

AP Statistics – Experimental Design Project

As a teacher, I often wonder about homework – is it worth it? How much should I assign? What types of assignments are most effective at helping students meet the educational objectives? I especially wonder about this in AP Statistics, since last year I did not collect any homework except for a few special assignments, and the scores on the AP Statistics exam were better than the year before (in which I did collect)!

So, I want you to design an experiment to answer those questions above for an AP Statistics course.

What you need to include:

- 1) A thorough description of at least one completely randomized design as well as one randomized block design. Identify the subjects and how many you think you'll need to come to a strong conclusion. Mention the factors, the number of levels for each, and the number of treatments. Also mention the response variable(s).
- 2) A traditional experimental design diagram for both the CR and RB designs
- 3) A discussion of your blocking variable(s), including your rationale for selection
- 4) A discussion of possible confounding variables and how you are going to eliminate or reduce confounding.
- 5) A discussion of potential sources of bias and how you will take steps to reduce or eliminate bias
- 6) A discussion of practical considerations that could make carrying out your experiment difficult or even impossible
- 7) A design for a prospective observational study in case you could not find enough volunteers willing to take part in your controlled, randomized experiment. Include a discussion of what this study could or could not support vis-à-vis a true experiment.

The above items do not necessarily need to be presented in the given order.

I encourage you to work in groups of two or three (the individuals can be in either one of the AP Statistics classes). I encourage you to discuss different design ideas in your group. When writing the report, I expect you to split up the work. One way to collaborate on a report is to use something like Google Docs and create a document that is shared and editable among your group members.

Deliverable: a typed report. The experimental design diagrams should also be created using the computer. If you want to do something different than a report, I'm open to it – just talk to me first.

Due date: Friday, October 28th (feel free to hand it in before then if you finish it early). You can submit a hard copy or a soft copy (please use the G drive instead of email as we are given a small amount of email storage space). Counts as a 50 point assessment grade, so I will be evaluating the quality and correctness of your work. Do a good job – hand in something that you're proud and sure of. And remember to relish the learning opportunity that this is!