Semester Research Project

Carthage College

Overview

Your goal is to complete a research project using raw data sources to answer a question. Research is an essential aspect of your future work life in the professional world or in graduate school. The wide availability of large data sets in the past decade has added an important dimension to "everyday research." One of the key skills you can bring to your professional work is the ability to add a quantitative analytical dimension to papers and reports you write. This assignment asks you to "bring together" the ideas presented in the course to build and execute a research question using a large publically available data set.

Objectives

1. Students will develop a problem statement to research related to a business or economic problem/issue.
2. Students will form a "testable" research question with a null and alternative hypothesis.
3. Students will obtain, clean and use data from a large publically accessible database to a business/economic problem or issue.
4. Students will determine which statistical test(s) analysis and visualizations to use.
5. Students will select appropriate samples, execute the statistical tests selected, analyze and report the results in a final paper.
6. Students will present their findings in a research poster session at the end of the semester.

Data Resources

A wide range of data sources and ideas are on the class site. Many more government and organizational data sets are available than are listed. If you find something of interest, discuss the data set with your instructor.

Deliverables and Timetable

Due Date	Project Deliverable
September 29	**Three Ideas Due**—You will submit 3 ideas for the semester project
October 6	**Brainstorming and Ranking**—We will discuss and rank the ideas turned in last week

October 13	**Topic Selection** is due (some consultation is expected). The resource list on the class site has a variety of topics and data sets available. You are welcome to go "off the list," but make sure you consult with the instructor about data availability and suitability. If students select the same topic area, there is an expectation of working with different data or a different statistical method so the projects are unique from each other. **Turn in on the E-learning site**
October 20	**Project Map Due**—this is a rough outline of some of the kinds of data, statistical tests, and other needs to complete the project. At this point, you should have some notion of geographic scope (state, county, MSA) and scale (county, tracts, block groups, individual cases). **Turn in on the E-learning site**
October 27	**1st Status/Problem Report Due**—what are some of the roadblocks you are facing your project. This might include (but not limited to) finding data, cleaning the dataset, writing your hypotheses, or finding that your original question needs revision, etc. **Turn in on the E-learning site**
November 3	**2nd Status/Problem Report Due**—At this point, you should have the project problem defined, data cleaned and setup, and descriptive statistics run. You should have your hypotheses written. You should also have some draft visualizations run. Not having these things done constitutes a problem and you should report that to the instructor. If these are not completed, this is your opportunity to ask questions or seek help with your data, descriptive statistics or visualizations. Your upcoming tasks include actually selecting and running the proper statistical test and beginning to interpret what those tests actually mean. **Turn in on the E-learning site**
November 10	**3rd Status/Problem Report Due**—At this point, you should have run your data and statistical tests (although they may still need some refinement/revision). Not having these things done constitutes a problem. If they are not done—what help do you need? There is still plenty of time to fix any problems might have, but you have to identify them and seek help. **Turn in on the E-learning site**
November 18	**Rough Draft of Paper is Due**—Have as much of your paper written as possible before you leave for Thanksgiving Break. This would include all the write-ups of your statistical analysis (results and discussion) **Turn in on the E-learning site**
November 20	**Rough Poster Design is Due**—Rough out what you think the poster will say and what it will look like based on your rough draft. No need for fancy graphs and text—just a simple digital sketch of what you think it will look like. **Turn in on the E-learning site**
December 8	**Final Written Paper is Due**—See rubric **Turn in on the E-learning site**

December 11	**Final Research Poster is Due**—see rubric–these will be printed over the weekend Turn in on the E-learning site
December 14 & 16	**Semester Final Poster Presentations** Turn in on the E-learning site

Paper Requirements

1. Portions of your paper will resemble many of the assignments you completed earlier in the year.
2. Your paper will define a problem that you have identified. You will provide a careful background description of the problem and its context to frame your research hypotheses.
3. Your paper will state your research hypotheses in the traditional formal method (null and alternative) and you will explain them in common language that a non-statistician can understand.
4. You will explain what data and variables you chose for the research and why they are appropriate for the problem
5. You will explain what statistical tests you chose and why they are appropriate to your question and the data selected.
6. You will display and explain a range of descriptive statistics and visualizations on the data to describe and characterize the data
7. You will display the results from the statistical tests you performed on the data.
8. You will interpret what those tests mean using formal statistical terms and then restating those findings in everyday language that a non- statistician can understand.
9. You will include additional graphs and charts that help your explanations.
10. Your paper will appropriately cite the background research material you used as well as the data source you used to conduct the research.
11. Length—students always ask me how long this should be. This is a fair question without a fair answer. The reality is that some very good projects have an economy of words (800-1000 words). However, this is rare. I recommend that this may take you (1200-1800) words to do well. You may want to consider 2000 words to be an upward boundary, but there is no limit on what you write as long as it is your actual writing.

Poster Requirements
1. Your poster must measure at least 40" X 40". It may measure no more than 40" X 60"
2. Your poster must use descriptive statistics to explain your problem.
3. Your poster must use graphs and charts to visualize and explain your problem (at least 3). You are also welcome to use maps.
4. Your poster must explain the statistical tests you used in your paper and their importance."
5. Your poster must contain some elements of descriptive text that explain your problem, outline the methodology you used, summarize your data, and analyze the results. You may use a combination of paragraphs and bullet items.
6. Each one of your maps and charts should follow good elements of cartographic and graphic design (contrast, color choice, balance, etc.).