



Final Project Guide

During the statistical and analytical investigation, students choose their own research topic, within this topic students articulate their research question for both subprojects (comparison and regression analysis), define their variables, devise and carry out a data collection plan, conduct the appropriate analysis on the data, and prepare both a written report and an oral presentation to share the results with the instructor and the rest of the class. Students will work in their assigned team groups. The investigation is referred to as discovery one because the research topic is selected by the students, and the full project implementation is student-directed, with the guidance from the instructor kept to a minimum.

The three phases of the investigation that rely heavily on technology are the (1) data collection phase, (2) the data analysis phase, and (3) the dissemination phase.

1. Data Collection

During the data collection phase, students may gather data from one of three sources: constructing and administering surveys (1); measuring and/or recording physical phenomena (2); or accessing Internet data repositories or other existing datasets (3). A number of tools are available to help students create and administer online surveys. These include SurveyMonkey, Zoomerang, KwikSurvey, and Google Docs Survey Maker. Students using these and other similar tools are also able to leverage the software's capability of organizing the survey results directly into a spreadsheet.

The Internet also can be a virtual goldmine of rich data sources for student projects. There are databases and web pages featuring a plethora of resources, including sports data, government records and census data, nutritional information, consumer product specifications and ratings, and data on individual cities and states. For example, if a student group is interested in sports, they can access one of many sports websites with extensive current and historical databases, such as <http://mlb.mlb.com/stats/sortable.jsp> or <http://www.nfl.com/stats/player> for major league baseball data or professional football data, respectively. Student groups interested in regional trends may use <http://www.city-data.com/>, where data is available on the large cities, midsize cities, and small towns in the United States (the similar cities can be found for Canada). This data includes overall population; population proportions by gender, age, education level, marital status, and so on; median age; median income; median home price; and many other data points of



interest for each city and town. Other data of this sort can also be found directly from various city, province, and government records websites, including the Statistics Canada <http://www.statcan.gc.ca/start-debut-eng.html> or US census bureau at <http://www.census.gov/>.

2. Data Analysis

The results are produced during the analysis phase of the project, after the data is collected and organized.

The following statistical analysis should be covered in the final project report. A summary of this report should be presented by each group in class.

1. Summary Descriptive Statistics

Important descriptive statistics such as Mean, Median, Mode, etc. should be computed, and interpreted.

2. Hypothesis Test

At least three hypothesis t-tests should be designed, conducted, and interpreted (both one sample and two samples)

3. Regression Analysis

A multiple regression model should be designed. All the required factors should be computed, analysed, and interpreted:

- Coefficient of Determination
- Standard Error of Estimate
- Testing the Validity of the Model
- Interpreting the Coefficients
- Testing the Coefficients

4. Graphs/Charts

Maximum 6 graphs (column chart, Pie, etc.) should be presented. But, Scatter Plot for regression analysis must be included.

Students will use one or more technological tools to accomplish these analyses, and there are many such tools available. All of the analyses described can be performed with Microsoft Excel that supports all of the analysis functions described, even without installing the statistical analysis add-in package. The requirements of the linear regression project lend themselves particularly well to Excel.



There are also some other advantages to using Excel: 1) The program is widely accessible to students from most platforms; 2) learning basic skills in Excel can prove useful for students in a broad variety of settings, which may enhance student motivation; and 3) the charts and graphs created in Excel port easily into student papers and presentations, as noted in the discussion below, under Dissemination. Several web-based tools for statistical analyses are also available at no cost, including those on sites such as <http://easycalculation.com/> and <http://www.graphpad.com/quickcalcs/>.

3. Dissemination

When the students have collected and analyzed their data, the last phase of the project is to prepare a written report and in-class presentation. Most frequently, students choose to use Microsoft Word and PowerPoint for these two tasks. Both packages are familiar and widely available, and they lend themselves to the task especially well when Microsoft Excel was used for the data analysis, since graphics generated in Excel import easily into both Word and PowerPoint, and all three of these Microsoft Office programs share a “common look and feel”.

However, students are not restricted to the Microsoft Office suite for this phase of the project. Some students have used the word processor and/or the presentation package built into the web-based Google Docs package. Some have used the Adobe software suite to create documents and/or Acrobat presentations. Still others have used the Prezi presentation tool available online at no charge to students (<http://prezi.com/>).

The statistical and analytical investigation has five checkpoints: Project Planning, Data Collection, Data Analysis, Project Report, and Project Presentation with three deliveries: Project Proposal, Final Report, and Oral Presentation. The guide for conducting can be found on Blackboard. The page limitation for the Project Proposal is 3 and for the Final Report is 30 pages, excluding references and appendices.

Rubric

Please refer to the rubric posted on Brightspace.