

Quantitative Research Methods with Replication

Course Level	Graduate
Subject	Research Methods or Statistics
Duration	7 weeks (2 x 2 hours a week)

WEEK 1

Introduction to Quantitative Research Methods and Replication

Session 1 · What is Replication and Its Importance?

- 1 Lecture & Discussion
 - Define replication and discuss the replication crisis with real-world examples.
 - Emphasize the importance of replication for scientific integrity and credibility.

Session 2 · Exploring the replicatED Database

- 1 Database Navigation and Study Selection
 - Guide student groups in exploring the replicatED database, selecting one study for each method (ANOVA, regression, logistic regression, for example).
- 2 Group Brainstorm
 - Each group identifies a suitable replication study for each method and further specifies which table(s) they plan to replicate. It is important that students do not replicate the entire study unless they choose to.

WEEK 2

Argument, Hypotheses and Measurement

Session 1 · Developing Replication Proposals

Guide groups to draft short replication proposal for the three studies, including a summary of argument, hypotheses and measurement. Discuss the transparency of the original study and how to assess it.

Session 2 · Refining Replication Proposals

1

Proposal Workshop

- Provide detailed feedback on each proposal, focusing on clarity and feasibility.

2

Analysis Plan Development

- Guide groups to discuss the dataset and statistical methods for each study, focusing on how well the statistical results in the study answer the research question.

3

Assignment

- Groups submit finalized proposal for all three replication studies for assessment.

WEEK 3

Replication of ANOVA Study

Session 1 · ANOVA Tutorial

- 1 Teach the setup and interpretation of ANOVA

Session 2 · Replication of ANOVA

- 1 Groups prepare their data in a software (e.g., SPSS, R) and submit their data entry log.
- 2 Groups conduct ANOVA on their data, interpreting the results and discussing possible discrepancies with the original study.

WEEK 4

Replication of OLS Multivariate Regression Study

Session 1 · Multivariate Regression Tutorial

- 1 Explain how to set up and interpret linear regression models.
- 2 Explain how to check for the validity of the OLS assumptions through residual analysis.
- 3 Guide groups to develop preliminary descriptive statistics and visualizations for the variables in the model.

Session 2 · Replication of Multivariate Regression Study

- 1 Groups prepare their data in a software (e.g., SPSS, R) and submit their data entry log.
- 2 Group Practice
 - Groups run their replication of regression analysis and interpret findings in comparison to the original study.
- 3 Students conduct the residual diagnostics of the original findings.

WEEK 5

Robustness Practice for OLS Regression Analysis

Session 1 · Introduction to Robustness in Regression Analysis

- 1 Introduce robustness in the context of regression analysis. Explain why verifying results across different specifications and assumptions is essential for credible findings.
 - Discuss common robustness checks for OLS regression: alternative variable specifications, and differences in samples.
- 2 Conducting Robustness Checks of the Replication Study
 - Alternative Specifications: Run additional models with adjusted independent variables (e.g., transforming variables, using polynomial terms) to assess how findings may change.
 - Subset Analysis: Perform the OLS regression on subsets of the data (e.g., demographic segments) to determine if results are consistent across groups.
 - Robust Standard Errors: Apply robust standard errors to assess the stability of coefficient estimates if assumptions of homoscedasticity are not met.
- 3 Interpreting Robustness Findings
 - Each group summarizes how their robustness checks influenced the reliability of their findings and discusses any significant shifts or insights gained through this process.

WEEK 6

Replication of the Logistic Regression Study

Session 1 · Logistic Regression Tutorial

- 1 Teach steps to set up and interpret logistic regression, focusing on odds ratios and probabilities.

Session 2 · Replication of Logistic Regression

- 1 Group Practice: Logistic Regression Analysis
 - Groups conduct logistic regression on their data, comparing the replication with the original study.
- 2 Assignment
 - Groups submit their logistic regression analysis with interpretations and comparison to the original study's outcomes.

Session 1 · Reflection on Statistical Methods and Replication

1 Class Discussion: Statistical Method Comparison

- Facilitate a discussion on the unique challenges and insights for each statistical method used (ANOVA, simple regression, logistic regression) in the context of the replication assignments.
- Discuss applying replication methods and statistical analysis in future academic or professional settings.

Session 2 · Workshop on Final Replication Assignment

Objective: Assist students in finalizing their replication reports and presentations through structured feedback, guidance on key elements to include, and dedicated work time.

Workshop Introduction and Objectives – review the final assignment requirements, including the essential components:

- Background & Rationale: Brief overview of the original study's purpose and findings.
- Replication Methodology: Key elements of the replication design, including data collection and analysis processes.
- Results: Findings from ANOVA, OLS regression, and logistic regression, along with robustness checks.
- Comparison and Interpretation: Differences or similarities with the original study's results, plus discussion of implications.
- Reflection: Insights gained from the replication process, any challenges, and thoughts on research reproducibility.