This lecture

Krogstie: Model-based development and evolution of information systems: A quality approach

Chapter 1 - Introduction
Conceptual modeling

- Models used for enterprise models, problem analysis requirements and design specification
- Primarily diagrammatic (2-dimensional diagrams)
- The languages used for modeling have a limited vocabulary
- The languages used are originally meant to be generally applicable (and not for a specific domain). Some exception e.g. using so-called domain specific modeling techniques
- Paradigmatic example: ER- modeling language
Overall terminology

- **Information systems**
  - Both the automated part and
  - information processing performed by humans (alone or supported by information systems)

- **Model:** can be almost anything
  - Representation of the past, current, or potential future
  - More abstract, usually less comprehensive, and normally cheaper to make than what it models
  - Important to select which parts to represent

- **Analysis:** Understand a problem (descriptive mod.)
- **Requirements specification:** indicate a solution (prescriptive mod.)
- **Design specification:** Detail a technical solution (prescriptive mod.)
- **Execute:** Deploy and use solution... and iterate!
Main elements and context of a modeling activity

- Goal of Modelling
- Persons
- Area of interest
- Means for representation
- Modeling task
- Tools
The context of a modeling activity

- Modeling is a way of representing, developing and spreading knowledge
- Performed as part of the changes done in an organization
- Organizations are under continuous change
- The organization changes through a process of social construction
Social construction in an organization

Local reality (individual knowledge)

Internalisation (Sensemaking)  Organisational reality
(objects, institutions, language, models, technology)

Externalisation (Action)
Nonaka and Takeuchi modes of knowledge creation

<table>
<thead>
<tr>
<th>Tacit knowledge</th>
<th>To</th>
<th>Explicit knowledge</th>
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<tr>
<td>Socialization</td>
<td></td>
<td>Externalization</td>
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<tr>
<td>creating tacit</td>
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<td>conversion from tacit to explicit knowledge</td>
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<td>knowledge through shared experience</td>
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<td>Internalization</td>
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<td>Combination</td>
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<tr>
<td>conversion of explicit knowledge to tacit knowledge</td>
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<td>creation of new explicit knowledge from explicit knowledge</td>
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Modeling as social construction - issues

- Subjective relative to what is focused in the language (language basis)
  - Focus on certain concepts (on the expense of others)
  - The choice of language influence on the way we think

- Subjective relative to what is regarded as relevant

- Subjective relative to the terms choosen

- The results are highly dependant on those involved in the process

- Problems related to model-monopoly
Usage of modeling

1. Sensemaking
- 1. Perception of current state
- 2. Communication

2. Communication
- 2. Perception of current state
- 2. Communication

3. Computer-assisted analysis
- 3. Model of current state
- 4. Quality assurance

4. Quality assurance
- 4. Perception of future state
- 4. Model of future state

5. Model deployment
- 5. Model of future state
- 5. Model deployment

6. Context for change
- 6. Perception of future state
- 6. Context for change

Develop project
Approaches to model-based solutions

- Model-Driven Architecture – MDA/MDD
- Domain Specific Modeling – DSL/DSM
- Business Process Modeling - BPM
- Enterprise Modeling - EM
- Active Knowledge Modeling - AKM (Interactive Modeling)

- No silver bullet
Execution environment supporting a full range of process types

**Socio-economic relationship**
- **Market**
  - Low uncertainty
  - Low goal congruence
- **Hierarchy**
- **Project/Team**
  - High uncertainty
  - High goal congruence

**Coordination technologies**
- **Electronic Commerce**
- **Workflow**
- **Groupware**

**Process Models**
- **Hardcoded**
- **Predefined model**
- **Evolving model**
- **Implicit**
Framework for structuring different use of modeling

Model-driven solutions:

Enterprise model

Platform Independent Model

Platform Specific Model

Code

Operating system, runtime execution environment (EE)