Qualitative Data Analysis

Reading Reflection

Discuss in groups

- Before this week's readings/videos, what did you think it looked like when folks analyzed qualitative data?
  - Did you know there are multiple approaches for Qualitative Data Analysis (QDA)?
- How confident do you feel right now that you could do substantive qualitative analysis if you had a dataset of videos of observations of people programming?
- When you're presenting the outcomes of a qualitative analysis, how do you expect to provide evidence for your analysis?
  - Why should readers/listeners believe your analysis?
- Is QDA replicable?
- Is QDA useless if it is not replicable?
- Does the QDA strategy change the data collection strategy?

Why QA in this class?

- First…not going to be a comprehensive view!
  - Take a QA class!
- Pragmatic
  - What's gone wrong in final projects in prior iterations of class?
  - Temptation to come in with a need you want to find, then look for quotes that support it—rather than a more systematic analysis of what the data says
  - We'll try to go pretty in-depth on one approach
    - …while also giving you awareness that others exist, keywords to search if you need them later
  - Our goal is to land on something better than "I went to an SE internship, and I personally experienced need X" :)

Three Categories of User Study RQs

Need Finding Study

What are interesting **problems** to solve?

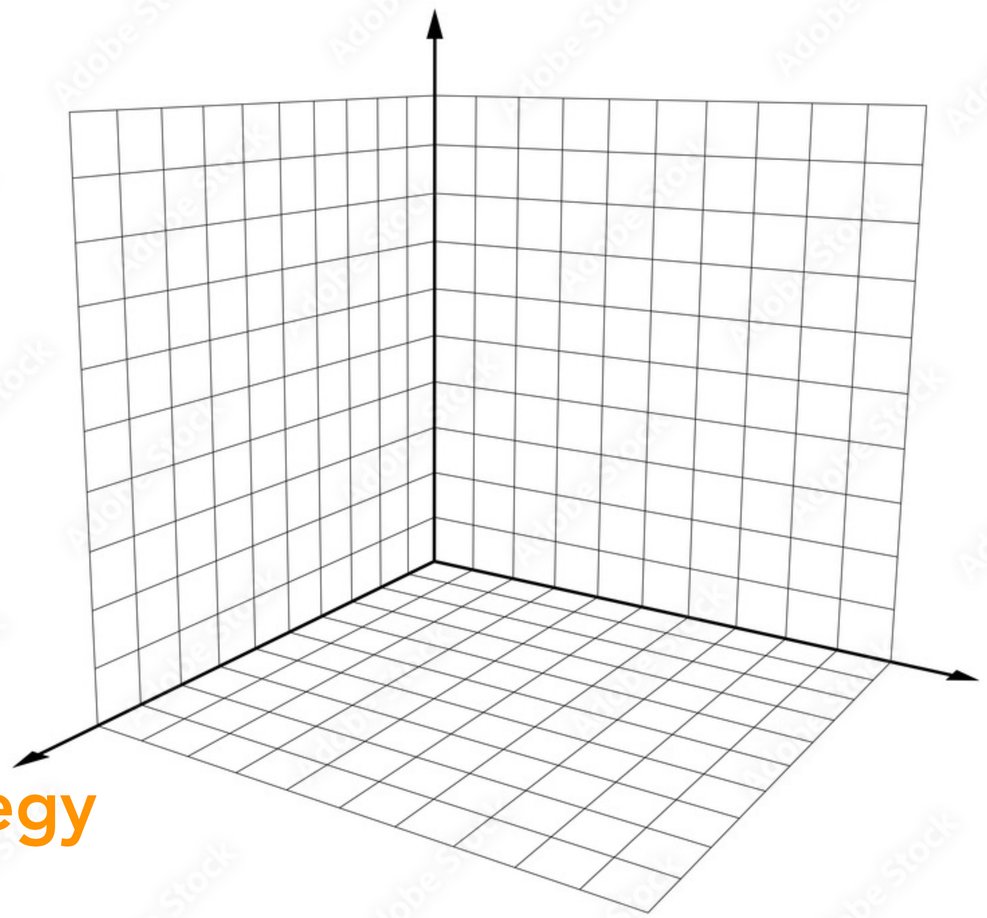
Formative Study

For a given **problem**, what are promising **solutions**?

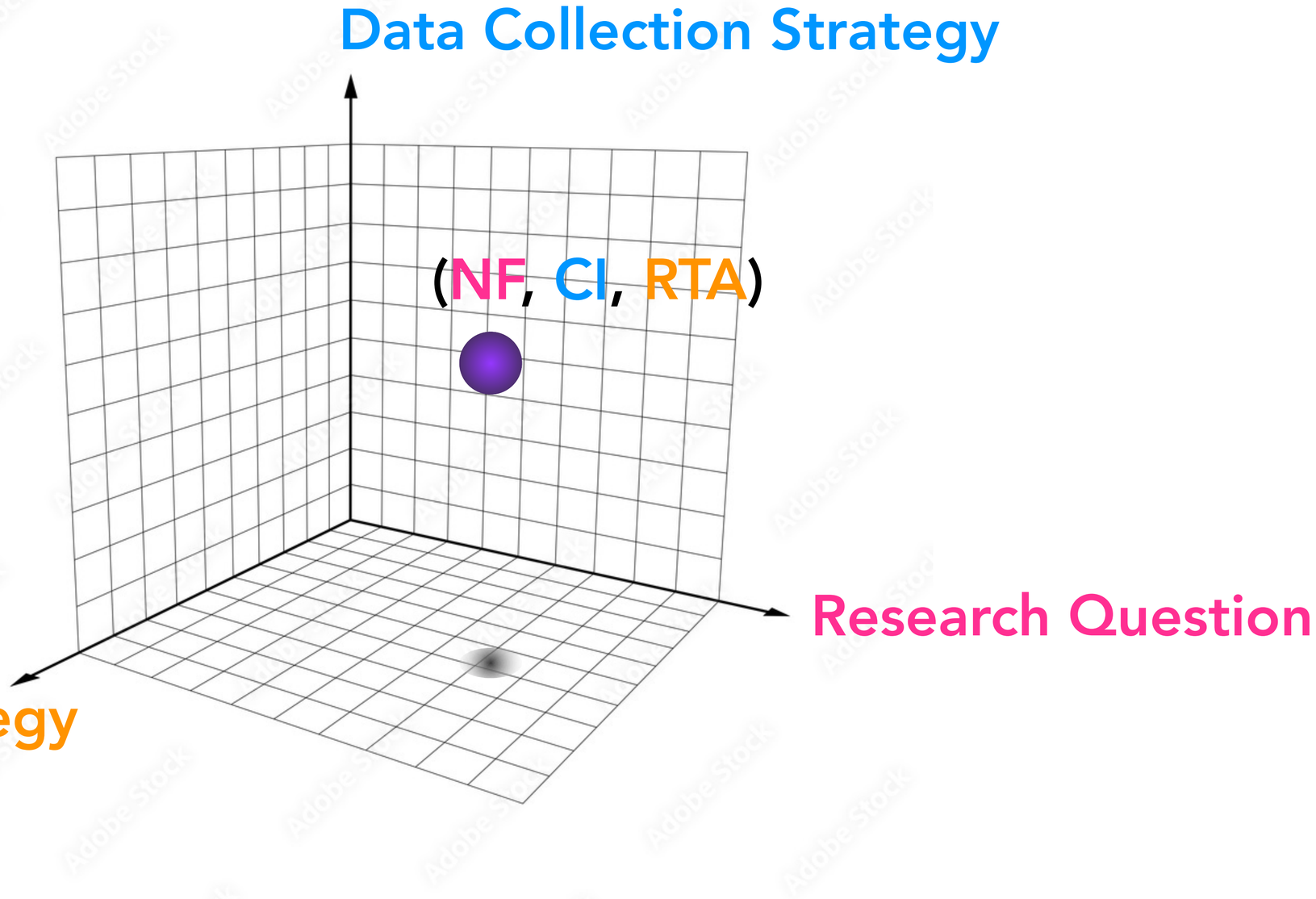
Evaluative Study

For a given **problem**, now that we've implemented a **solution**, did it work?

User Study Design Axes

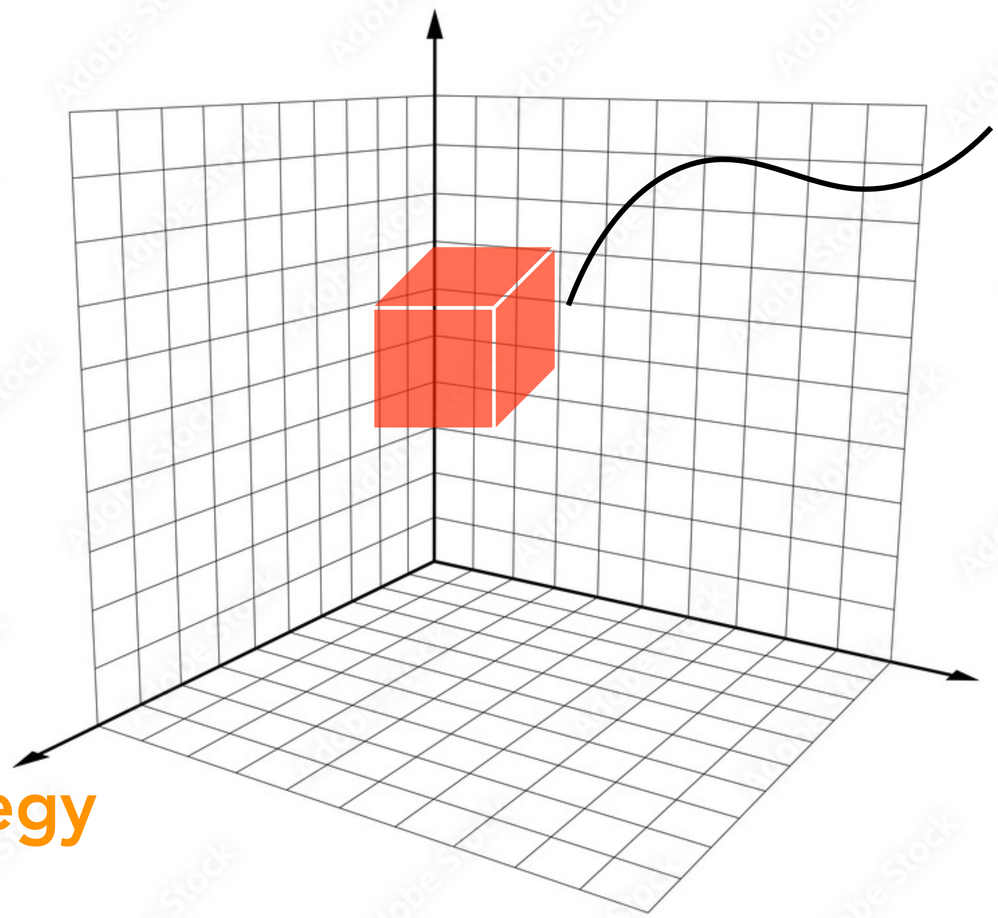


User Study Design Axes



User Study Design Axes

Data Collection Strategy



some spaces impossible bc of interactions between axes. E.g., if intend to use grounded theory to analyze, must change data collection strategy.

Research Question

Data Analysis Strategy

User Study Design Axes

Research Question

Need Finding Study

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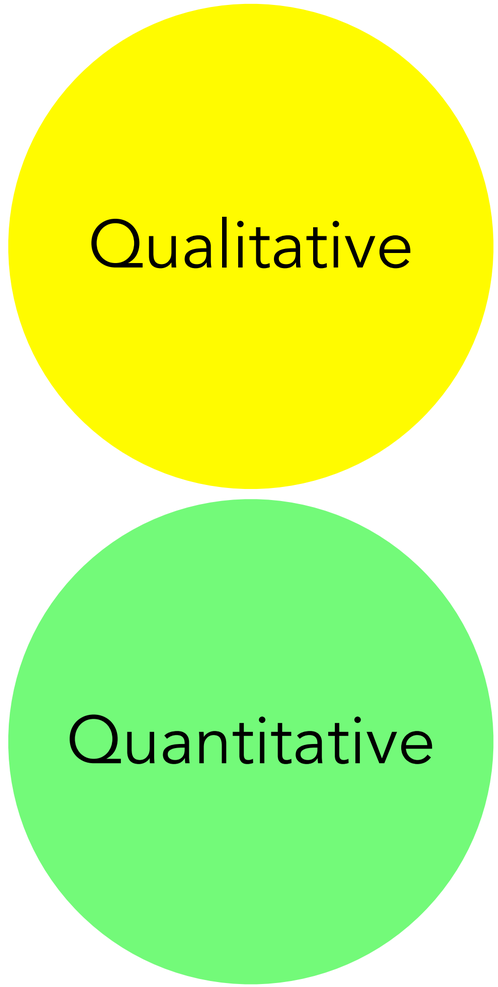
Data Collection Strategy

Method	Phases supported	Key benefits	Challenges and limitations
Interviews	Requirements, Creation	Gathers open-ended qualitative data from experts	Depends on skill of interviewer and selection of participants; results may not generalize
Surveys	Requirements, Creation	Assesses opinions among a broad audience; can generalize interview results	Output is subjective; may not reflect reality
Corpus studies	Requirements, Creation	Assesses incidence of problems or applicability of solutions in a large dataset	Depends on appropriate datasets and efficient methods of analysis
Natural programming	Requirements, Creation	Obtains insights from people without biasing them toward preferred solutions	Data may be biased toward participants' prior experiences
Rapid prototyping	Requirements, Creation	Facilitates efficient design space exploration	Lack of fidelity in prototypes may hide faults
Programming language theory	Requirements, Creation, Evaluation	Ensures sound designs	High cost; applying formal methods too early may limit ability to iterate, but applying too late can waste time on unsound approaches
Software engineering theory	Requirements, Creation, Evaluation	Improves practicality of designs	Unclear how to prioritize recommendations when they conflict
Qualitative user studies	Requirements, Creation, Evaluation	High-bandwidth method to obtain insight on user behavior when using systems	Results may not generalize; Results depend on skills of experimenter and participants
Case studies	Evaluation	Tests applicability of systems to real-world cases; allows in-depth explorations of real-world difficulties	Requires finding appropriate cases; generalizability may be limited
Expert evaluation	Evaluation	Benefit from experience acquired by experts	Biased by opinions of experts, which may not reflect real-world implications of the design
Performance evaluation	Evaluation	Reproducible way of assessing performance	Results depend heavily on selection of test suite
User experiments	Evaluation	Quantitative comparison of human performance across systems	Results may not generalize to non-trivial tasks, other kinds of participants, expert users, long-term use, or use on large systems
Formalism and proof	Requirements, Creation, Evaluation	Provides definitive evidence of safety	Results are limited to the specific theorems proven

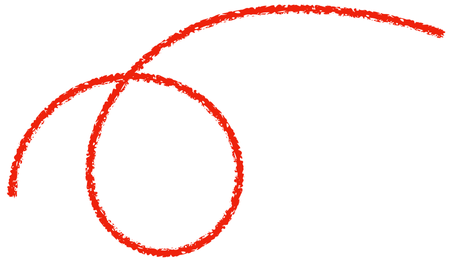
Data Analysis Strategy



Qualitative

Quantitative

This week



But why?

Activity: Take 2 minutes to design a controlled experiment for doing need finding.

Qualitative Data Analysis Approaches

- Qualitative content analysis
- Narrative analysis
- Discourse analysis
- Thematic analysis
- Grounded theory (GT)
- Interpretive phenomenological analysis (IPA)
- Framework analysis

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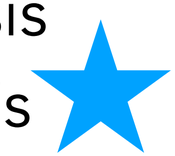

Today’s Q: What does the output of QDA look like?

Part 1 of HW

- Part 1 of this week's HW is designed to get at exactly this question of what does the output of QDA look like.
- I'm not asking you to do the whole thing in class today, but I strongly suggest that by the end of class you have picked…
  - The paper you'll read
  - The need on which you'll focus your reflection
- If you really, *really* want to read a different need finding paper, it's possible, but call me over to discuss and approve it first