

## Project Guide

### Introduction

Often, the most interesting part of a project is the student's motivation in choosing a particular project. The student may have extensive background knowledge or other personal reasons for a project choice. Do not be afraid to discuss this in detail in your introduction. I would prefer a less formal approach for this section, since you are not typically presenting technical material. The informality of the introduction, actually, sets the tone for the entire paper. Presenting the introductory material (and hence the entire paper) in first person, for instance, is acceptable.

### Design Choices

Finding a suitable response can often be the hardest part in selecting a topic for experimentation. You may have found an interesting measuring device for your response or you may have uncovered a simpler-to-measure surrogate characteristic. If you are particularly pleased with the way you have chosen to measure your response, be sure to discuss it.

Discuss the design in some detail, identifying blocks and other randomization restrictions, such as nesting, or split plots. For factors and factor levels, include details on what guided your choices—which factors were included/excluded, and the number and choice of factor levels.

Be sure to discuss randomization, and acknowledge any compromises made in replication or randomization. In these experiments, with our limited resources in time and effort, there are almost always compromises made in one or both of these two areas.

The choice of the design should be guided by practical considerations—don't block on day, for instance, if the experiment can be easily carried out in one day. I will not be grading you so much on the difficulty of your design; I am more interested in how well you follow principles of randomization, blocking and factorial design.

This would also be a good time to discuss any hypotheses or predictions you may have for the factor effects.

### Experiment

Discuss any difficulties you had in carrying out your design. It often turns out to be impossible to carry out the experiment as originally envisioned. If things do not work out, do not worry about it or try to cover it up—it is all part of the experimental process. If any changes in the design had to be made, please discuss them and their implications for experimental outcomes and analysis.

### Analysis

At this point, you can write out your model, if you haven't done so already, being sure to identify random and fixed effects, blocks, nesting, and other model assumptions. In addition to testing, be sure to include diagnostics, and analyze any interesting main effects. Really, I just anticipate seeing the usual analyses I expect on homework, with a little more attention paid to follow-up analyses on results than I typically request. If results are different from what you anticipated, please discuss any discrepancies. What would you do for a follow-up

experimentation—would some factors be studied in more detail and others discarded? Would you use different randomization restrictions? Would more replicates be necessary?

Most importantly, discuss the implications of your experimental results. Do not simply point out that an effect is significant, but discuss the effect within your experimental context. What did you learn and how does it affect you and your behavior?

#### Presentation

I will typically point out patterns in mechanical problems (spelling, grammar, etc.) only if they seriously interfere with the presentation of your material. I also do not like to modify a student's "voice" too much—I may prefer to phrase something differently, but such decisions are more often personal than preferable. Do try to avoid stylistic problems—I am not a big fan of the passive voice and I know it can be hard to come up with transition elements, but make the attempt nonetheless—do not compartmentalize your text.

I would also like tables and graphs (when embedded in the text) kept to a minimum, though they can certainly be included in appendices. In general, do not include output in the text unless you refer to it explicitly, and even then it should be modified to a more attractive format.