

1920S MA482

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Criteria for Successfully Completing the Capstone Project

The Capstone Project is the backbone of the course, and it provides an opportunity to see the entire research pipeline.

General Instructions:

The majority of major decisions regarding the project will be discussed in class as a group. However, the components of the project will be completed individually or in small groups throughout the term. While the details of the project will depend on the topic chosen by the class/instructor during the term, the project will entail the following components:

- [Topic Selection](#) / [Background Research](#)
- Study Design
- Data Collection
- Statistical Analysis
- Report Generation
- Visual Presentation

Every student is expected to participate in all aspects of the project. However, the level of participation for an individual may vary throughout the project. Individuals or small groups will be tasked with managing various aspects of the project. Often, individuals will be given specific assignments in order to advance the project throughout the term.

During the course of your analysis, you may use any resource available to you - including the internet, texts, notes, etc. If any resource has a substantial impact on the project, it should be appropriately cited. You need not cite course notes; this is understood to be common knowledge. However, if you choose to employ a strategy you discover in a textbook, it should be cited. The class in its entirety will be responsible for the content of the final product. Be sure to see the [Course Syllabus](#) for a description of the expectations while working in a group.

There will be two final products - a short written report detailing the project and a presentation (either poster or PowerPoint). The final report should be written at the level described in the [Criteria for Successfully Completing the Case Study](#). The criteria for the visual presentation are discussed below. However, the criteria for successfully completing the project at the individual level are simple:

- Actively participate in all aspects of the project.
- Provide a "good-faith" effort on any individual tasks assigned during the project.

Caveat: this is real research. We may not have a successful project. If we choose a project involving human subject research, it is possible we do not receive IRB approval in the time required to complete the project. We will need to be flexible and adapt as we proceed through the process. The instructor is ultimately in charge of the direction of the project and will have the final authority in all decisions related to the project.

Criteria:

The criteria stated below ensure that the final product is of an acceptable caliber. This will not determine whether the project is successfully completed, but it provides a benchmark for you to aim at when constructing the visual presentation.

Overall Criteria:

The submission should be well formatted, which includes the following:

- Your poster/slides should be organized into at least 3 logical sections: Introduction, Methods, Results.
- Your poster/slides should be readable from a distance of 3 feet when displayed on a 36-by-48 inch screen.
- R code / Minitab output should be excluded.

The second criteria above is basically to ensure that you do not use too small of font; a visual presentation is different than a report. The presentation will **not** have every detail available for the reader; it is meant to be a talking point. R code is not considered readable by a general audience; therefore, it is not appropriate to include it in poster.

In addition to formatting, the submission should be presentation-ready, which includes being well written. To this end, the report should only require minor editing before it would be suitable for presentation, which includes the following:

- The poster should not have any typographical errors.
- Professional language used throughout.

Introduction Criteria:

The Introduction should briefly, yet clearly, state the question of interest as well as summarize the results of the study. Specifically, the introduction should satisfy the following:

- Summarize the rationale for the original study.
- State the primary question that is to be addressed in the study.

Methods Criteria:

The Methods section is the "technical" portion of the report. In this section, you should detail the study design and analyses conducted and any summaries constructed. You are striving to give enough detail that a trained researcher could replicate your results; this is not the same as printing R code. The following criteria should be adhered to:

- The Methods section includes a description of the study design.
- The Methods section includes an accurate description of the model/analysis constructed.
- The Methods employed are appropriate for the study.

If you are very clear, this can be done without actually stating the model explicitly. However, you *may* include the model along with the description for clarity. Be aware, the model alone is **not** sufficient, and if it is included, it should be formatted using an equation editor (or LaTeX). In addition to the description of the model, you should also include a statement regarding the assumptions. A word of advice: providing conflicting analyses is confusing. Pick a course of action, and be able to justify your methodology. The key is explaining why you chose to do what you did.

Results Criteria:

This component should not be technical. That is, it should be readable by anyone who has graduated from Rose-Hulman. Therefore, our goal is to write up the results of the questions asked in the Introduction in context, avoiding jargon.

- The Results section should **avoid** jargon such as "we rejected the null hypothesis." Every conclusion should be stated in context.
- At least 1 graphic summarizing the data should be included (see criteria for graphics below). The graphic should address a question of interest.
- Any included graphic should be referenced (discussed in context). This discussion often coincides with the discussion of a p-value or confidence interval.
- Address the questions of interest, citing any p-values or confidence intervals relevant to each question.
- Any differences between your analysis and that of the original article should be explained.
- Any limitations regarding the study or analysis should be noted.

A difficult part of a presentation is balancing the "white space" and the amount of text. When constructing a poster, I lean toward having a lot of white space; so, instead of a wall of text, I use a lot of graphics to tell the story. Graphics are much more inviting. When constructing a presentation, I prefer the "assertion-evidence" presentation style favored in Biology; this makes use of a conversational tone within the presentation instead of several bullet points.

Criteria for Graphics / Tables:

Graphics help to tell the story presented by the data. Many researchers often "skim" posters from a distance by looking at the graphics and maybe reading the abstract. If they like what they see, they engage further. Therefore, our graphics need to be of sufficient quality to tell the story of our analysis. Only graphics relevant to the question of interest should be included in the text. The same is true of tables.

- All Figures/Tables should be numbered.
- All Figures/Tables should be appropriately labeled (axis and legends) and captioned (description of graphic).
- Captions are placed just above (or below) the accompanying Figure/Table.

The above specifications ensure the graphic can stand alone. If all you were provided was the graphic (without the accompanying text in the Results section), you should be able to understand the graphic. The implications are discussed in the results section, but the graphic itself should be self-contained. Additional requirements for graphics and tabular summaries:

- Refrain from using too many significant digits on the axis markings.
- Axis labels should include units, where applicable.
- Fractional values should be presented with a leading zero (e.g., 0.3432 and never .3432).
- Output directly from a computer package should be reformatted to be clear without knowledge of the program itself.

Criteria for Presentation:

Perhaps the most daunting part of a presentation is the actual presentation. My rule of thumb with a poster is to lean toward telling a clear story, even if that means cutting out some material. Since presentations are given in a discussion-centric atmosphere, people are free to ask questions. So, the goal is to present enough detail that people can ask good questions (don't leave out the critical stuff), but you do not need to provide every detail. During the presentation, you should be prepared to:

- Provide an overview of the project and the results; basically, walk through the visual aid.
- Address questions accurately regarding the design and analysis of the study.

Note that a presentation may not be required depending on the course schedule. The instructor will make clear if a presentation is required.

Example:

Below are two annotated poster presentations given in the past. Note that these are individual projects instead of class projects, but they give an idea of good poster presentations. The first would be considered a successful completion (meeting all specifications); the second would **not** be considered a successful completion. Both are annotated to demonstrate how they meet (or fail to meet) the above specified criteria.

- [Example of Successful Capstone Project](#)
- [Example of Unsuccessful Capstone Project](#)

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