MATH 271 Applied Statistics with R (Face-to-face) (Spring 2023)

Assignment: A multi-student 5- to 10-paragraph report (analysis) of a data set. Students must identify a publicly available data set and a simple statistical hypothesis that they would like to test using the data. The report required the following:

- a data set table on a public webpage (research)
- a short narrative about the source of the data and what's in it (descriptive writing)
- rendering of the data into usable shape (coding)
- a short methods narrative about the wrangling process (descriptive writing)
- an appropriate visualization of some aspect of the data (coding)
- a short narrative about the visualization (interpretive writing)
- Each "short narrative" should be about one or two paragraphs. As long as needed, but not longer.

Methodology: Two readers from the department read seven papers (*n* = 7) using the Written Communication Rubric (WC) only. Scoring follows.

Spring 2023	WC Line of Reasoning (Critical Thinking)	WC Organization & Structure	WC Content	WC Language/ Prose/Syntax
Paper 1				
Reader 1	2	3	2	3
Reader 2	2	3	3	3
	2.00	3.00	2.50	3.00
Paper 2				
Reader 1	1	1	1	1
Reader 2	1	1	1	1
	1.00	1.00	1.00	1.00
Paper 3				
Reader 1	2	3	2	4
Reader 2	2	3	2	3
	2.00	3.00	2.00	3.50
Paper 4				
Reader 1	1	1	2	2
Reader 2	1	2	2	2
	1.00	1.50	2.00	2.00
Paper 5				
Reader 1	3	3	3	4
Reader 2	2	3	3	3
	2.50	3.00	3.00	3.50
Paper 6				
Reader 1	1	1	1	1
Reader 2	1	1	1	1
	1.00	1.00	1.00	1.00
Paper 7				
Reader 1	3	3	3	4
Reader 2	3	3	3	3
	3.00	3.00	3.00	3.50
AVERAGE *n* = 7	1.78 Reader 1: 1.85 Reader 2: 1.71	2.21 Reader 1: 2.14 Reader 2: 2.28	2.07 Reader 1: 2.00 Reader 2: 2.14	2.50 Reader 1: 2.71 Reader 2: 2.50

Inter-Rater	85%	85%	85%	62%

Comments by evaluators: Of the 7 submissions on this assignment, 3 had an average score between 1–2 across all 4 categories, 2 had an average score between 2-3, and 2 had an average score between 3–4. In all cases readers were in relatively close agreement with each other, with no paper's scores in any category varying by more than one point across the different readers.

Two of the reviewer's summary comments are provided below:

> Perhaps some way to stress the importance of the written portion of the assignment. It may be natural for the students to focus on the coding aspect in this course, but analyzing and presenting the output is critical. They may need to see a sample project, so they have an idea of what the written narratives should be like.
>
> I'll begin with the caveat that this was an emergency assessment due to the Writing Intensive math class not being available for analysis. For this assignment, it would be good to require students to write an abstract of their paper since this would allow them to focus on the topic and to consider the conclusions. It may be good to put the code in an appendix of some sort, and then the students can make reference to it.

The reviewers noted that the different submissions varied widely in the writing portion of the assignment. While submissions generally completed the programming portions of the assignment satisfactorily, compliance with the instructions to give written explanations of the code and output was often lacking or perfunctory. Only two of the seven submissions for this assignment were rated as competent or better across all written communication rubric items, but as mentioned previously, most of the students are still in relatively early stages of their programs and have not had extensive exposure to technical writing tasks yet.

The reviewers identify two important components that should be added to the course curriculum in future offerings to increase the focus on written communications: 1. Provide more examples of the type of narrative summaries that should be included in data reports. 2. Include assignments that focus entirely on the writing component, with the R programming components of the analysis already completed in the assignment template.

Response by Program (closing the loop): The instructor of the course agrees that both of these suggestions are important steps to take to increase the focus on written communication in this course. The suggestion to include writing assignments that do not also include programming tasks is particularly insightful, as this will increase the variety of assignment types in the class, which is always helpful for student engagement, as well as discourage the CS students from devoting all of their effort to coding tasks. The instructor also noted that an interesting complementary assignment type would be to have students read the statistical methods sections of real papers, and attempt to write the code that recreates the results of the paper from the written descriptions. Including a few examples with poorly written methods sections should serve to drive home the importance of clear writing.

The instructor intends to begin implementing these new assignment types in upcoming offerings of the course, and continue to look for additional ways to increase the focus on written communication in this course.