

The learning outcomes for STAT 523 project include:

- Identifying instances in actual data collection when the principles of good experimentation are applicable.
- Identifying the nature of a data collection activity and the appropriate statistical methods for analyzing the resulting data.
- Recognizing the scope and limitations of the statistical methods when they are applied to the actual data collection activity.

The results of this exercise should be presented in a professional-quality technical report. The report should be thorough and concise on 3-to-5 double-spaced pages (excluding tables and graphs). Your instructor will give you a scan of the score distribution sheet with comments. **The original report will not be returned to you.**

Some guidelines:

1. Describe a data set that you have collected or will collect (preferably related to your graduate/undergraduate research).
 - a. What are the research objectives of the data collection activity?
 - b. Describe how the data were/will be collected. At what instances of the activity can the principles of control, randomization and replication be applied?
 - c. How does the data collection address the research objectives in 1a above?
 - d. What kind of study is it [e.g. a comparison of treatments (Chapter 10), a factorial experiment (Chapter 11), a regression problem (Chapters 12, 13)]?
 - e. Identify the treatments, factors or predictor variables, the experimental units, the response variable(s) that you will measure.
 - f. **Tips:**
 - Ideally (not a requirement), your experiment is
 - a comparison of at least 3 population means (see Chapter 10), or
 - a factorial experiment (see Chapter 11).

Either way, choose your subject so that the response variable y is a continuous measurement and that the data analysis methods of Chapter 10 or Chapter 11 can be sensibly applied.

Studies to avoid:

- The requirements here involve genuine experimentation. A completely observational study (e.g. surveys and opinion polls, sports statistics) or data collected by someone else are **not acceptable**.
- Do not use human subjects in your study. Studies involving student course grades are **not acceptable**.
- Do not choose a topic that is illegal or potentially dangerous to you or anyone else.

Get instructor approval (no later than February 13). Before conducting the study, submit a one-paragraph description of what you plan to do and obtain your instructor's approval (in the form of his signature on the statement). This signed statement should be turned in with your project report.

2. Describe the statistical/inferential methods pertinent to the data collection activity.
 - a. What statistical model and assumptions are relevant to the problem?
 - b. What kinds of analysis will you apply to the data? Enumerate as many, that are appropriate, as you can.
 - c. What kinds of diagnostics, both numerical and graphical, should you perform to assess the
 - appropriateness of the model assumptions and
 - the fit of the model to the data?
 - d. What is the potential importance or significance of your findings?

Report Outline. The written report should include at least

- a. an executive summary - one page overview of your problem and analysis methods
- b. a statement of objective of the study and expectations
- c. a description of the experiment/data-collection activity (in words lay persons can understand) - you may include graphics of the experiment apparatuses
- d. a description of the form of the raw data and the variables that are measured
- e. a presentation of the data analysis and diagnostics - include both numerical (estimates, confidence intervals, hypothesis tests) and graphical (plots of means, probability plots) techniques
- f. a discussion of further questions that could be raised by your study that might be investigated in a follow-up experiment – include potential consequences and relevance of your findings

Points System (50 points maximum)

- Executive Summary, Study Objectives = 5 points
- Description of Data Collection, Appropriateness of Experiment Plan = 15 points
- Statistical Analysis Methods = 15 points
- Conclusions, Study Implications and Questions for Further Study = 5 points
- Professional Appearance of Report = 5 points
- General Readability of Report = 5 points

Submission deadline: April 21, 2020.