Conducting Rigorous Research
in Engineering Education

The Community of Practice

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Fundamentals of Qualitative Research

Types of Educational Research

Quantitative ❌   Qualitative ❌

Types of Educational Research

Traditional

Single reality.

Relationships among *variables*.

Methods and variables defined in *advance.*

Researcher is *detached*.

Context-free generalizations.

Interpretivist

Multiple realities.

Description of *situation*.

Methods and themes *emerge* during study.

Researcher and participants are *partners*.

Context-bound descriptions.

From Douglas, Koro-Ljungberg & Borrego, presentation at Clemson University

Five qualitative research strategies

- Ethnography
- Phenomenology
- Grounded theory
- Case study
- Narrative

Ethnography

- Origins in anthropology
- Focus is description and interpretation of the *cultural behavior* of a group
- In-depth immersion in the culture
- Researcher is participant-observer

Phenomenology

- Focus is description of the *essence* of (one, invariant) *phenomenon*.

- Participants are people who have experienced the phenomenon.

- Interviews center on experience of the phenomenon.

- Note: Phenomeno*graphy* looks at variation in the experience of a phenomenon.

Grounded theory

- Primarily a data analysis technique
- Data collection and analysis simultaneous
- Data collection continues until "saturation"

Case study

- Is bounded by time, space, or participants.
- Three types:
  - Intrinsic – interesting in itself
  - Instrumental – says something about a general phenomenon
    - Representative or in contrast to
  - Collective
    - Several cases say something about a phenomenon
- Flexibility of methods

Narrative

- Focus on one individual
- May be biographical or psychological
- Collect the "stories" of an individual
- Link together in a framework
- Add meaning to the stories

Design of a qualitative study

- Naturalistic setting
  - Don't rely on interventions
- Purpose is understanding - not prediction
- Researcher involvement
- Holistic perspective (context-bound)
- Depth more important than breadth
- Inductive approach (exploration not confirmation)
- Emergent design – findings suggest directions

Data collection methods

- Interviews

- Observation

- Document analysis

Interviews

- Types
  - Structured
    - Questions defined in advance
    - Responses meant to be short, fit into specific categories
  - Semi-structured
    - Predetermined, open-ended questions
    - Room to explore
  - Unstructured
    - A few "grand tour" questions, general areas to be explore but not specific questions
    - Interview proceeds according to participant responses

Types of interview questions

- Grand tour:
  - Tell me about your experience with conducting qualitative research studies.
- Focusing:
  - What strategies do you use to decide on the research methods you will use?
- Question with probes:
  - How do you start your literature reviews? Do you use databases? Google scholar? With assistance from a research librarian?

Things to consider

- Who will be interviewed? How many people?
  - Includes sampling plan
    - PURPOSEFUL (not random)
- Characteristics of the interview
  - How long? How many times will each person be interviewed? Where will interviews take place?
- How will the interview be organized

A good *interview*

- Responses are spontaneous, rich
- Interview tells a self-contained "story"
- Interviewer clarifies, checks interpretation
- Interviewer comments shorter than the interviewees

A good interview*er* is:

- Knowledgeable, clear
- Gentle, nonjudgmental, sensitive, open
- Interpretive, "critical"
- Structuring, steering, remembering

Observation

- Participant observation
    - Observer is part of the group
- Reactive observation
    - Controlled setting
    - Participants aware of observation
- Unobtrusive observation
    - Participants unaware of observation

Observation

- ## Structured
  - Categories of what will be observed determined ahead of time
  - Protocol focuses on whether or not these things happened

- ## Unstructured
  - "Everything" that happens is recorded
  - Make meaning of what occurred afterward

Dimensions of observation - continuum

- Role of observer: full participant to spectator

- Perspective: insider to outsider

- Who conducts the inquiry: professional to people in the setting being studied

- Disclosure of observer's role: Full to none

- Duration: short/single to multiple/long

- Focus: single element to holistic

Documents - approaches

- Who wrote them?

- Who reads them?

- What is recorded? What is omitted?

- What does the written seem to assume about the readers?

Type of records

- Records and archives
- Printed media
- Diaries, letters, autobiographies

Judging quality of qualitative studies

- Evidence of proper use of method
- Ethical considerations

Evidence of proper use of method (2)

- Triangulation
- Divergent cases
- Research bias is described
- Member checks
- Prolonged engagement
- Audit trail (code book, etc)
- Peer debriefing
- Thick description
- Collaboration with participants

Ethics

- Informed consent
- Confidentiality
- Avoiding harmful consequences
- Genuine reasons for conducting research
- Honesty
- Reciprocity
  - Report back findings to participants

Analyzing data

- Analysis is recursive, not linear
- Begins *during* data collection
    - Reflective notes, interim analysis
- Review data and decide which will be most important
- Sort data into categories
    - Develop a codebook – defines boundaries of that category
- Managing the data – qualitative software
- Displaying the data for analysis and review
- Review within and across categories
- Synthesize data

Writing up the research

- May be written in the first person
- Traditional sections (intro, lit search, methods, results, discussion) may not be present or may be in a different order
- Provide information about the context of the study
- Articulate reason for purposeful sampling
- Include more description about analysis
- Presents quotes, examples, displays – may make write-up longer than traditional reports.

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- Workshop materials are posted on
  - CLEERhub.org