INF 5500

Research Methods III:

Qualitative studies, Case studies

Magne Jørgensen
magnej@simula.no

Introduction

Learning goals of this lecture:

- Understand the principles of qualitative research.

- Better ability to evaluate the validity of results from qualitative studies.

Recommended reading:

- Briony J Oates, Researching information systems and computing, SAGE Publications.

- David Silverman, Interpreting Qualitative Data, SAGE Publications

- Cynthia K Russell and David M Gregory, Evaluation of qualitative research studies, *Evid. Based Nurs. 2003;6;36-40*

Quantitative vs qualitative research

- Possible differences:
  - Statistical analysis vs interviews and text analyses?
  - Experiments vs case studies?
  - Positivistic vs interpretivistic?
  - "Natural science" vs "Social science"?

- The subject of study should decide the selection of research method, e.g.
  - a study of the connection between education and salary levels may be hard to carry out without measurements.
  - a study of how people perceive the power structure at universities may be hard to carry out without talking to people and analysing their answers and/or observing behavior.

- There are no good or bad research methods, only good and bad research and different degrees of fit between research method and research problem.

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Main types of qualitative research methods

- Observation
  - Example: Observation of people's behavior at meetings

- Analysing texts and documents
  - Example: Analysing project experience reports and minutes from status meetings

- Interviews
  - Example: Interviews with experienced managers about the reasons of estimation errors.

- Recording and transcribing
  - Example: Videorecording of team work. Categorizing the communication according to types of statements.

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Example: Observation of Effort Estimation in Teams

- **Research Problem**: What is the processes used when estimating effort in teams.

- **Setting**: Seven teams from the same company estimated the effort of the same software application in a close to 100% realistic setting.

- **Quantitative research methods applied**:
  - Video recording of the team discussions
  - Repeated observation of the teams' verbal and non-verbal communication
  - Transcription of the discussions (with information about non-verbal communication)
  - Coding of the discussion elements
  - Combining quantitative (the estimates) and qualitative information
  - Interviews with all the participants after the team estimation process was completed

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An example of a transcribed dialogue

Verbal communication	Description of actions
1. **DB:** The first thing we have to do at any rate is that we have to implement what it says here, then we'll see if it's right (). And of course that takes some time, so we have a one-off job here. We'll convert what we have from Oracle to an SQL server. I don't understand why they are going to do this, but it is (5 sec). The challenge here is that. It says at the back here, that they don't have, they don't have any Oracle installations themselves. So the question is whether we can assume that they have access to an existing Oracle installation so that we can get it over, access the database directly, or whether we have to get it on files and define the file format.	DB looks at the process float diagram in the requirement specification. PM is picking up a pen, looking in DB`s requirement specification. D looks in her requirement specification.
2. **D:** Of course, there's not supposed to be any online interface at all.	
3. **DB:** No, and then we have to	
4. **D:** Everything will just go on files.	
5. **PM:** I see it also quite clearly as the transfer of historic data. Then () Someone whether or not it is a part of this, I am not quite sure at the moment, which then extracts it from the Oracle, but of course the most important part of the job here is to get the data put into the database. So that you. The format is different, so you can't just plop it in.	PM looks in the requirement specification while talking.
6. **DB:** Yeah, yeah, because it says that they are different formats and that it is a one-off job. It's something you do just once. This is a bit difficult since I don't know how much data is supposed to be transferred. It doesn't say very much about it.	
7. **PM:** In my opinion, it needs to be interpreted based on that we have defined, or we are now defining the database we want. Then we will need some data, and we have to take that from the old one, which we will actually have to use as a starting point. What we want to include and assume will be available in one form or another in the old one.	All three team memebers look in the requirement specification.
8. **D and DB:** mm	
9. **DB:** As I interpret the text here, there is at least wholesale data that we are retrieving from there. () Getting a comma separated file is not a big job. If we, that is, if we assume they can retrieve it for us, and if not, we will need people who know both Oracle and Outsider. No, excuse me, SQL Server. () Because then you need to be able to export it from there, and it must be possible to make an import program in the other database.	DB looks in the requirement specification while talking. PM starts taking notes.

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Excerpt of the analysis of the transcribed analysis …

- What happens in this interplay between elaborations and clarifications is that assumptions drive the interaction forward and creates possibilities to pinpoint and narrow down the elaborations that takes place. This narrowing down is achieved through an articulation of the main challenges which close the elaboration and establishes a common ground of understanding, making it possible for the team to continue in their work. This is what happens with the project manager's utterance in line 5.

- The articulation also leads to another aspect of the estimation discussion, namely planning. Planning the development of the software system is what activates the future-oriented dimension in the estimation discussion, which is of vital importance for assigning a number of work hours needed for the development. Moreover, the articulation creates the connection between the two aspects, problem solving and planning, making switching between them possible.

<excerpt from a paper by Kristin Børte and Monika Nerland>

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The coding of the team discussion elements

Team 1	Team 2	Team 3	Team 4	Team 5	Team 6	Team 7
Process	Process	Process	Process	Process	Process	Process
Understand	Understand	Understand	Understand	EstimTot	Understand	Understand
Process	Process	EstimAna	EstimAna	Process	EstimProg	Process
Understand	EstimProg	Process	EstimDes	Understand	Understand	Understand
Process	Understand	EstimProg	EstimProg	EstimAna	EstimProg	EstimProg
Understand	EstimProg	Understand	EstimOther	Understand	Understand	Understand
EstimDes	Process	SearchPart	EstimTot	EstimDes	EstimProg	EstimProg
EstimProg	EstimProg	Understand		EstimProg	Understand	EstimTot
Understand	Understand	EstimProg		EstimOther	EstimProg	Process
EstimProg	EstimProg	Understand		EstimTot	Understand	EstimTot
Process	Understand	EstimProg		EstimOther	EstimProg	
Understand	EstimProg	Process		Understand	Understand	
EstimProg	Understand	EstimProg		EstimOther	EstimProg	
Understand	EstimProg	EstimOther		EstimTot	Understand	
EstimProg	Understand	EstimDes			EstimProg	
Process	Process	EstimAna			EstimTot	
EstimProg	EstimDesign	EstimOther				
EstimTot	Process	EstimTot				
	Understand					
	EstimProg					
	Understand					
	EstimProg					
	Understand					
	EstimProg					
	EstimOther					
	EstimTot					

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Examples of results

- There seems to be two types of estimation processes in use:
  - Sequence
  - Inside-out

- There was a surprising lack of reference to previous experience
  - Instead there was a sort of negotiation between beliefs.

- One of the team started with an "estimation anchor", which seems to have made their estimate less accurate than the other teams' estimates.

- One of the teams ended up agreeing on an effort estimate that all team members thought were too low.

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Case study: Selection of cases

- Some good strategies for selecting cases:
  - Random selection (to avoid systematic biases)
  - Stratified selection (to ensure representativeness)
  - Typical cases
  - Extreme or exceptional cases
  - Maximum variation cases
  - Maximum generalizability cases (if it's the case here, it will be the case in many other cases)
  - Falsifying/critical cases (if it's not the case here, the theory is strongly weakened)
  - Educational cases

- The typical strategies (which are not that good): Convenience cases and confirming cases

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Example: Case study

- Embedded knowledge and offshore software development, by Brian Nicholson and Sundeep Sahay.

- Longitudinal and interpretive case study methodology conducted during 1998–2000.

- "*An interpretive approach assumes that the knowledge of reality is gained only through social constructions such as the use of language, attitudes and shared meanings of actors, structure and form of documents, and the use of tools, technologies and other artefacts (Klein & Myers, 1999). Interpretive research does not predefine independent and dependent variables and determine causal relationships between them. Instead, the aim is to understand the complexity of human sense making processes, and the processes by which inter-subjectivity is obtained as the situation is constantly changing. An implication of this interpretive perspective in our research was that our aim was not to try to correlate the problems of knowledge with the success or failure of a global software development relationship. Instead, the aim was to provide insights into the processes contributing to the complexity of embedded knowledge in offshore software development settings, and the contextual conditions that contribute to this complexity*."

Example: Case study

- Motivation:
  - "While migratory knowledge resides in ''mobile packages'' such as books, formulas and machines, embedded knowledge tends to be non-migratory and ''resides primarily in specialised relationships among individuals and groups and in the particular norms, attitudes, information flows and ways of making decisions that shape their dealings with each other''. Thus, knowledge residing in organising principles, routines and standard operating procedures may be non-migratory due to embeddedness of knowledge in context."

- Research questions:
  - What is the nature of embedded knowledge in offshore development?
  - How do individuals, teams, and organisations manage this complex problem of embedded knowledge in offshore development?

Example: Case study

- Information sources: Semi-structured interviews, observations and document analysis.

- Research process: Evolutionary
  - Observe, develop concepts/theory, observe more, adjust concepts/theory, ….

- Example of result:
  - Demonstrations on how knowledge embedded in one culture may lead to communication problems. [and, after 2 years, to a shut down of the company's subsidiary in India.]
  - "*The case emphasizes that outsourcing is not merely about managing the economics, but also developing cultural sensitivity and empathy.*"
    - Informally: It may not be a good idea to create "little England" in India.

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Evaluation of quantitative research

Control questions

What are the findings?

1. Is the description of findings thorough?

Are the findings valid?

1. Is the research question clear and adequately substantiated?

2. Is the design (the research method) appropriate for the research question?

3. Was the method of sampling (e.g., case selection) appropriate for the research question and design?

4. Were data collected and managed systematically?

5. Were the data analysed appropriately?

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Evaluation of quantitative research

How can I apply the findings?

1. What meaning and relevance does the study have for my practice?

2. Does the study help me understand the context of my practice?

3. Does the study enhance my knowledge about my practice?

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