Qualitative research

Kari Smolander
Definition of qualitative research
”Paradigms” of qualitative research
Different qualitative methods
• Grounded Theory
• GT example
• Ethnography
• Action research
• Case study
What is qualitative research

Qualitative approaches are used
• To get an in-depth understanding of human behaviour and the reasons that govern such behaviour
  - Especially social and cultural phenomena
• When Why and how are essential questions – in addition to what, where, when and how many/how often.

Qualitative is often contrasted with quantitative as the opposite
• Quantitative methods are used in natural sciences and also in social sciences (surveys, experiments, econometrics)

Qualitative research methods are designed to help researchers understand people and the social and cultural contexts within which they live
• Quantification often loses these contexts
Alternative definition of qualitative research

Denzin & Lincoln, 2011

• Qualitative research is a situated activity that locates the observer in the world
• A set of interpretive, material practices that make the world visible
• These practices transform the world to series of representations, such as field notes, interviews, photographs, recordings, and memos
• An interpretive, naturalistic approach to the world
  - *Qualitative researchers study things in their natural settings*
    • Make sense or interpret phenomena in terms of the meanings people bring to them
"Paradigms" of qualitative research
(Orlikowski & Baroudi 1991)

Qualitative ≠ Interpretive
Researchers may have different kind of view on knowledge, i.e. epistemology
Orlikowski and Baroudi (1991) make a distinction between three different approaches in qualitative research
• Positivist
• Interpretive
• Critical
Positivist qualitative

• Reality is objectively given
  - Can be described by measurable properties that are independent of the observer.
• Theory testing and increasing the predictive understanding of phenomena
• Formal propositions
• Quantifiable measures of variables
• Hypothesis testing
• Drawing of inferences about a phenomenon from the sample to a stated population.

• Very near to quantitative research

• Generalization problem of case studies with a small sample
  - Hypothesis testing does not prove anything (problem of induction)
  - Not possible to generalize from the sample to the population.
Interpretive qualitative

• Access to reality is only through social constructions such as language, consciousness and shared meanings
• The philosophical base in hermeneutics (text interpretation) and phenomenology (structures of experience and consciousness)
• Attempt to understand phenomena through the meanings that people assign to them
• Walsham (1993), interpretive methods in information systems produce
  - Understanding of the context of the information system
  - Understanding of the process how IS influences and is influenced by the context
• No predefined dependent and independent variables as in quantitative
  - Focuses on the full complexity of human sense making as the situation emerges (Kaplan and Maxwell, 1994)
Critical qualitative

• Critical researchers assume that social reality is
  - historically constituted
  - produced and reproduced by people.

• The ability of people to change their social and economic circumstances is constrained by various forms of social, cultural and political domination.

• The main task of critical research is social critique
  - Revealing the restrictive and alienating conditions of the status quo

• Focuses on the oppositions, conflicts and contradictions in contemporary society

• Seeks emancipation, i.e. elimination of the causes of alienation and domination

• Examples of related philosophers
  - Habermas, Adorno, Marcuse, Lucács, etc.
Qualitative data

For example

• Field notes
• Interviews
• Conversations
• Photographs and videos
• Documents and texts
• Direct observations
• Memos

Any observations of the world that can be stored and analyzed
Qualitative methods

Myers (1997) lists the following qualitative methods that are essential in information systems field (and also in software engineering)

- Action research
- Case study research
- Ethnography
- Grounded theory

In addition, there is a multitude of other qualitative methods, for example

- Participant observation (related to ethnography)
- Focus groups
- Discourse analysis
- Historical analysis
- Content analysis
- Storytelling and narratology
Grounded Theory

Developed by sociologists Anselm Strauss and Barney Glaser in 1960s
• Later two different paths: glaserian and straussian GT
Development of a theory that is grounded in data systematically gathered and analyzed
An inductive, theory discovery methodology grounded in empirical observations
• Inductive = theory is created from observations
A continuous interplay between data collection and analysis
• Data collection and analysis are not separate
• Data can be anything that is collected for the purpose
No a priori hypotheses, no review of existing research before analysis
• A priori = from the earlier – justification independent from observation
• A posteriori = from the later – justification dependent from observation
Grounded theory concepts

Theoretical sampling

- Different from the probabilistic sampling that aims at a representative capture of all possible variations
- Theoretical sampling aims to facilitate the development of the analytic frame and concepts, i.e. the theory
- Data is captured for the purpose of the theory, not for representativeness

Theoretical sensitivity

- Ability to see what is essential in the data
- Creativity and professional experience is often needed

Constant comparison

- All pieces of data is compared to other pieces: what is going on here - what is similar and what is different between the pieces?
Grounded theory concepts (2)

Codes, concepts and categories
- Data is coded: each meaningful piece of data is given a label
- The label/code is a theoretical generalization of individual piece of data
  - Data is conceptualized

Memoing
- The process of creating the theory must be traceable
- All new inventions and decision of theories must be recorded
- These are called memos – free form descriptions of items in theoretical development

Core category
- At later phases of analysis the core category is selected
- The resulting theory explains the core category
- All other categories are related to the core category

Theoretical saturation
- The data collection can end when no new essential observations emerge any more
- Same observations occur again and again
- The theory seems to be fully developed
Phases of a GT analysis

Strauss & Corbin (1991)

• Open Coding - "The process of breaking down, examining, comparing, conceptualizing, and categorizing data" (p. 61).

• Axial Coding - "A set of procedures whereby data are put back together in new ways after open coding, by making connections between categories. This is done by utilizing a coding paradigm involving conditions, context, action/interactional strategies and consequences" (p. 96).

• Selective Coding - "The process of selecting the core category, systematically relating it to other categories, validating those relationships, and filling in categories that need further refinement and development" (p. 116).
“Open coding”: the conceptualization and categorization of the data
During open coding data must be merged into new concepts, and eventually renamed and modified
• A very tedious process with lots of codes

The researcher goes back and forth while comparing data, constantly modifying, and sharpening the growing theory

... Q: Do you mean that you can describe [architecture] better with PowerPoint?
A: You can do it much better with it. You can draw empty boxes with Rational Rose, but it isn't as visual.

Q: Is it a problem of looking good?
A: When you are presenting it to salesmen and customers, yes it is.

Q: Is it important that you show pretty pictures to customers?
A: Yes. Especially when you can tell with that picture what you have been thinking. In addition, many times when we are making requirements documents, the customer wants architecture documentation as a PowerPoint presentation. They present the architecture also to other possible suppliers and they do not want to redraw the pictures. It is little like giving a tool to the customer too.

...
Axial coding

Connections are made between the categories and the subcategories. What influences the phenomena that are being studied?
• conditions
• context
• action/interactional strategies
• consequences.

What conditions give rise to the category?
What context was it embedded in?
What strategies are people using to manage it?
What are the consequences of those strategies?
The researcher moves back and forth open and axial coding and possibly adds new data.
Use of figures, diagrams, tables etc.
Selective coding

Selective coding is the process of:

- selecting the core category;
- systematically relating it to other categories;
- validating those relationships;
- filling in categories that require further refinement and development.

Produces a coherent "story" or explanation of the phenomenon (the core category) = theory

Example (Kasurinen & al. 2010)

Table 5. Two stereotypical approaches for test case selection

<table>
<thead>
<tr>
<th>Category</th>
<th>Risk-based selection</th>
<th>Design-based selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test designers</td>
<td>Developers: programmers and testers</td>
<td>Managers: test and project managers</td>
</tr>
<tr>
<td>Development approach</td>
<td>Leans towards agile methods</td>
<td>Leans towards plan-driven methods</td>
</tr>
<tr>
<td>Testing resources</td>
<td>Limited</td>
<td>Sufficient</td>
</tr>
<tr>
<td>Explorative testing</td>
<td>Applied commonly</td>
<td>Applied rarely</td>
</tr>
<tr>
<td>Effect of policies in decisions on testing</td>
<td>Small; most decisions done in project level.</td>
<td>Large; most decisions are based on company policies or customer requirements.</td>
</tr>
<tr>
<td>Customer influence</td>
<td>In the testing process</td>
<td>In the design process</td>
</tr>
<tr>
<td>Limitations of the model</td>
<td>Test case coverage may become limited.</td>
<td>Test process may become laborious to manage</td>
</tr>
<tr>
<td>Design concept</td>
<td>“What should be tested to ensure smallest losses if the product is faulty?”</td>
<td>“What should be tested to ensure that the product does what it is intended to do?”</td>
</tr>
</tbody>
</table>
Glaserian vs. Straussian GT

Glaser and Strauss took different ways in 1980s

Glaser emphasizes more emergence

- The theory emerges from the data without a strict analysis process
- The researcher must tolerate confusion and be open to emerging evidence

Strauss (and Corbin) created a detailed analysis process for GT

- A structured approach for theory creation

Difference in naming

- Strauss & Corbin: Open – Axial – Selective coding
- Glaser: Open – Selective – Theoretical coding
Example of GT: Meaning of architecture in practice

Modern systems are based on complex software architectures

Many definitions and conceptions about software architecture

• E.g. SEI web pages: 11 textbook definitions, 18 definitions from articles, 78 “visitor definitions”
• Most of these definitions and conceptions have a very technical orientation

However, there is a need to communicate architecture widely across organizations

• Software engineers, architects, data administration departments, customers, interfacing suppliers, hardware vendors, salespersons, general management, ...
Research method and data collection

Observations in three software organizations
• How is architecture used and communicated in practice by those who participate in its creation and use?

No known theory available that could explain the whole picture → exploratory, qualitative, and theory-forming strategy needed
• Grounded theory selected as the research method
  - Qualitative content analysis
  - Construction of a theory grounded in the data

Data collection: 19 interviews + full transcripts
Group meetings with architects from the three organizations
Also written material received for the analysis
• Process descriptions, sample architecture descriptions
## Target organizations

<table>
<thead>
<tr>
<th>Company</th>
<th>Business</th>
<th>Employees</th>
<th>Interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecom service developer</td>
<td>Development of software-based telecom services and platforms for in-house customer</td>
<td>200</td>
<td>2 architects, 2 designers, 3 managers</td>
</tr>
<tr>
<td>Handheld software producer</td>
<td>Software and software tool development for mobile terminals and hand-held devices</td>
<td>200</td>
<td>1 architect, 1 designer, 4 managers</td>
</tr>
<tr>
<td>IT solution provider</td>
<td>Development of tailored information systems for projects dictated by customers.</td>
<td>400 in a division, 600 in the other</td>
<td>3 architects, 1 designer, 2 managers</td>
</tr>
</tbody>
</table>
Analysis

“Open coding”: the conceptualization and categorization of the data
• Seed categories of stakeholders, problems, and rationales for architecture description
• Many other categories emerged, at the end 179 different categories
• Atlas.ti used in the coding process

... Q: Do you mean that you can describe [architecture] better with PowerPoint?
A: You can do it much better with it. You can draw empty boxes with Rational Rose, but it isn't as visual.

Q: Is it a problem of looking good?
A: When you are presenting it to salesmen and customers, yes it is.

Q: Is it important that you show pretty pictures to customers?
A: Yes. Especially when you can tell with that picture what you have been thinking. In addition, many times when we are making requirements documents, the customer wants architecture documentation as a PowerPoint presentation. They present the architecture also to other possible suppliers and they do not want to redraw the pictures. It is little like giving a tool to the customer too.

Problem: tool constraints
Problem: visual appearance
Stakeholder: customer management & marketing
Stakeholder: customer
Problem: communicating meanings
Rationale: communicating
Stakeholder: customer
Stakeholder: other suppliers
“Axial coding”: resolving the relationships between the categories
• For example: what rationales different stakeholders emphasize and what problems then emerge
• Elaboration of properties related to categories

“Selective coding”: description of the core category and its relationships
• “The meaning of architecture in practice”
• Four metaphors of architecture were extracted
Properties of architecture design and description activities

The following properties/categories directly described the metaphors:

- Time orientation
- Formality of descriptions
- Detail level
- Typical activity
- Objective

Other properties characterizing the circumstances under which the metaphors are emphasized:

- Customer orientation
- Business orientation
- Diversity of stakeholders
Meanings of architecture in practice

Varying meanings between organizations and stakeholders

• Each group satisfies its informational requirements with architecture

Meaning of architecture in practice: architecture can be “deconstructed” to four metaphors:

• Architecture as **blueprint**: architecture is the structure of the system to be implemented.

• Architecture as **decision**: architecture is the decision and basis for decisions about the system to be implemented.

• Architecture as **language**: architecture is the language for achieving a common conception about the system.

• Architecture as **literature**: architecture resides at the documentation and frames of reference for readers.
Example description: Architecture as blueprint

Architecture description is the high-level implementation of the system: guides the detailed implementation work

Architecture can be seen from the working implementation

Properties:
- Time orientation: future
- Formality: high
- Detail level: high
- Typical activity: implementing
- Objective: artefact building

Emphasized by designers and typically co-occurs with low customer and business orientation and low diversity of stakeholders
Ethnography

Origin in social and cultural anthropology
The process of recording and describing a culture of a specific people and their traits, patterns, and principles of coherent integration. Ethnography is produced on the basis of firsthand field observation of the people who are being studied.

• An ethnographer is required to spend a significant amount of time in the field

Ethnographers immerse themselves in the lives of the people they study
• Seek to place the phenomena studied in their social and cultural context.

Used also in organizational studies and studies of technology management

An ethnography may also include collaboration between people in various fields, e.g. ethnographers, designers, IT professionals, engineers etc.
Ethnography (2)

Characteristics of ethnographic research:
1. Takes place "in the field"
2. Observation is primary data collection technique
3. Interviews are used to clarify observations
4. Attention is paid to context and artifacts
5. Field notes coded and analyzed for themes and variables

Coding may use similar tools as Grounded Theory

The data should be as rich as possible

• Texts, interviews, field notes, videos, big data, public material, interviews, ...
Field research spectrum

Involvement

Complete Participant

Participant-as-observer

Observer-as-participant

Complete observer

Detachment
Other important qualitative methods

These will be presented in other lectures
• Action research
• Case study

Short description follows
Action research

Kurt Lewin (1946)
• Social research that combined generation of theory with changing the social system through the researcher acting on or in the social system.
• The act itself is presented as the means of both changing the system and generating critical knowledge about it.

Rapoport (1970):
• “Action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework.”

Action research can be viewed as a cyclical process with five phases: diagnosing, action planning, action taking, evaluating, and specifying learning.
Case study

A commonly used strategy in many fields:

- Psychology, sociology, political science, business, management, etc.

Yin (2003)

- "An empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident"

Terminology is very vague

- Toy problems in laboratory as "case studies"
- Full-scale investigation of complex organizational problem in real-life contexts as case study

Is case study a research method?

- Many claim it is
- There are many ways of doing case studies
- A case study can be made with Grounded Theory or ethnography
Thank you!

Questions? Comments?