Research Design

Master in Computational Social Science
Universidad Carlos III de Madrid

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Tuesday 15:00–18:00h
Room 0.A.01 (Puerta de Toledo)
September 13th - October 25th

1 Description

This course provides an introduction to research design in the social sciences. The goal is to equip students with the skills necessary to evaluate and develop strategies to answer empirical questions with data. We will not cover statistical techniques or advanced data analysis. Rather, our focus will be on the logic of empirical comparison, particularly applied to quantitative data.

2 Requirements

We meet once a week for a total of seven sessions. During the first six weeks, we will review the main topics in research design, including the basics of empirical evidence, the link between theory and empirics, or the logic of causal inference. Every session will include a lecture followed by practical exercises related to what was covered that day. Some of these exercises might require previous readings, which will be made available the previous week. The final session will consist of a workshop where students both present an ongoing project where they develop an strategy to answer empirically to a research question and comment on each other's projects. Attendance to all sessions is mandatory.

3 Materials

This course does not follow any textbook in particular. However, there are some books that were used to design the course and can be very useful to expand on what is covered in class:

- Nick Huntington-Klein, *The Effect: An Introduction to Research Design and Causality* (Chapman and Hall/CRC Publishing, 2021).
- Ethan Bueno de Mesquita & Anthony Fowler, *Thinking clearly with data: A guide to quantitative reasoning and analysis* (Princeton University Press, 2021).
- Scott Cunningham, *Causal Inference: The Mixtape* (Yale University Press, 2021).

- Paul M. Kellstedt & Guy D. Whitten, *The Fundamentals of Political Science Research* (Cambridge University Press, 2018).

Some of these books (Huntington-Klein's *The Effect* and Cunningham's *Mixtape*) are available online for free.[1] Besides, I will make available additional readings in *Aula Global*.

4 Assessment

Participation (10%)

Every student is expected to be an active participant in all sessions, asking questions and engaging in discussions, including during the lectures.

In-class exercises (30%)

In every session, during the second half, we will make practical exercises related to what was covered each day in class. These exercises can be made individually or in groups.

Workshop presentation (20%)

The last session will be a workshop where students present an ongoing project, corresponding to their final essay. This project should present a research question that can be answered empirically with quantitative data and a strategy to answer it. Rather than focusing on data analysis, the focus should be on the type of variation that will be exploited and how well it answers the question. A potential structure could be:

- Present a topic in general terms, why is it relevant?
- Specific research question
- Empirical strategy:
  - What type of variation is going to be exploited? Unit of analyses
  - Data: source, variables, measurement
  - Empirical comparisons

Student will also comment on each other's project, looking for limitations and possible ways forward. Evaluation will focus more on the presentation and the Q&A than on the content itself.

Final essay (40%)

The main assignment is a written essay developing the research design. This assignment can be thought of as a pre-analysis plan for some study, but there are other options (e.g. compare two different strategies for the same research question).

[1] https://theeffectbook.net/ and https://mixtape.scunning.com/.

5 Course outline

September 13th: Introduction to social research

- What is social *science*?
- Using empirical evidence to answer questions
- Importance of research design
- Types of research questions and types of empirical research

September 20th: Social mechanisms and causality

- What are we explaining? Building blocks: units, variables, processes
- Simplifying social complexity
- Different units of analysis and mechanisms
- How to approach this empirically? Key idea: variability

September 27th: Understanding empirical evidence

- What is *data*? Types of empirical evidence
- Unit of analysis and variability, different approaches
- Raw data and final data, aggregating and disaggregating, measurement problems

October 4th: Causal inference design

- The experimental ideal in the natural and social sciences
- How to get closer with observational data?
- Confounding, selection bias, collider bias, etc

October 11th: Assessing external and internal validity

- Bringing it all together
- Where does evidence come from? External validity
- Issues with unit of analysis? Ecological fallacy
- Unaccounted for processes? Diffusion, unit independence

October 18th: Introduction to causal inference methods

- Understanding the logic of methods to determine causality, without the use of statistics
- Controls, matching
- Exploiting exogeneity: difference-in-differences, regression discontuinity

October 25th: Presentations workshop

∗ **Final essay deadline: November 4th, 23.59h**