinking skills of statistical analysis and interpretation with a high degree of effectiveness Processing and logical skills in problem solving was strong and excellent
Communication -Creativity Tables, data and graphs with details and labelling. (5 points) -Clear and organized manner. (5 points) -Organization and appropriate format (5 points)	Has no graphical representation of the tasks 1 and 2. Unable to find the measures of central tendency, quartiles, percentiles and z - scores Uses appropriate formulas in each tasks with limited effectiveness and errors	Has one graphical representation of the tasks 1 and 2. Unable to find the measures of central tendency, quartiles, percentiles and z - scores Uses appropriate formulas in each tasks with some effectiveness and minor errors	Have two graphical representations of the tasks 1 and 2. Unable to find the measures of central tendency, quartiles, percentiles and z - scores Uses appropriate formulas in each tasks with considerable effectiveness and no errors	Have all graphical representation of the tasks. Unable to find the measures of central tendency, quartiles, percentiles and z - scores Uses appropriate formulas in tasks with a high degree of effectiveness and correctness in solutions.
Application Making conclusions, predictions and connections. (10 points)	Unable to make conclusions, predictions and connections from data with limited effectiveness	Able to make conclusions, predictions and connections from data with satisfactory results	Able to make conclusions, predictions and connections from data with considerable effectiveness	Have insightful conclusions, predictions, and or connections from data with a high degree of effectiveness.

Total Marks: _____/45

Percentage: _____

Comments:
