

Case 1: Effectiveness of Learning Formats

This study aims to compare the effectiveness of two distinct learning formats: in-person and online. A random sample of 42 students is drawn from a large class consisting of two groups based on their choice of learning format. Both groups undergo the same final exam after one semester. The scores are listed in Table 5.2. Evaluate whether the final exam scores differ significantly between students in the two learning formats and whether the effectiveness of the two learning formats is significantly different.

TABLE 5.2: Learning Format and Final Score Comparison ([download data](#)).

Format	Final Score	Format	Final Score
Online	70	In-Person	77.5
Online	74	In-Person	72
Online	68.5	In-Person	72.5
Online	69.5	In-Person	68.5
Online	74.5	In-Person	76
Online	68	In-Person	73.5
Online	72.5	In-Person	76.5
Online	69	In-Person	71
Online	73.5	In-Person	75
Online	71.5	In-Person	73
Online	71	In-Person	78
Online	72.5	In-Person	73.5
Online	68.5	In-Person	75.5
Online	71	In-Person	74.5
Online	70	In-Person	76.5
Online	73	In-Person	74
Online	71.5	In-Person	72
Online	70	In-Person	71.5
Online	69.5	In-Person	74.5
Online	68	In-Person	72.5
Online	70.5		
Online	69.5		

Initial Questions

1. What are the research objectives?
2. What are the statistical questions?
3. What is the response variable, and what is the data type of the response variable?
4. What are the explanatory variables of interest?
5. Are there covariates?
6. What is the population of interest?
7. What is the subject, and what is the number of distinct subjects?
8. Are there subject-level data?
9. Are response variables dependent (repeated measures / clustered subjects)?
10. Are the subjects selected randomly?
11. Are the subjects randomly assigned to different groups?

Initial Thoughts