Qualitative Methods

Research Method

17-939A
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4/5/2005

Qualitative Data

- Words & pictures (not numbers)
  - More information
  - More labor-intensive
- Complex behavior
  - Human
  - Complex technical systems

Qualitative Data Collection

- Observation
  - Think-aloud protocols
  - Continuous vs. sampled
  - Field notes, data forms
- Interviews
  - Structured, unstructured, & semistructured
  - Explain research
  - Field notes, interview guides
- Coding
  - Qualitative data -> quantitative values
  - Empirical analysis

What is the research strategy?

- Question: Generalization/Characterization
  - What qualitative methods can be used in software engineering research, and how can they be incorporated into empirical studies?
- Result: Technique
  - How to collect and analyze qualitative data
  - How to incorporate in empirical studies
- Validation: Example
Data Collection Considerations
- Influence of observer/interviewer
- Rater agreement
- Format of observations/interviews
- Information loss from coding

Qualitative Analysis: Theory Generation
- Constant comparison
  - Categorize
  - Look for trends
- Cross-case analysis
  - Multiple studies
  - Different perspectives
  - Data sources

Qualitative Analysis: Theory Confirmation
- Validity of methods
  - Representativeness
  - Researcher influence
- Validity of results
  - Triangulation
  - Anomalies
  - Negative case analysis
  - Replication
  - Member checking

Qualitative Experiments
- Same setup as empirical studies
  - Blocked subject-project study
  - Replicated project study
  - Multiproject variation
  - Single project study
- Use to enhance quantitative analysis
  - Explain quantitative results
  - Reveal new issues for quantitative study
Example: Code Inspection Study
D. Kelly & T. Shepard '02

- What is the research strategy?
  - Question: Evaluation/analysis of an instance
    - How do people react to structured software inspection techniques?
  - Result: Report
    - Interesting observations, rules of thumb
    (8 maxims of software inspection)
  - Validation: Experience
    - Qualitative data from empirical code-inspection study
- Qualitative data used to explain quantitative results

Example: Code Inspection Study
D. Kelly & T. Shepard '02

- Data collection method:
  - Semistructured interviews (written comments)
- Data analysis:
  - Triangulation
    - Sources
    - Studies
    - Technique order
- Experimental Design
  - Multiproject variation
    - 3 code inspection techniques
    - 1 class of grad students

Bibliography