CSE 599K

Empirical Research Methods

Winter 2025

Qualitative Research Methods

Today

- Qualitative research

Qualitative Research

Recap: Qualitative vs. quantitative research

Qualitative research

- Data that isn't (easily) quantifiable
  - Concepts, ideas, perception, and feelings
- Deeper understanding of complex situations, systems, or data
- More subjective than quantitative research
- Often an inductive approach
  - Develop hypotheses (from the ground up)

Example Methods

- Focus groups and interviews
- Think-aloud studies
- Grounded-theory (coding)

Recap: Qualitative vs. quantitative research

Quantitative research

- Quantifiable data such as numbers and factors
- Focus on “hard” numbers: measure differences and relationships
- More objective than qualitative research
    - Definition of measures is still subjective
- Often a deductive approach
    - Test and confirm hypotheses

Example Methods

- Descriptive statistics: summarize data and trends
- Correlation analysis
- (Linear) models

Qualitative vs. quantitative research

Mixed-methods research

- More comprehensive insights into research questions.
- Mixes quantitative (***what***) and qualitative (***why***) methods.

- Qualitative methods to develop hypotheses
  -> Quantitative methods to test these.

- Quantitative research to quantify differences or relationships
  -> qualitative research to explain why these exist.

Qualitative research: why?

- When would you opt for a qualitative over a quantitative approach?
- When would you opt for a mixed-methods approach?
- What are examples for qualitative research in your area?

Qualitative research: why?

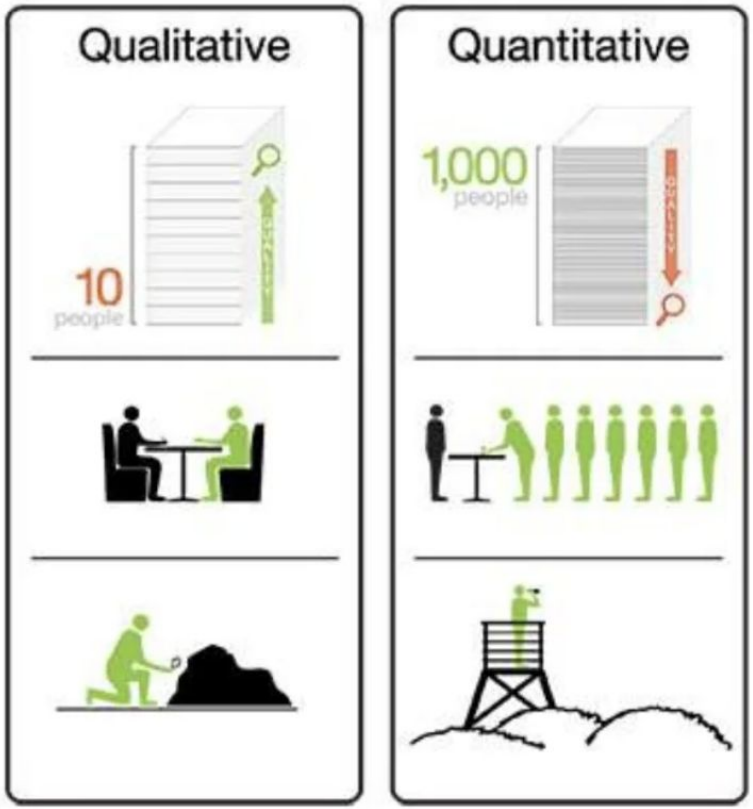
Quantifiable measures require simplification

- Construct validity requires narrow, clearly defined constructs.
- Sometimes we need to study broad or vaguely defined constructs.

Generalizability vs. particularity

- Generalizable findings identify causal processes that apply to most subjects. A focus on average effects.
- But what causal processes are unique to particular subjects?
  - Outliers and unique cases are really interesting
  - Exceptions to the rule are interesting

Qualitative research: why?



Qualitative research: pros and cons

Pros

- Research design can evolve as the study progresses
- Simultaneous data collection and theory development
  - Realize and seize opportunities to advance understanding
  - Get answers to questions that weren't even known at the beginning

Cons

- Subjective (perception, biases, prior knowledge)
- Requires expertise and domain knowledge
- Not easily replicable

Qualitative research: use cases

- **Exploration and summarization**
  - Inform design decisions (e.g., explore a design space)
  - Summarize qualitative data
- **Theory development and explanation**
  - Qualitative methods to develop hypotheses
    -> Quantitative methods to test these.
  - Quantitative methods to quantify differences or relationships
    -> qualitative methods to explain why these exist.

Qualitative research: common methods

- Observation (naturalistic setting)
- In-depth interview
- Focus group

Qualitative research: how to observe/interact?

- Overt observation
  - Reactive effects (e.g. Hawthorne effect)
  - Possible stigmatization (e.g., illegal or socially unacceptable behavior)
- Covert observation
  - Raises ethical questions
  - Hard to observe well without blowing your cover
- Overt participation
  - Ethnography
  - Fitting in (well enough) is a key challenge

Qualitative research: common methods

- Ethnography
  - Studying an entire group (common in anthropology)
  - Observe behavior of a group in the field (over a long period of time)
  - Description, analysis, interpretation
- Case study
  - Deep dive into one particular case (or a few cases)
  - Analysis of artifacts, documents, records (interviews, outcomes)
  - Description, themes, assertions/hypotheses
- Grounded theory
  - Open and flexible coding for sense making
  - Iterative analysis of (sampled) artifacts to reach saturation
  - Description, iterative analysis, theory

Qualitative research: sampling

- Convenience sampling
  - Pick a readily available sample.
- Purposive sampling
  - Hand-pick a sample based on understanding of the population.
- Stratified sampling
  - Divide into groups based on understanding of the population.
- Snowball sampling
  - Start with relevant subjects and sample based on their suggestions or relationships with other subjects.

Qualitative research: analysis and coding

- Prepare, prepare, prepare
- Pilot and refine the analysis
- Record the observations (written notes, video/audio)
- Produce a (structured) transcript
- Coding (assign labels to observations/patterns)
- Refinement/compression (refine codes into constructs)
- Content analysis (give meaning to the data)

Qualitative research: example scenarios

Example scenarios:

- Learnability and usability of a programming language
- Effectiveness of tool design choices
- Common sources of errors in programs

Think about:

- Method: observation, interview, focus group
- Sampling: convenience, purposive, stratified, snowball

Next week

- Experiment design and validity