

ICT-supported End User Participation in Creative and Innovative Building Design

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PROJECT VIC Virtual Innovation in Construction

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Project lead Aalborg University

<http://www.vicspace.org>



PROJECT VIC Virtual Innovation in Construction

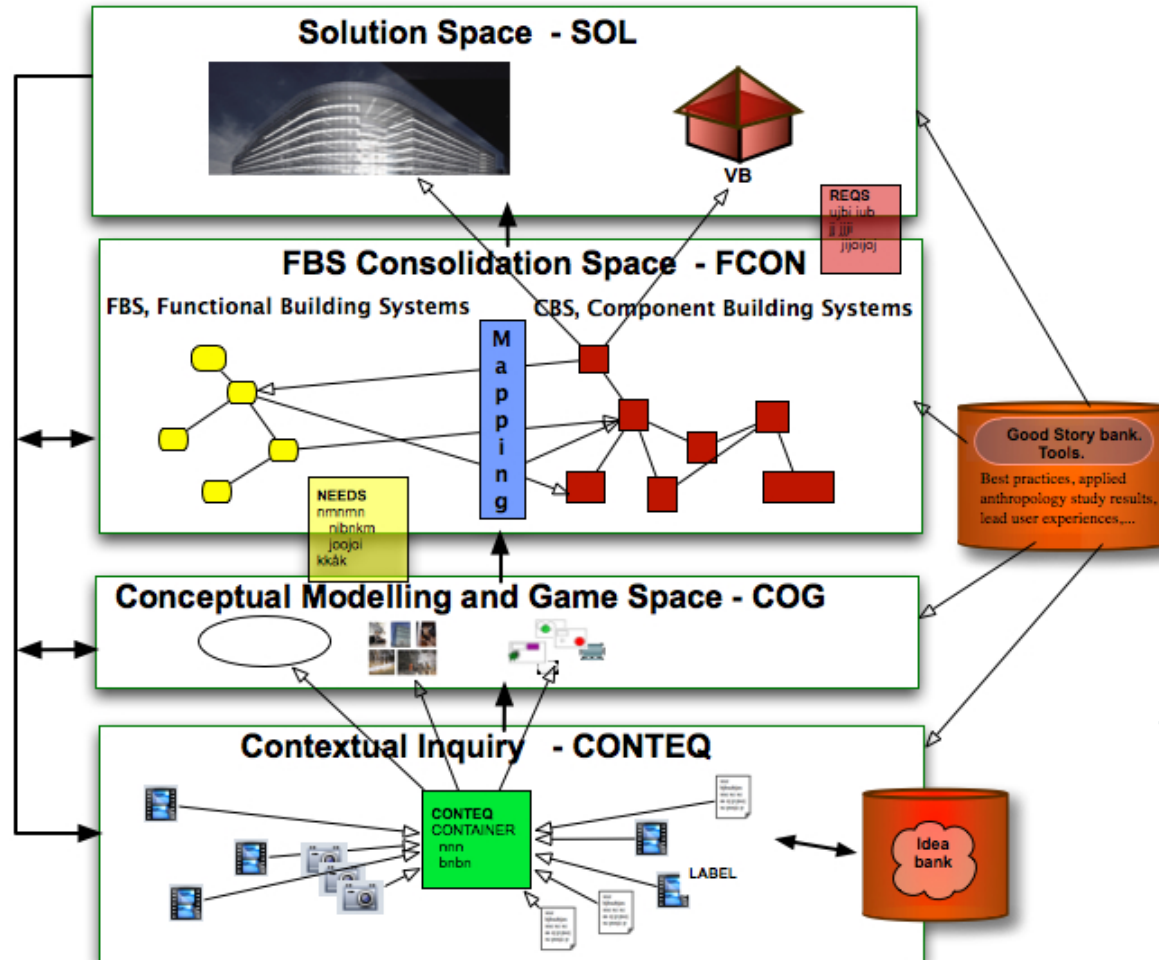


The project *goal* is to create an ICT supported methodology VIC-MET to involve building end user in a creative innovation process together with building designers, to capture and formulate end-user needs and requirements on buildings and their functionality.

USER DRIVEN INNOVATION

a 'systematic approach to develop new products and services, building on investigation or adoption of users life, identity, praxis, and needs including unrevealed needs'

VICMET DESIGN SPACES



PC 10.9.2008 rev 6

The method supports user involvement in every phase of the construction process and with a unique setup depending on design context.

The 4 main design-spaces in VIC-MET

UISING VIC-MET

Activities in the Solution space (SOL)

- 3D virtual building modeling of (alternative) solutions.
- End user evaluation of solutions.
- Documentation of end user feed-back.
- Allocate tools from the ICT tools bank.
- Choose solution(s) or return to the FCON, COG or CONTEQ space.

Activities in the Functional Building Systems Consolidation space (FCON)

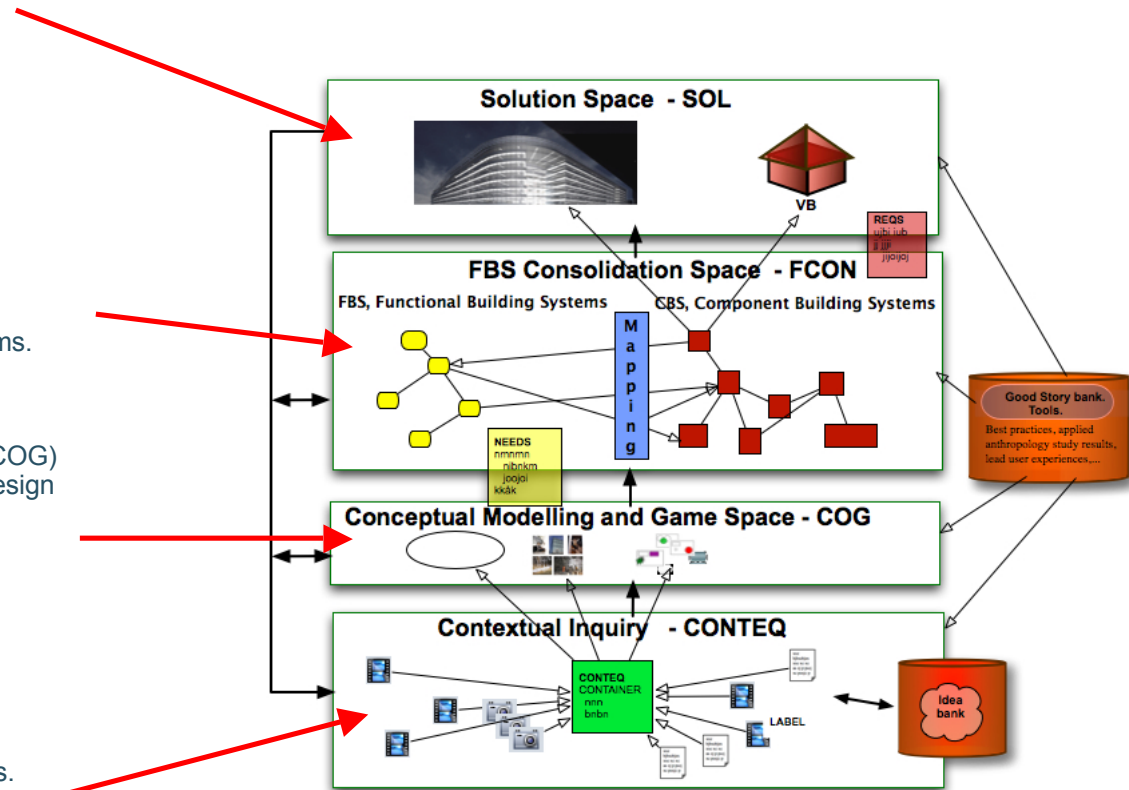
- Needs consolidation, weighing and listing.
- Project vision formulation.
- Prioritizing needs.
- Mapping of Functional Building Systems (FBS) and Component Building Systems (CBS).
- Listing of requirements on Component Building systems.
- Component Building System modeling.
- Allocate tools from the ICT tools bank.

Activities in the Conceptual Modeling and Gaming space (COG)

- Develop conceptual models (e.g. using Context-tual design methodology).
- Needs listing.
- Common values development.
- Functional Building Systems specification.
- Creative/Innovative design.
- Allocate tools from the ICT tools bank.

Activities in the Contextual Inquiry space (CON-TEQ)

- Formulate Design/Innovation domain.
- Set up design team including proper end-users groups.
- Plan the whole design process.
- Identify/allocate resources such as Idea bank, Best practice, Contextual Inquiry Bank.
- Allocate tools from the ICT Tools Bank.
- Perform contextual inquiry including needs cap-ture.



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VIC-MET TOOL BOX

Data collection and modeling

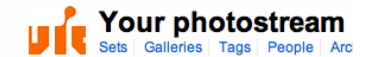
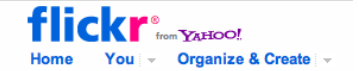
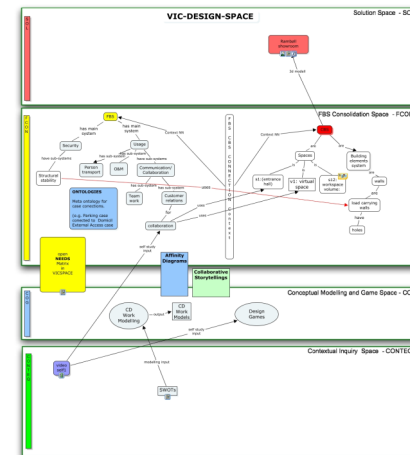
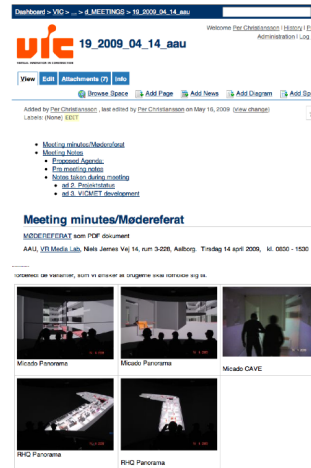
- Interviews and user investigations.
- Conceptual modeling.
- Scanning and surveying.
- 3D modeling.
- Registering and measurements.
- Analyses and prioritizing.

Communication and collaboration

- Communication.
- Information and knowledge sharing.
- Relationship and competence handling.

Visualization and interaction

- Still renderings.
- Animation.
- Interactive visualization.
- Virtual reality.
- Virtual 3D communities.
- Rapid prototyping.

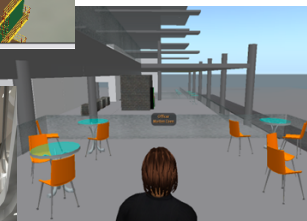
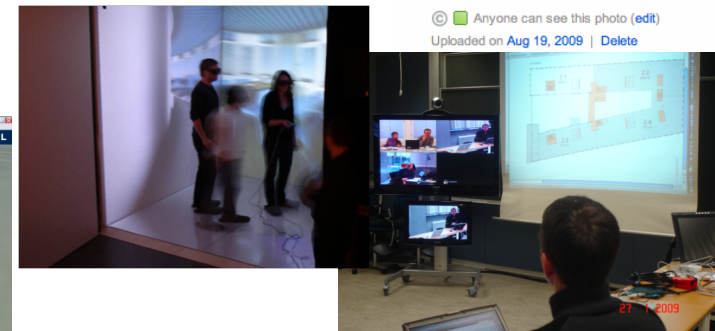


Ramboll headquarters



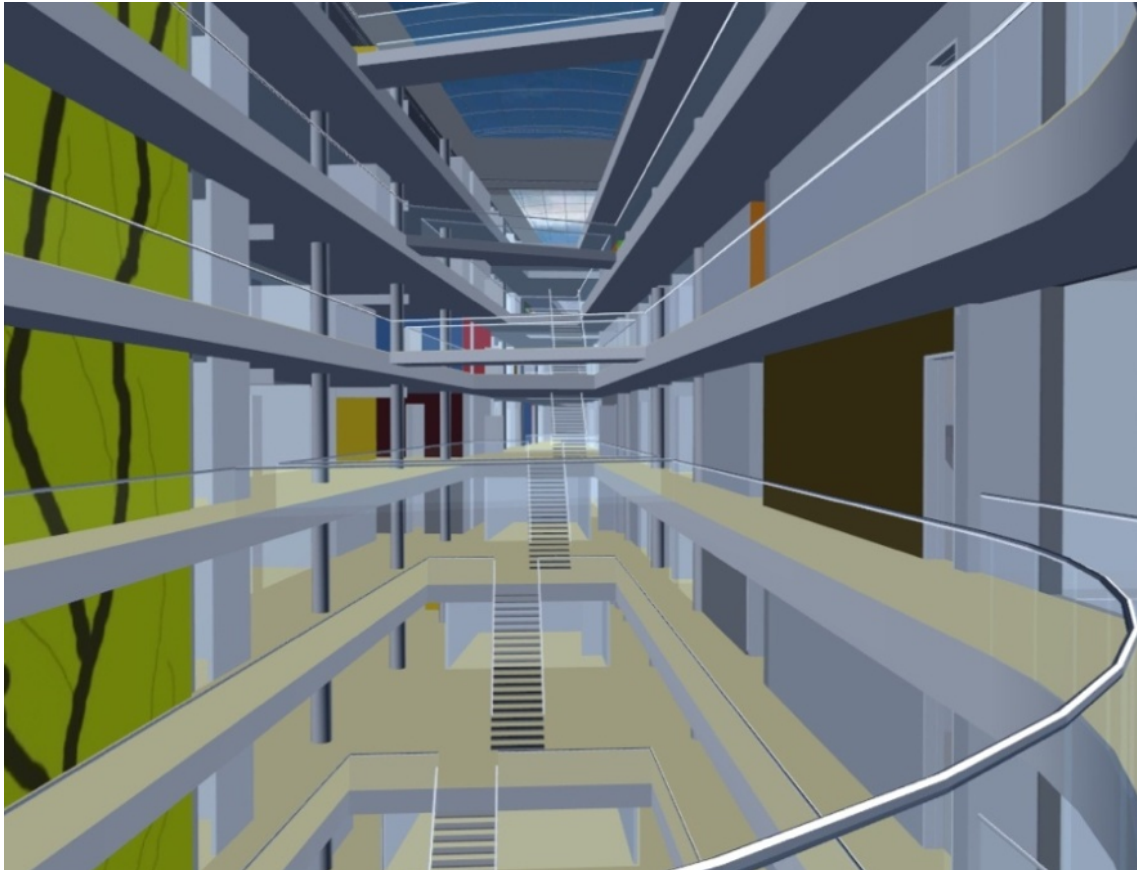
Case building

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THE RAMBOLL HEAD OFFICE CASE

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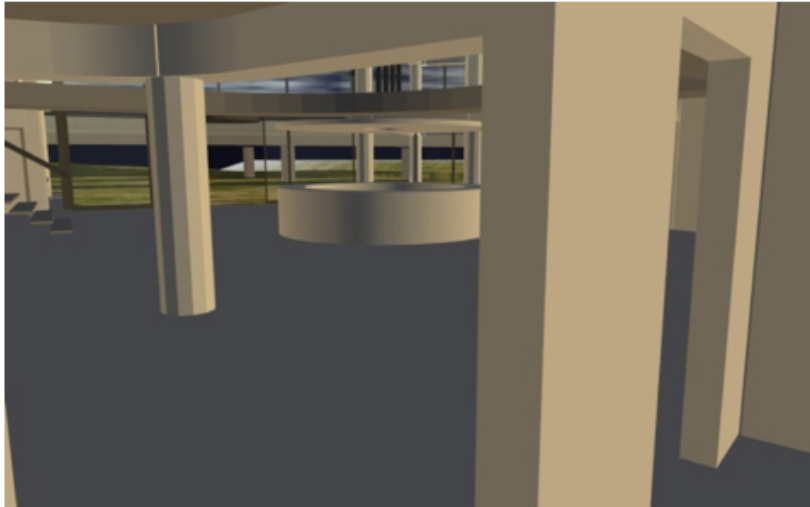


The Ramboll Head Office case
Three test cases were carried
through in the RHO case.

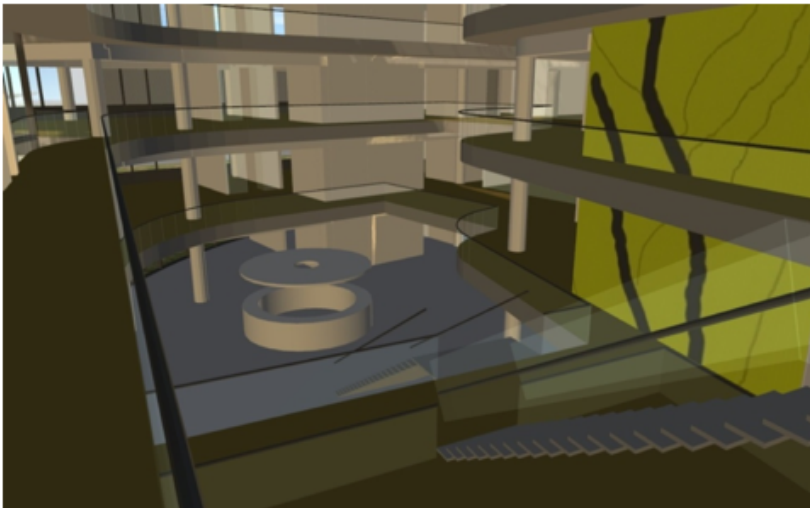
- 1 Color selection
- 2 Placement of reception desk
- 3 Interiors of meeting spaces

VIRTUAL INNOVATION IN CONSTRUCTION - VIC

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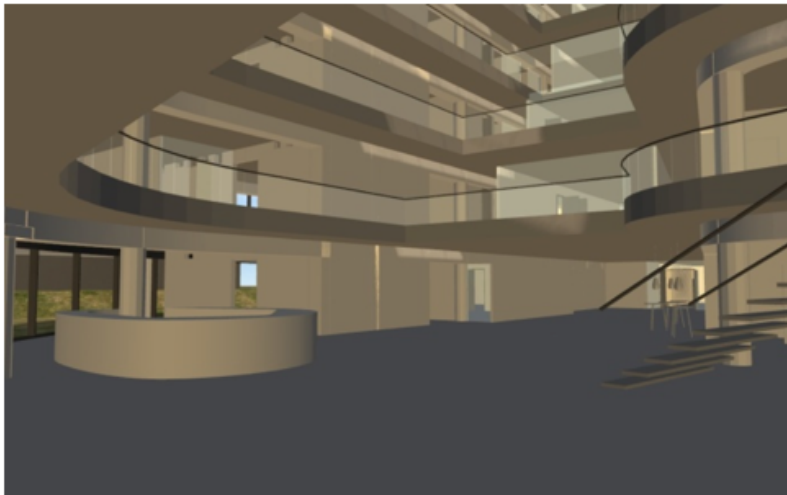
The activities in the Contextual Inquiry (CONTEQ) space, invoked mainly the executive level in Rambøll. These end users expressed a lot of needs and requirements with at first glance contradictory functional and visual challenges.



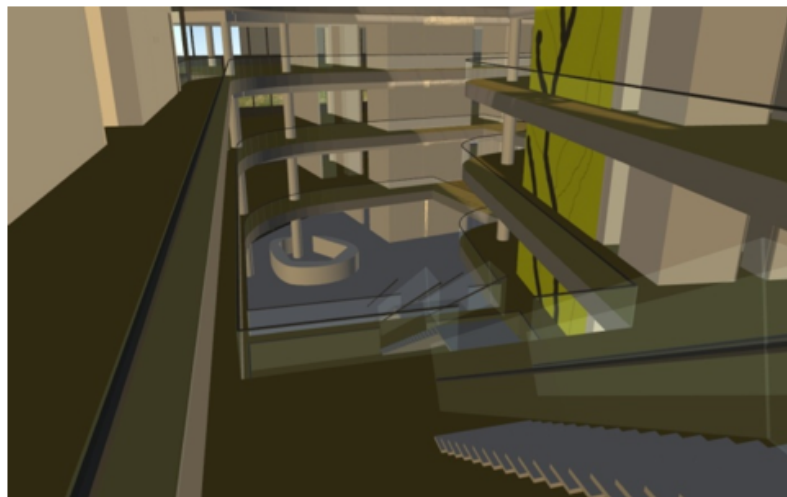
Entrance alternative 1 in the new Ramboll Head Office.

VIRTUAL INNOVATION IN CONSTRUCTION - VIC

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Four initial proposals were presented for the end-users in the solution (SOL) space, to support the following discussions in the Conceptual Modeling and Gaming (COG) space. It was for example discovered that there were different requirements on placement of the reception depending on if it was watched from the entrance or from the inside of the entrance hall.



Entrance alternative 2 in the new Ramboll Head Office.

VIRTUAL INNOVATION IN CONSTRUCTION - VIC

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A special VR-Wii solution was developed at Rambøll providing the users a simple and cost efficient way to navigate in the virtual buildings solutions in the SOL space.

VIRTUAL INNOVATION IN CONSTRUCTION - VIC

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In this case VIC-MET was used late in the process involving a choice of specific furniture and their placements. Solutions were presented in both virtual and real settings in the existing office. The main activities took place in the FCON and SOL spaces. Special regards to possibilities for housing both social and more private meetings were studied in the café space.

The combined café and meeting space at the new Ramboll Head Office

VIRTUAL INNOVATION IN CONSTRUCTION - VIC

1/2



An intentional focus in the office design was to keep the design activities on a high abstraction level with focus on common values, needs and functional building performance.

User involvement procedures for the VIC-MET were set-up and evaluated for the office space design case.

Video documentation of design, evaluation activities in the SOL space at the Panorama VRMediaLab Aalborg University.

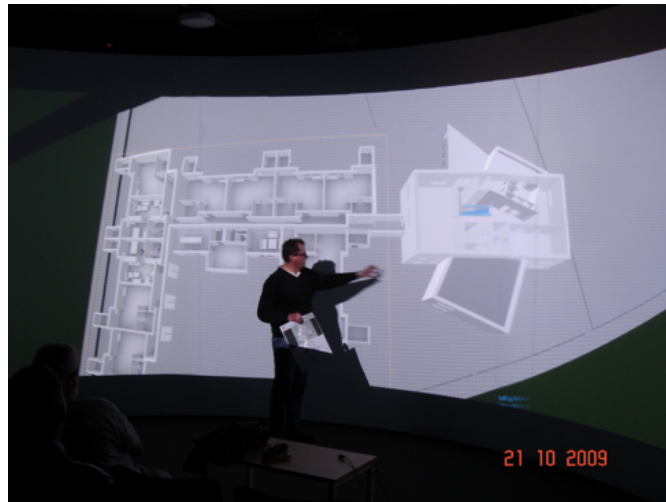
VIRTUAL INNOVATION IN CONSTRUCTION - VIC

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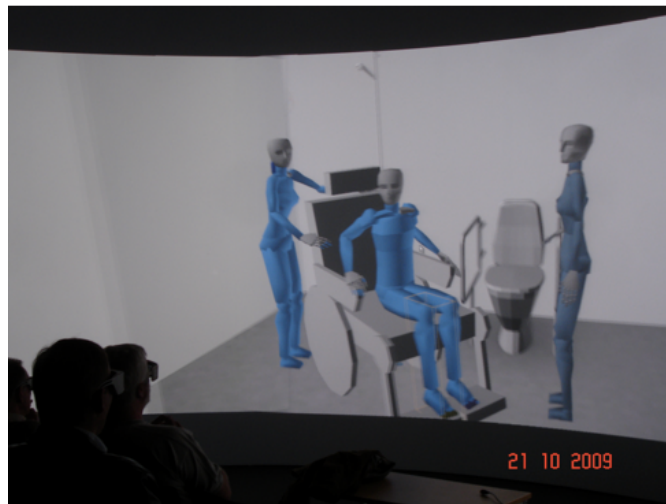


Use of symbols in the virtual building office space to evaluate placements of privileged meeting places in the Panorama respectively Cave at the Aalborg University

VIRTUAL INNOVATION IN CONSTRUCTION - VIC



The architect leads the walk-through for a broad (15 persons) end-user representation of clients, patient relatives, AE design team, nurses, and university Living Lab researchers. Feed-back from evaluations in the SOL space were used as input to the architect for further iteration and alternative evaluations.



User Involvement in the design of The Late Brain Injury Center Frederikshavn Denmark.
VIC-MET development support

CONCLUSIONS

The method supports user involvement in *every phase* of the construction process and with a *unique setup* depending on design *context*.

A sequential *methodology*, including better functionality on supporting ICT *tools*, to support a creative design with end-user involvement in an open innovation environment is *needed* (VICMET).

Client/end-user *needs capture* and *requirements formulation* and modeling must be further advanced.

We envision and contribute in the project to a *change of the design process*.

Ontologies and dictionaries have to be further developed especially on *business* and *meta* levels to secure effective systems interoperability, and information handling.

Functional Building Systems have to be categorized.

Great potentials to develop better products through higher end user involvement.

END

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