

IKT og Videnrepræsentationer - ICT and Knowledge Representations.

3. Contextual Design

Cand. Scient. Bygningsinformatik.
Semester 2, 2010.

CONTENT

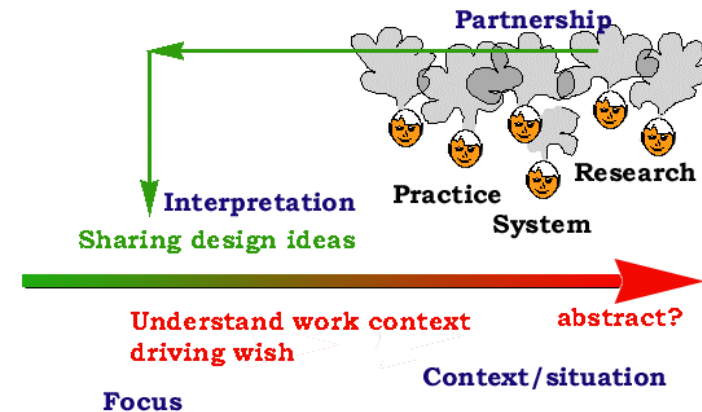
- Contextual Design overview
- Work models
- User Environment Design

CONTEXTUAL DESIGN

The main steps in Contextual Design

1. Contextual inquiry
2. Work modelling (and interpretation sessions)
3. Consolidation (and affinity building)
4. Work redesign (visioning)

5. Storyboarding (sketch new way of working....)
6. User environment design
7. Mockup and test with customers
8. Putting into practice



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Reference to (Beyer H, Holtzblatt K, 1998) and (Preece J, Rogers Yvonne, Helen Rogers, 2002)].

CONTEXTUAL DESIGN

Four principles for contextual inquiry (Byer and Holtzblatt, 1998) with example comments.

- **Context**

Observing ongoing work prevents the customer from summarizing and express abstract opinions.

Find concrete data rather than abstract data (easier to lump together than being concrete). 'In our group we do..' no instead 'that time we did'.

Use real artifacts to ground the customer in specific instances - 'can you do it now?'

Going back to past instances prevents the user from make something up about what will happen.

- **Partnership**

Observe and discuss how work is structured.

Iterative techniques as rapid prototyping or Participatory design enables rethinking initial ideas easier.

Project participants are all design team members (not only consisting of system implementation experts)

Sharing interpretations ensures that work is understood correctly.

Faster and more goal oriented than ethnographic studies.

- **Interpretation**

Walk the chain backwards to understand the work context driving the design or to understand a customer wish list.

- **Focus**

Everything a person does has a reason. When collecting facts always take the attitude that everything is new as if you had never seen it before.

Admit your ignorance if you do not understand. Let the 'customer' repeat step by step

CONTEXTUAL DESIGN

Commercial software may be generated in three principal ways.

- *Designing a known product* (like a word processor).
Gather data on people using competitive products.
- *Addressing a new work domain*
"Look for problems and places where the lack of tools keeps them from to achieve their real intent"
- *New technology*
What will the new technology replace?
Look for analogs of the technology and how they are used in real world.
Look for underlying metaphor of new technology and study that (VR collaboration tools, VR shared work spaces, PDA personal digital assistant,...)

Reference to (Beyer H, Holtzblatt K, 1998) and (Preece J, Rogers Yvonne, Helen Rogers, 2002)].

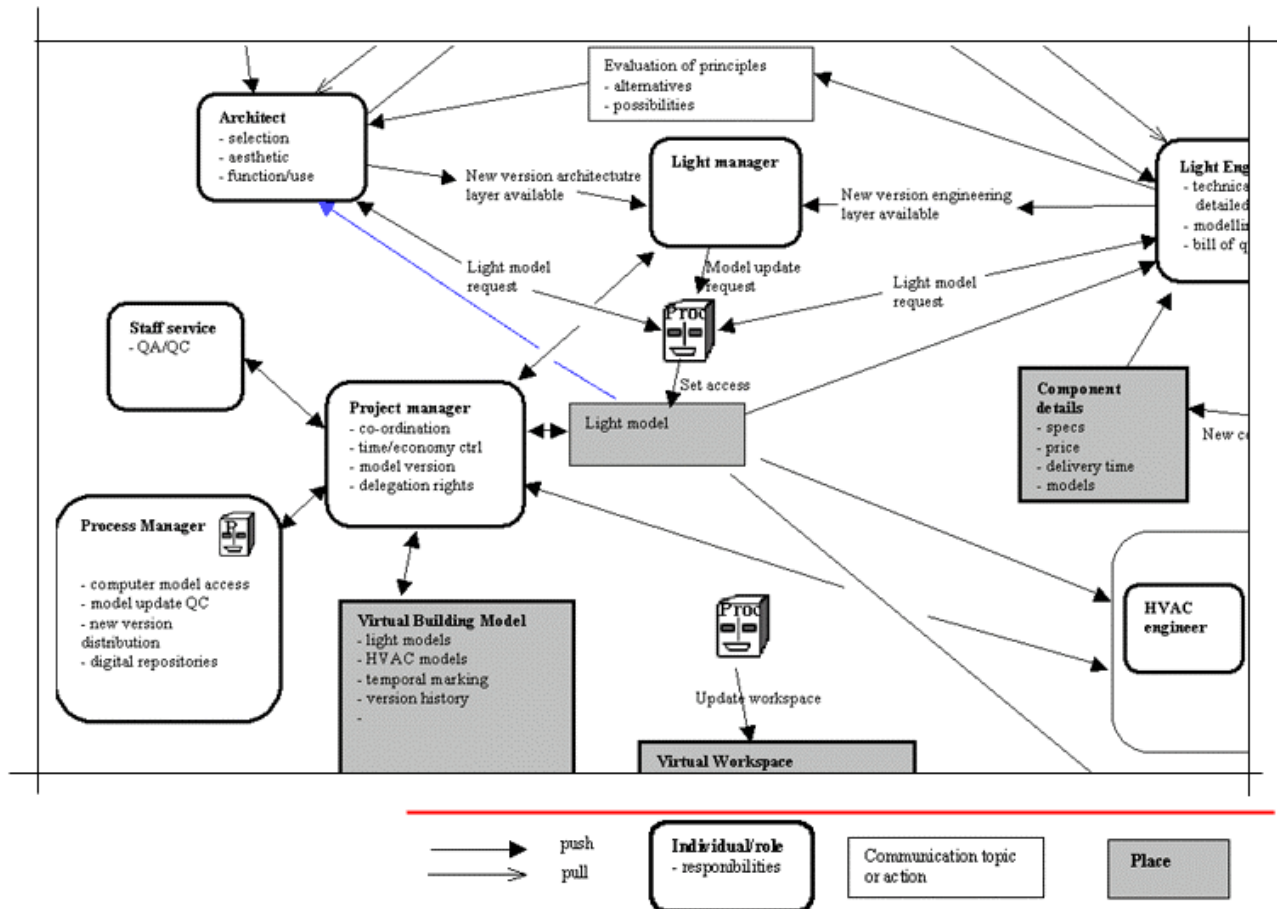
CONTEXTUAL DESIGN

Designing the inquiry for **IT projects**

- *Upgrades:*
Do things better and more efficient
Look at tool use and its edges to extend the system.
- *New systems:*
Ask: how will the new system support real work of the department?
- *Process redesign:*
What will work practice change?
What will get in the way of introducing a new process?

Reference to (Beyer H, Holtzblatt K, 1998) and (Preece J, Rogers Yvonne, Helen Rogers, 2002)].

WORK MODELS in Contextual Design. WORK FLOW model



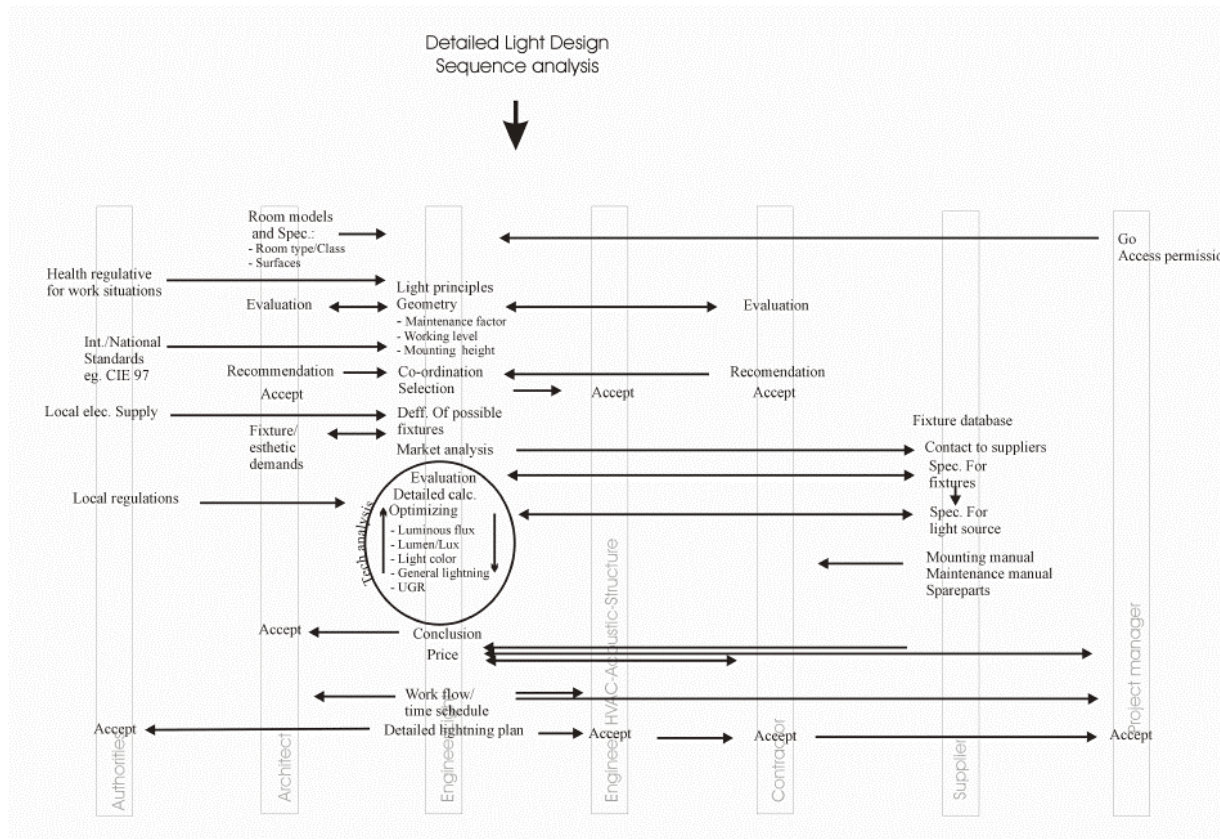
Flow model, representing communication and coordination necessary to do the work.

Individuals, responsibilities, groups, communication, artifacts (VB,...), communication topic or action, coordination, informal structures, and roles. The work flow models also give hints to possible virtual collaboration spaces.

Look at real not only formal definition of how work is done.

The responsibilities of different roles are identified.

WORK MODELS in Contextual Design. SEQUENCE model.



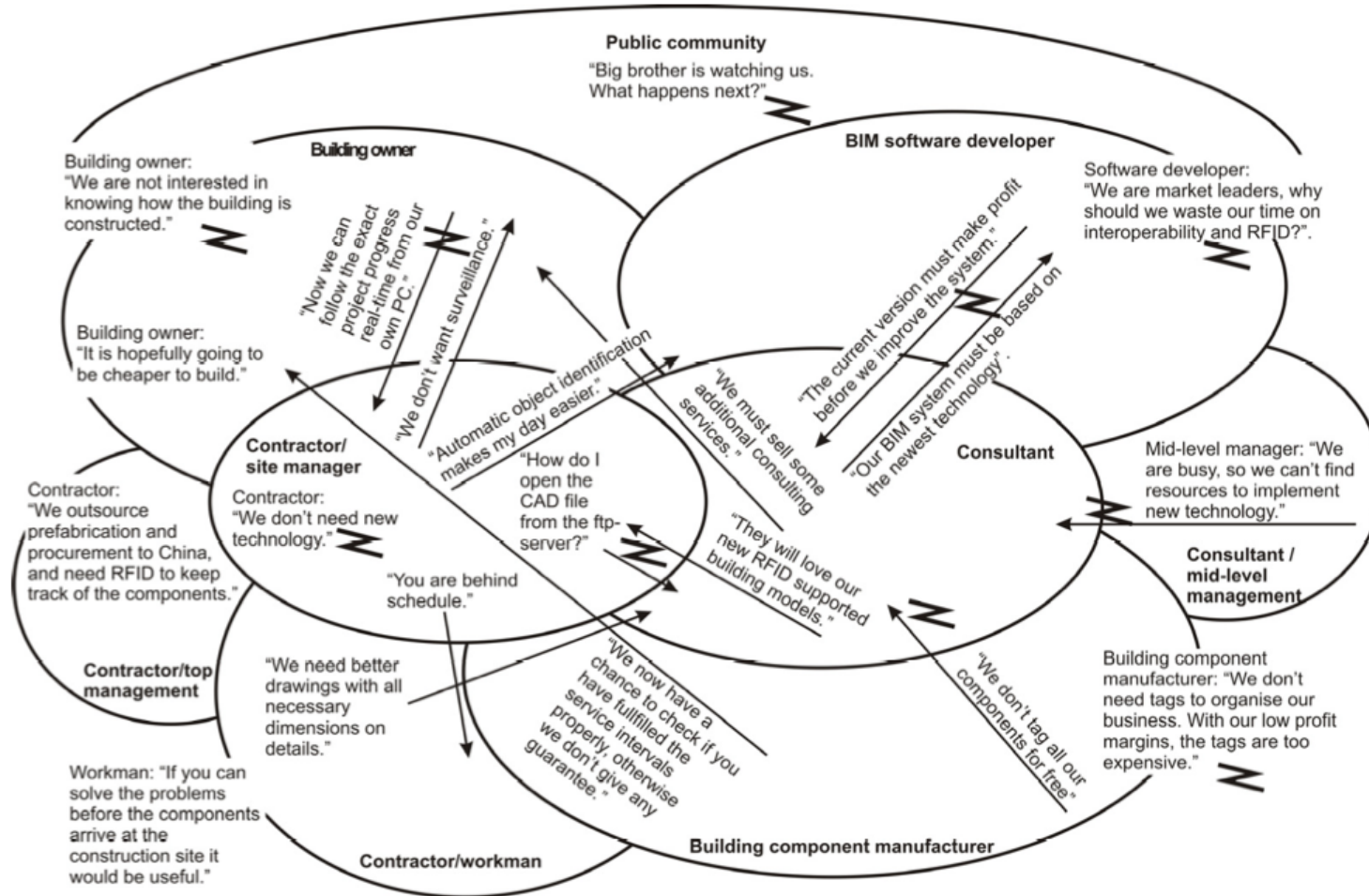
Sequence model, showing the detailed work steps necessary to achieve an intent. Sequence models can reveal alternate strategies to achieve the same intent.

Peoples actions reveal their intent and what matters to them. Note hesitation and errors. Identifies what really needs to happen and to be supported to accomplish the work.

Sequence models show design intent and the workflow models show how these intents are achieved (strategies for organising work)

The sequence models are complemented by the artefacts models to show how the design artefact is manipulated and with what tools. They also help to reveal the design intent and how the team, groups and persons think about their work.

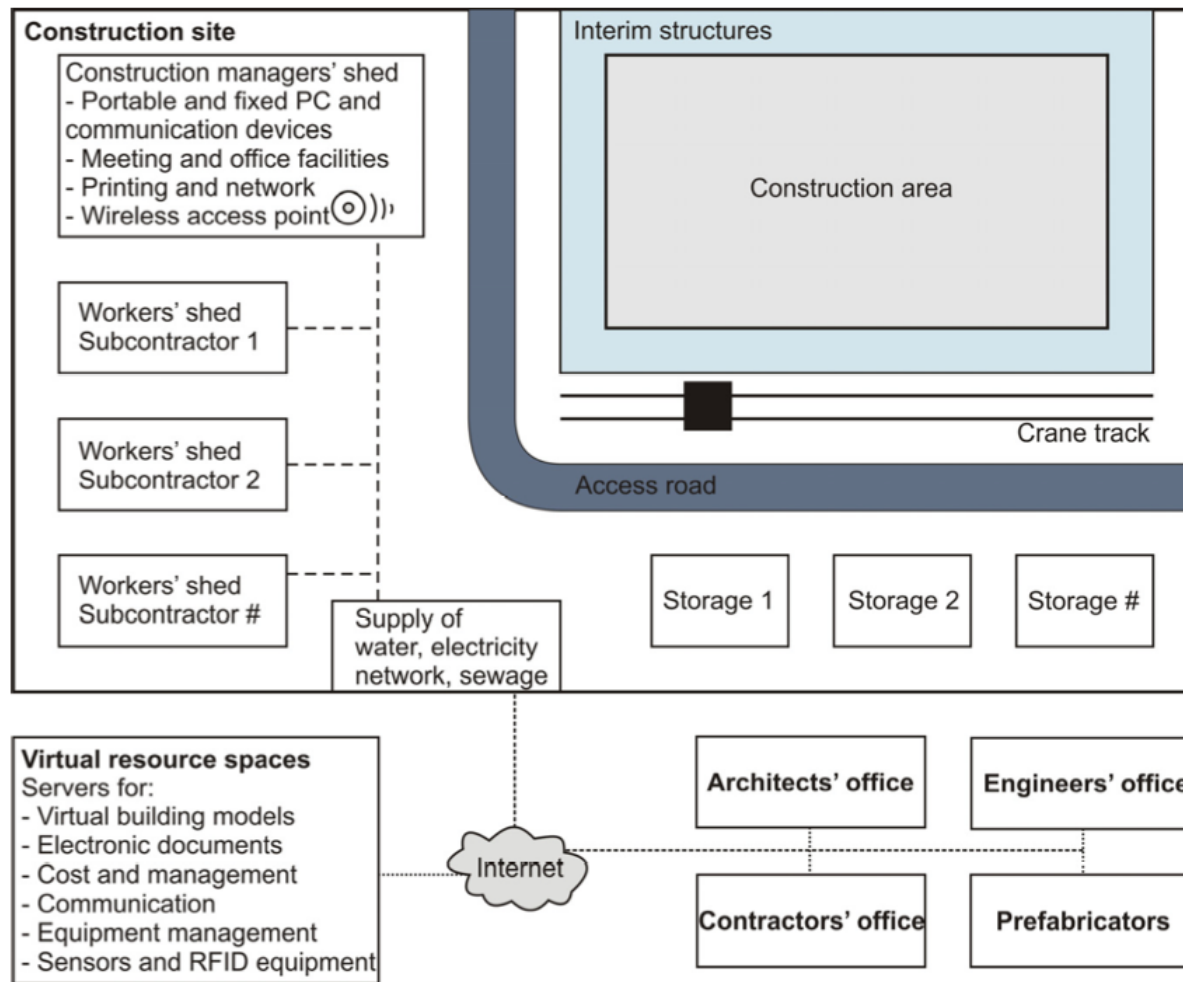
WORK MODELS in Contextual Design. CULTURAL model.



“*Cultural* model of the context influencing an ICT system to support construction management based on virtual models and RFID. The bubbles illustrate users with overlapping interests, and the arrows illustrate cultural influence. Zigzags indicate conflicts.” From

Sørensen K B, Christiansson P, Svidt K (2009) “Prototype Development of an ICT system to Support Construction Management Based on Virtual Models and RFID.” *Journal of Information Technology in Construction*, Vol. 14, Special Issue Next Generation Construction IT: Technology Foresight, Future Studies, Roadmapping, and Scenario Planning, pp. 263-288, <http://www.itcon.org/2009/19>

WORK MODELS in Contextual Design. PHYSICAL model.



Pphysical model showing the physical structure of the physical/virtual work environment as it affects the work (supports, enable or gets in the way).

I will embrace computers, storage hardware, (computer) screens, physical/wireless networks, canalization, tables, physical spaces etc.

WORK MODELS in Contextual Design. ARTIFACT model.

Artificat model, showing the physical/virtual things and tools used (and created) to support the work, along with their structure, usage, and purpose, and information content.

Artifacts are identified and grouped in relation to intended and/or real use and their properties described (e.g. personal/shared, specific/general, synchronous/asynchronous usage, access rights, access levels, artifact memory, alternative artifacts for the same activity, alternative VW activities with use of same artifact, artifact hierarchies, identification icon and name) .

The sequence models are complemented by the artifacts models to show how the design artifact is manipulated and with which tools. They also help to reveal the design intent and how the team, groups and persons think about their work.

Which artifacts are you using today (local storage, spreadsheets, where do you write your notes (on the agenda or own paper).

Artifact models shows how people organize and structure their work.

WORK MODELS in Contextual Design. Storyboarding.

Using *storyboards*, the team develops the vision into a definition of how people will work in the new system and ensuring that all aspects of work captured in the work models are accounted for.

It is now time for a detailed user *environment design*, UED, with no prescribed order of work as in the storyboards, valid for many story told. A system work model contains the structure of the system under design. The next step is to decide on user interface.

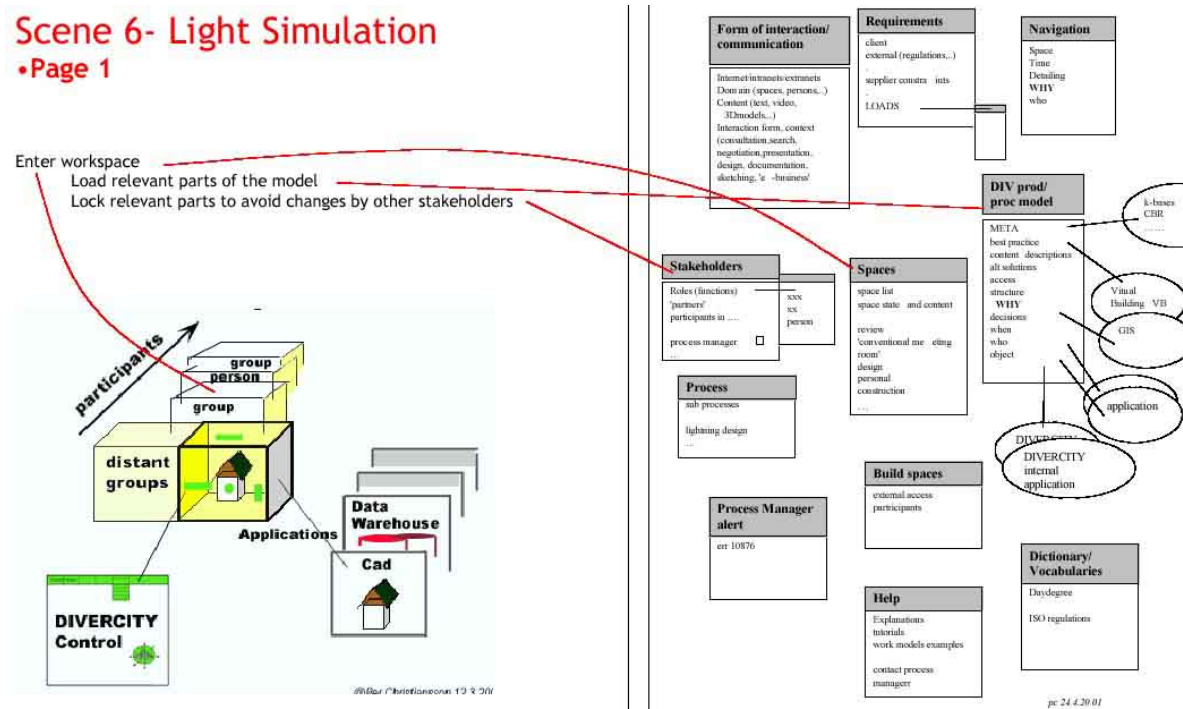
"The structure of the system consists of the places in the product where she [the user] can work, the *functions* that support work in each place, and the links that allow her to move from one place to another" (Beyer, Holtzblatt, 1998, page 302).

"The User Environment Design plays the same role in Contextual Design that the floor plan plays in house design." (Beyer, Holtzblatt, 1998, page 306).

Objects and other knowledge representations are further specified during system implementation work to meet user-induced requirements.

WORK MODELS in Contextual Design. Storyboarding.

Scene 6- Light Simulation •Page 1



Using storyboards, the team develops the vision into a definition of how people will work in the new system and ensuring that all aspects of work captured in the work models are accounted for.

Storyboards forms the basis for user environment design, UED, with no prescribed order of work as in the storyboards, i.e. valid for many story told, and with detailed user interfaces proposal. Objects and other underlying knowledge representations are further specified to meet user-induced requirements.

The figure shows one way to create storyboards with the artifacts to the right in the figure

WORK MODELS in Contextual Design. Storyboarding.

Scene 6- Light Simulation

• Page 2

The main issues for the light engineer are to analyse the needs for light, the influence from outdoor light, the internal distribution of light and maintenance factors.

Basic information retrieval

- Room and Building information, Geometry, surfaces, concealed light from outside (windows)
- Legal requirements and regulations (national and local)

Analyse needs for light

- Check best practice and previous projects in the knowledge base
- Define light principles and get accept for these
- Import light components (fixtures and sources by types)
- Calculate
 - export data to external application
 - perform calculations
- Check regulations

Light simulation

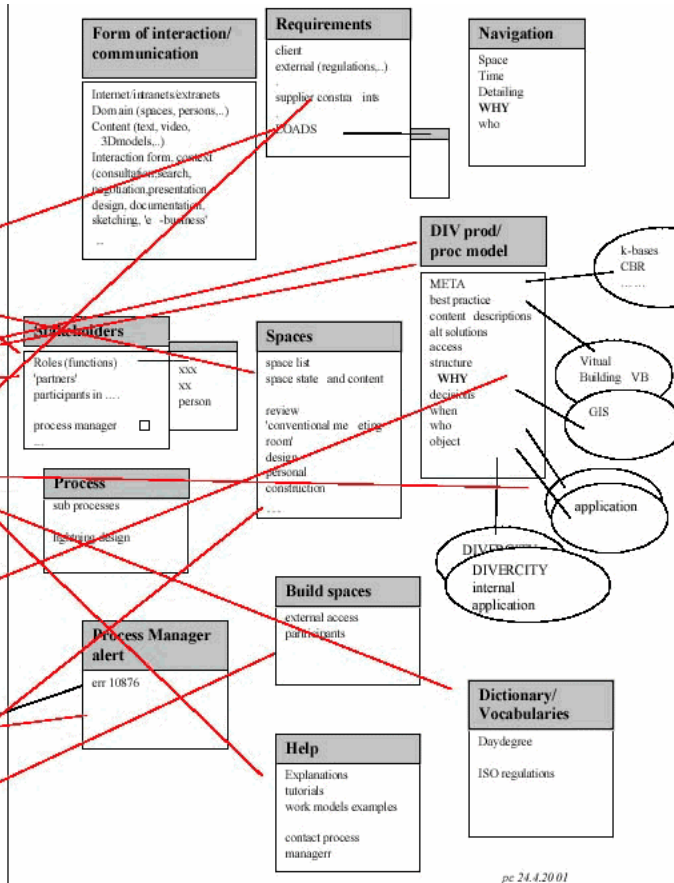
- Import light components (fixtures and sources by BRANDS)
- Light simulation based on distribution, intensity factor per room
- Modelling mounting heights, light sources, fixture design
- Simulation of light distribution between rooms
- Simulation of influence of light from outside

Generate light model

- Mounting scheme
- Co-ordination with other design disciplines (thermal, acoustics...)
- Collision control

Process output

- List of quantities
- List of possible suppliers

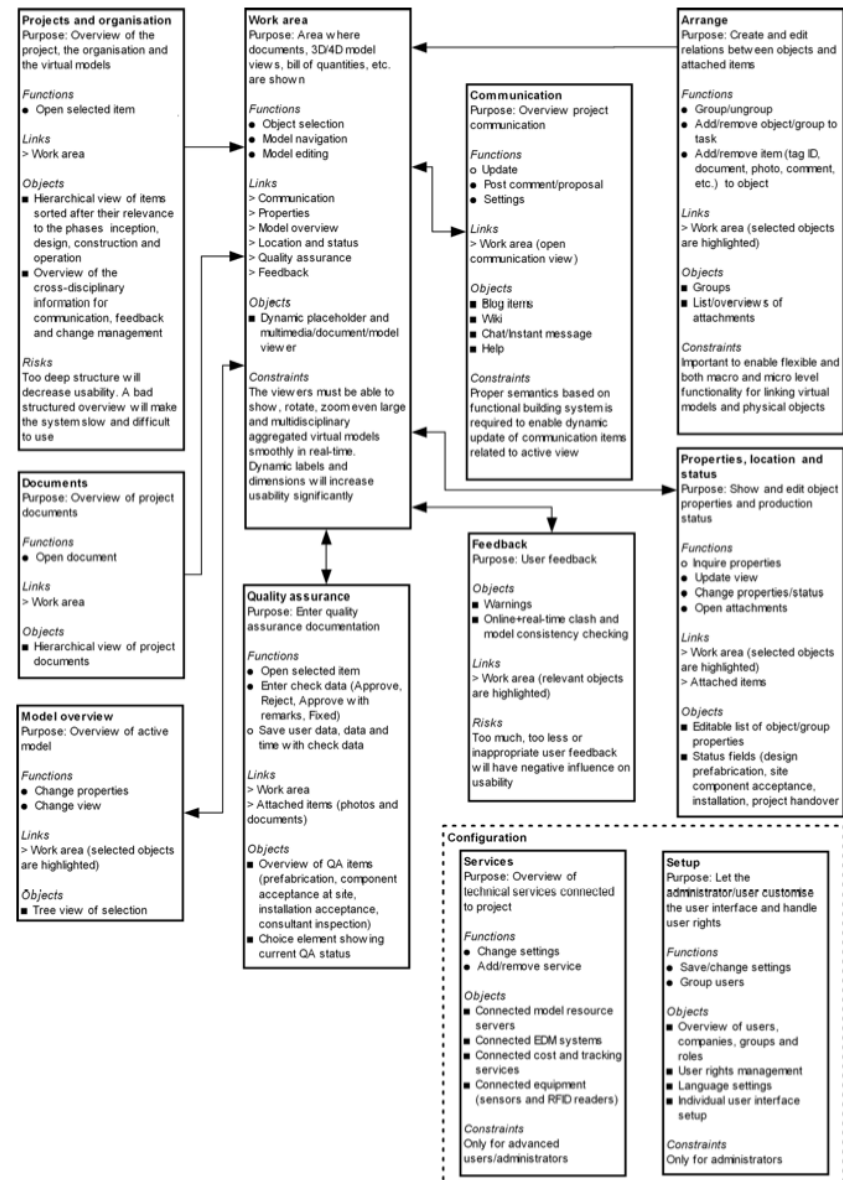


From the EU DIVERICTY project

Contextual Design. USER ENVIRONMENT DESIGN.

High level user environment model for a future ICT system supporting project progress management, quality assurance and inventory management in construction. From

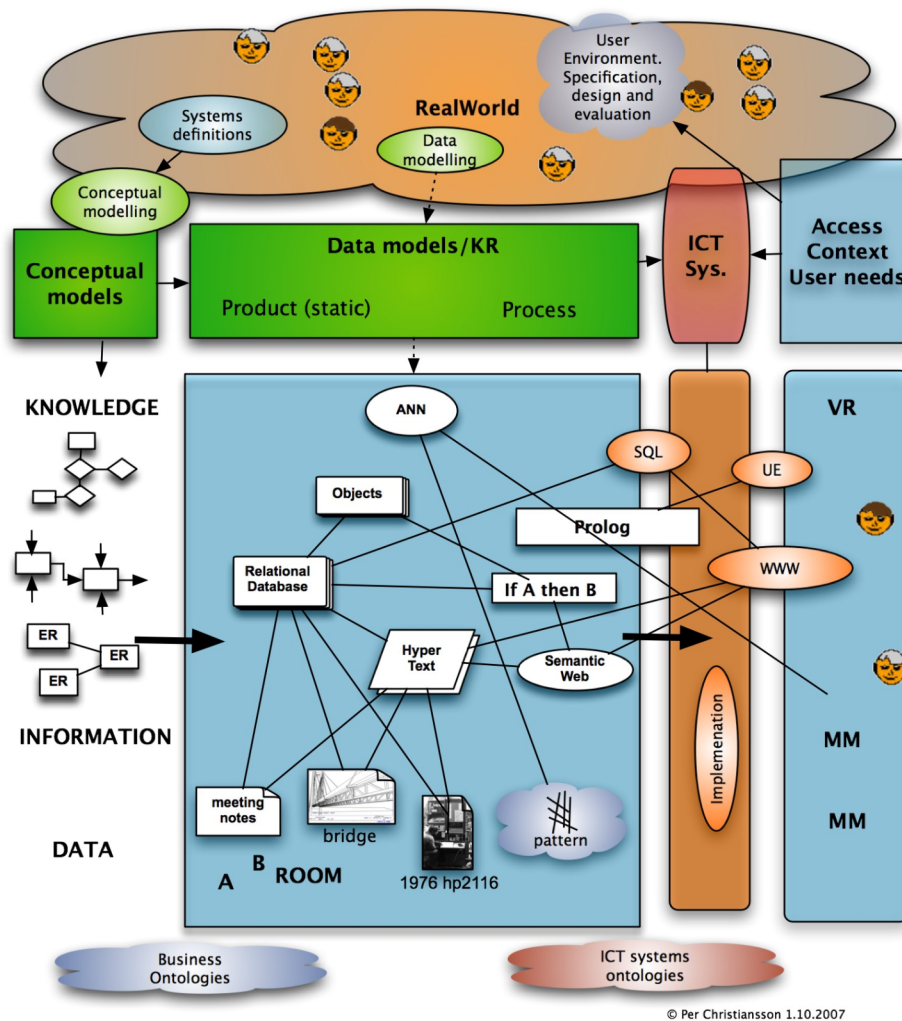
Sørensen K B, Christiansson P, Svidt K (2009) "Prototype Development of an ICT system to Support Construction Management Based on Virtual Models and RFID." Journal of Information Technology in Construction, Vol. 14, Special Issue Next Generation Construction IT: Technology Foresight, Future Studies, Roadmapping, and Scenario Planning, pp. 263- 288, <http://www.itcon.org/2009/19>



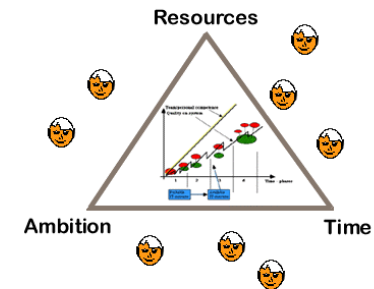
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<http://it.civil.aau.dk>

SYSTEM DEVELOPMENT



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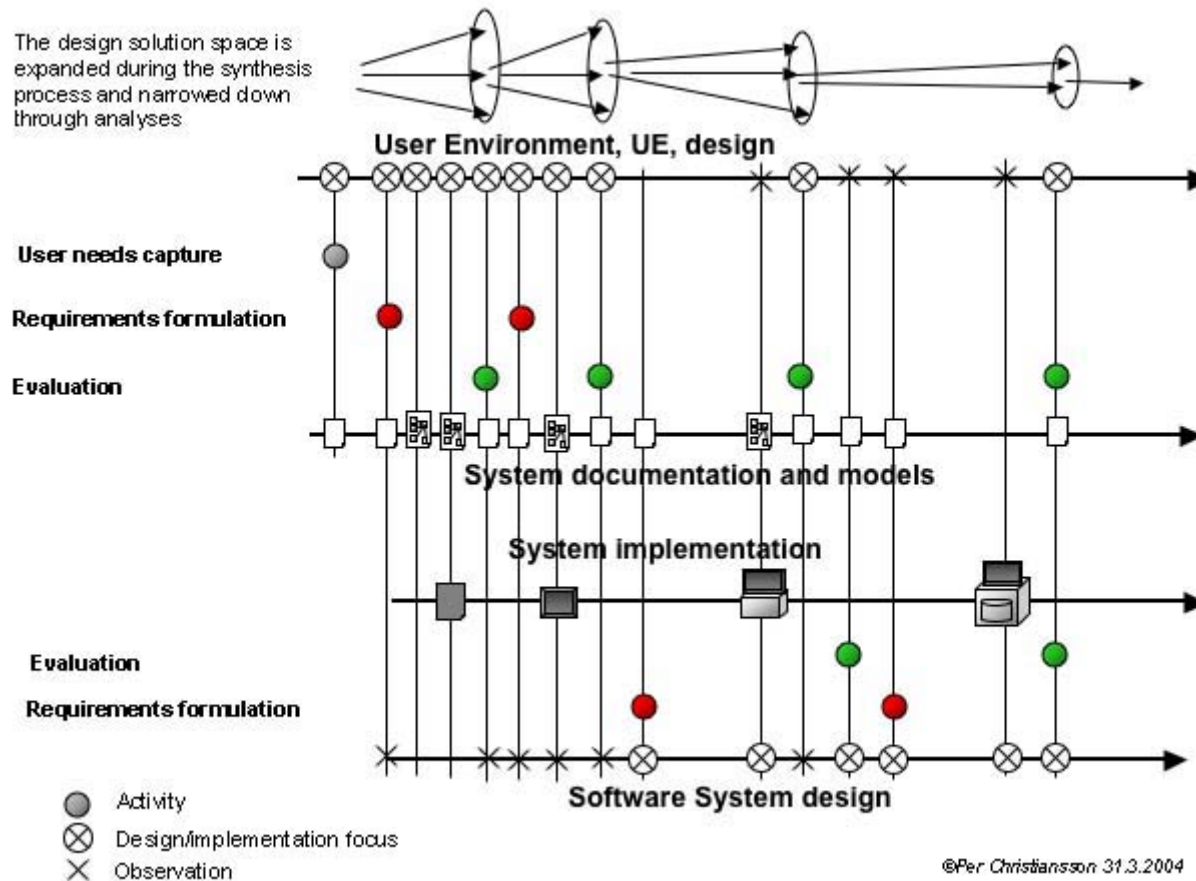


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Always achieve a good balance between Time, Ambition and Resources.

From the real world to implemented systems in use

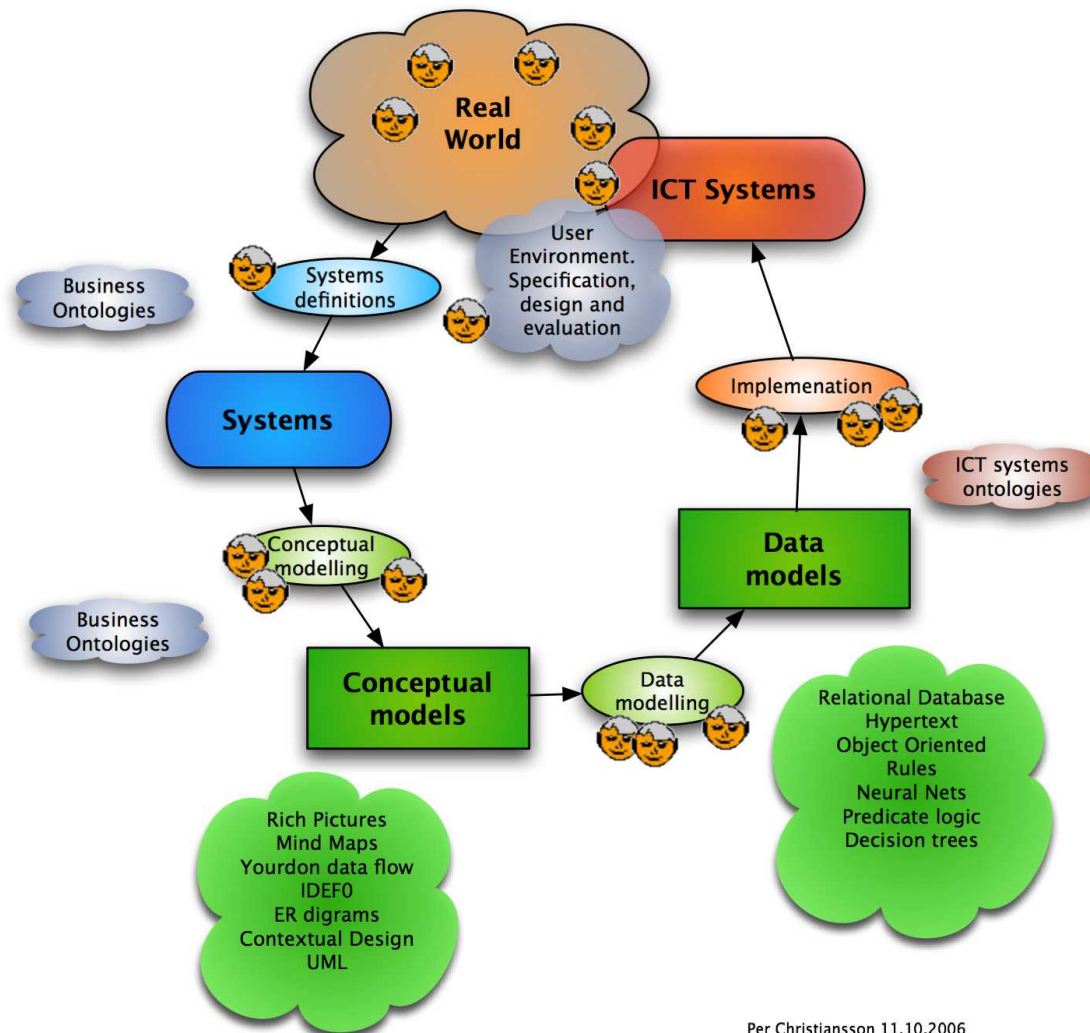
MODELS OF THE REAL WORLD



The early design process focuses on user environment, UE, design/implementation and the later phases on software development and implementation.

The UE design including user needs capture and user requirements formulations can be supported by contextual design methodology. Different evaluation paradigms can be used as design/implementation progresses.

SYSTEM DEVELOPMENT



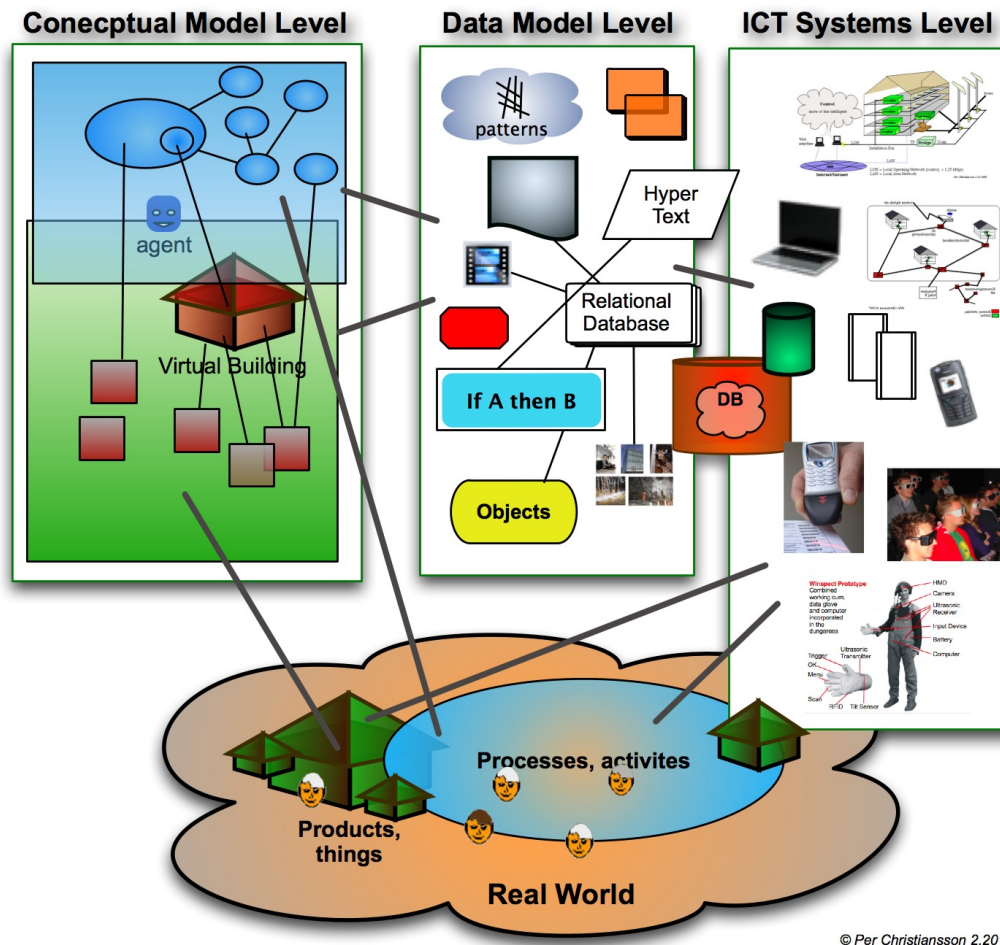
Per Christiansson 11.10.2006

In the real world we identify activities, things, processes, context, and persons.

The real world can be described as (interrelated) systems (no de-facto structure is available today) to accomplish different functions e.g. a comfort system to provide personal living and working quality, personal transport system, load carrying building system, escape system, and communication systems (collaboration, knowledge transfer, mediation, virtual meeting).

MODELS OF THE REAL WORLD

The Real World, Models and Systems



The HOLISTIC view
The holistic view.

We use different kinds
of ICT support in the
building process and
the built environment.

The ICT systems
support different
functionalities in the
building process and
built environment.

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