Luna-Ryes and Andersen (2003): Collecting and analyzing qualitative data for system dynamics: methods and models.

The authors are stressing how essential quantitative data in the model building process of System Dynamics models is. In this paper different social science techniques for dealing with qualitative data are explored and described according to their fit in the different stages of the modeling process. Luna-Ryes and Andersen are mentioning (based on what we could also red in the Forrester article) that the most important information source are the mental models of involved people. The use of this information is difficult and thus different techniques are used.

System Dynamics and qualitative data

- Use of soft variables (e.g. willingness, happiness) → Qualitative scaling.
- Qualitative modeling → Called as systems thinking.
- Qualitative data collection and analysis methods. → Simulation here is four stages:
  1. Conceptualization stage: Take part of the real world → Describe this mental model with verbal descriptions and their feedback loops → Reference mode
  2. Formulation stage: Positing a detailed structure → Find important parameters and their values →Possible leverage points for policies.
  3. Testing stage: Different tests can be used to examine the developed model → e.g. structure-verification test
  4. Implementation stage: Insides of the users of the model are necessary →Describe model to users → More a qualitative process (discussions)

Qualitative data collection techniques that support system dynamics model building

- Interviews: Strength = Collection of qualitative data.
- Oral history: Verified transcripts of interviews which become part of the public record.
- Focus groups: Similar to group model building.
- Delphi groups: Extension of focus groups. → Q&A Cycles, ranking of critical issues, try to reach consensus, mostly experts.
- Observation: Collect social structure, culture, process and human interaction information.
- Participant observation: Interacting with the participant.
- Experimental approaches: e.g. tasks for participants, videotaping, etc.

Qualitative data analysis (in social sciences)

- Hermeneutic: Find meanings and how they are connected with culture.
- Discourse analyses: Study of interaction among people in the occurring context.
- Grounded theory: Identify themes and concepts in texts. → Data collection as first step.
- Ethnographic decision models: Understand why a person makes a decision.
- Content analysis: Identification of reference modes and parameter estimation from texts.