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## USABILITY BRIEFING FOR HEALTHCARE ARCHITECTURE

- Exploring user needs and experiences to improve complex buildings

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# Summary of a finished PhD project, 2016



This PhD thesis is a contribution to an ongoing debate in Denmark about improving the building design processes of complex buildings, especially in relation to the current hospital developments. It provides knowledge about capturing user needs and defines a process model for usability briefing for hospital architecture from a user perspective.

The thesis is based on comprehensive literature studies, three main case studies at hospitals, numerous expert interviews and workshops. The research results generate a better understanding of how knowledge about user needs, acquired from workshops and evaluations, can be fed into briefing and design processes. This PhD thesis proposes methods for usability briefing as a dynamic and continuous process throughout all the building phases.

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Usability Briefing for hospital design

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## Usability Briefing for hospital design

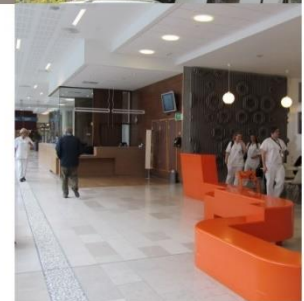
Exploring user needs and experiences to improve complex buildings.



Aneta Fronczek-Munter

PhD thesis  
April 2016

DTU Management Engineering  
Department of Management Engineering



DTU

# Background

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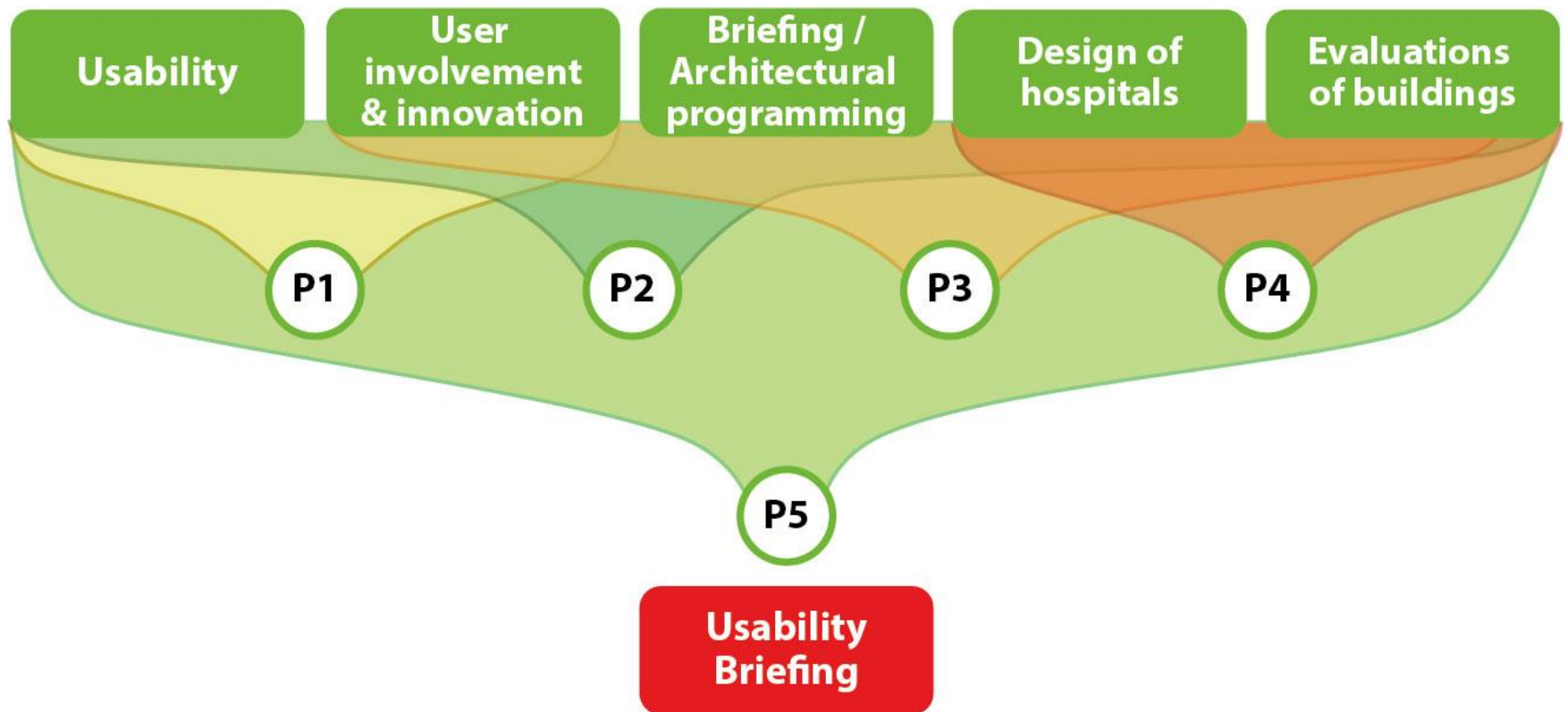
- hospitals – all visit them, society
- complex buildings
- many users, contradictory requirements





# Research themes

4



synthesis of research papers and case results, propose a process model for Usability Briefing.

# Method

5

## EMPIRICAL DATA

- Three long term case studies of hospitals
- Literature review
- 140 events (expert interviews, workshops, meetings with architectural and engineering companies specialized in briefing or design of hospitals)

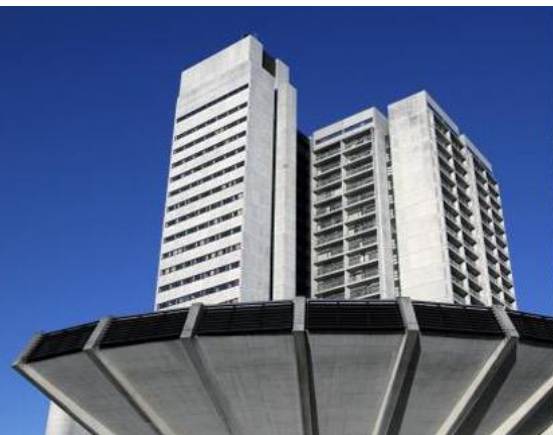


## CASE STUDIES

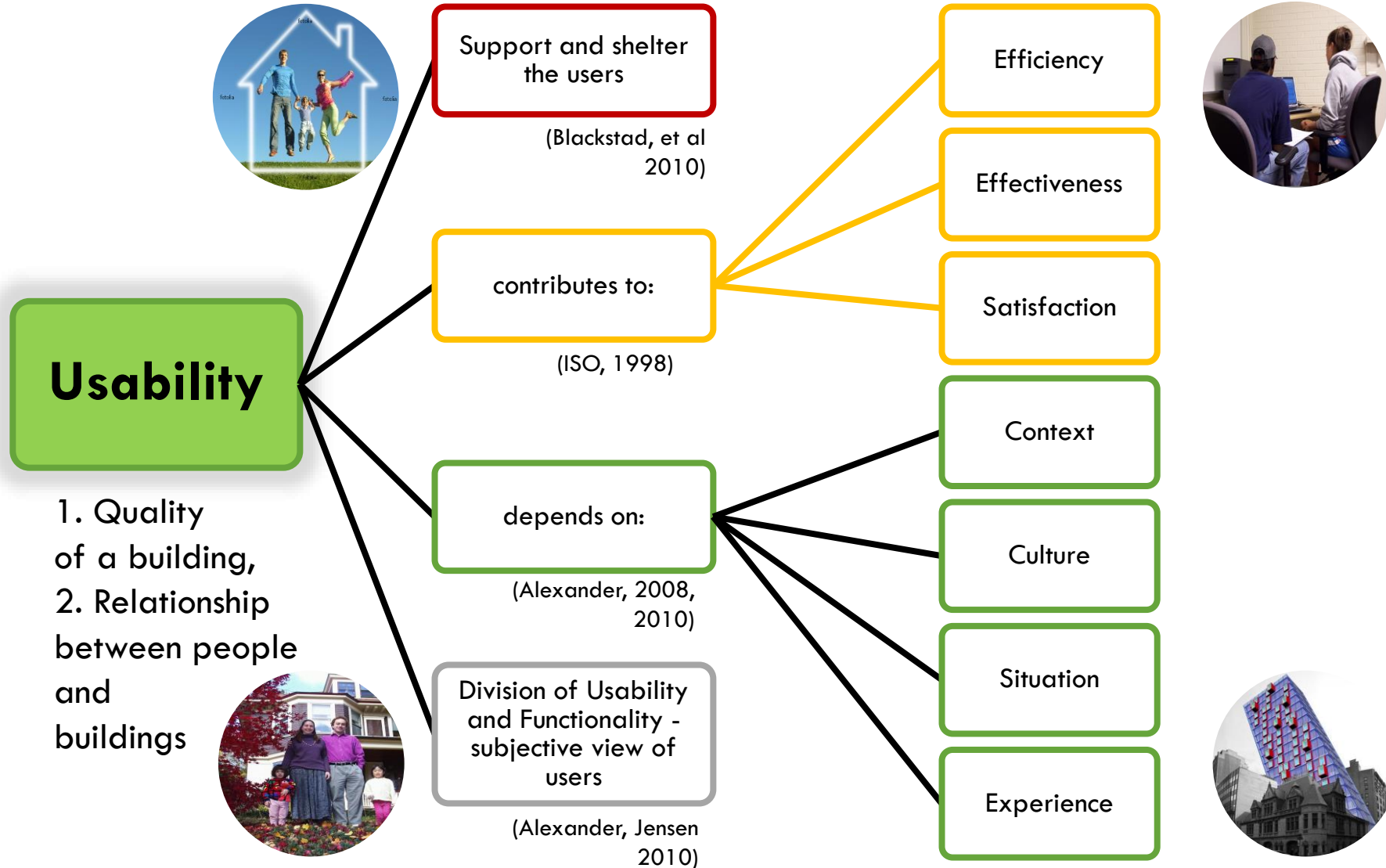
Healthcare Innovation Lab, DK

Bispebjerg Hospital, DK

St.Olavs Hospital, NO

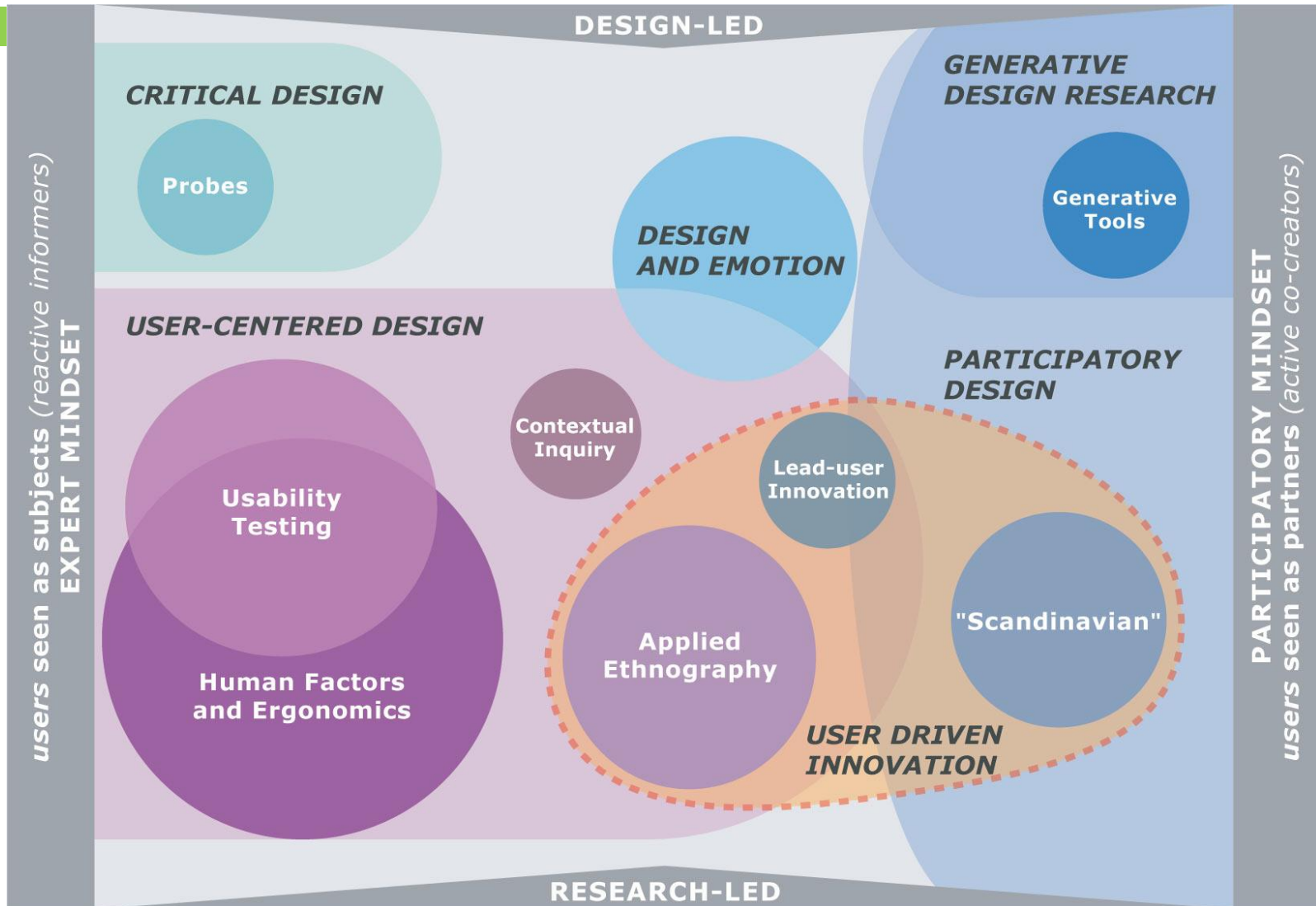


# Usability definition



# User involvement, participatory design

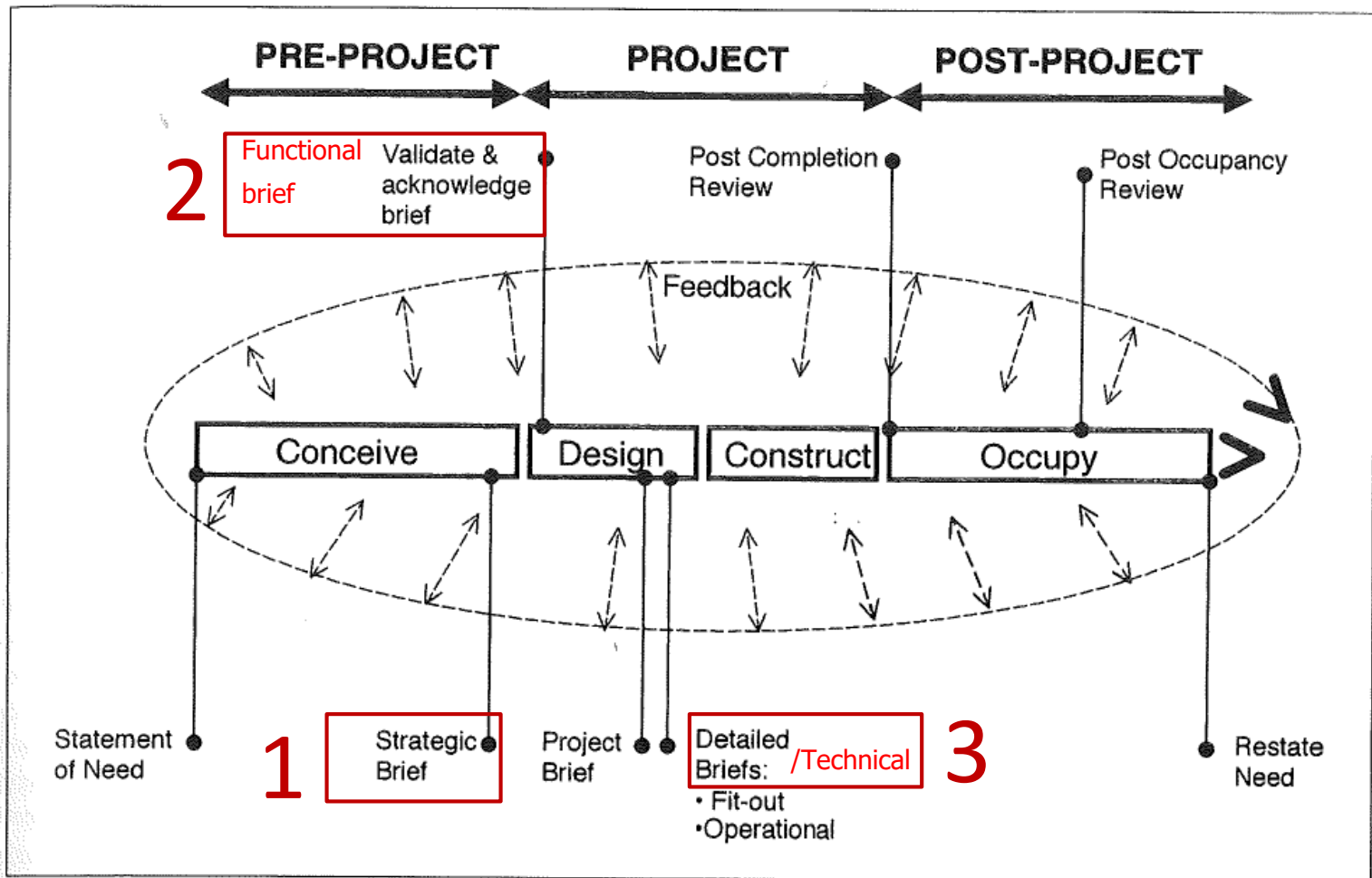
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Jensen, P. A., Alexander, K., Fronczek-Munter, A. (2011), adapted from Sanders (2006)

# Briefing, architectural programming

8





# Briefing

9

| <b>Traditional briefing</b>                              | <b>Usability briefing</b>   |
|--|---|
| Concerns new building project                            | Concerns client and user needs in existing or future facilities   |
| A definite phase at an initial stage of building project | A continuous process with changing focus in all phases of building life cycle including design, construction and in use |
| An expert based information collection                   | A co-learning and dialogue process with users   |
| User opinions mainly used as data source                 | Users actively involved as co-designers and part of a corporate change process  |
| The result is a brief, i.e. a requirement specification  | Continuous collection of visions and requirement specifications, with changing detail and focus in all phases           |

# Evaluation focus flower

Venustas  
Beauty / Form

Firmitas  
Durability / Technology

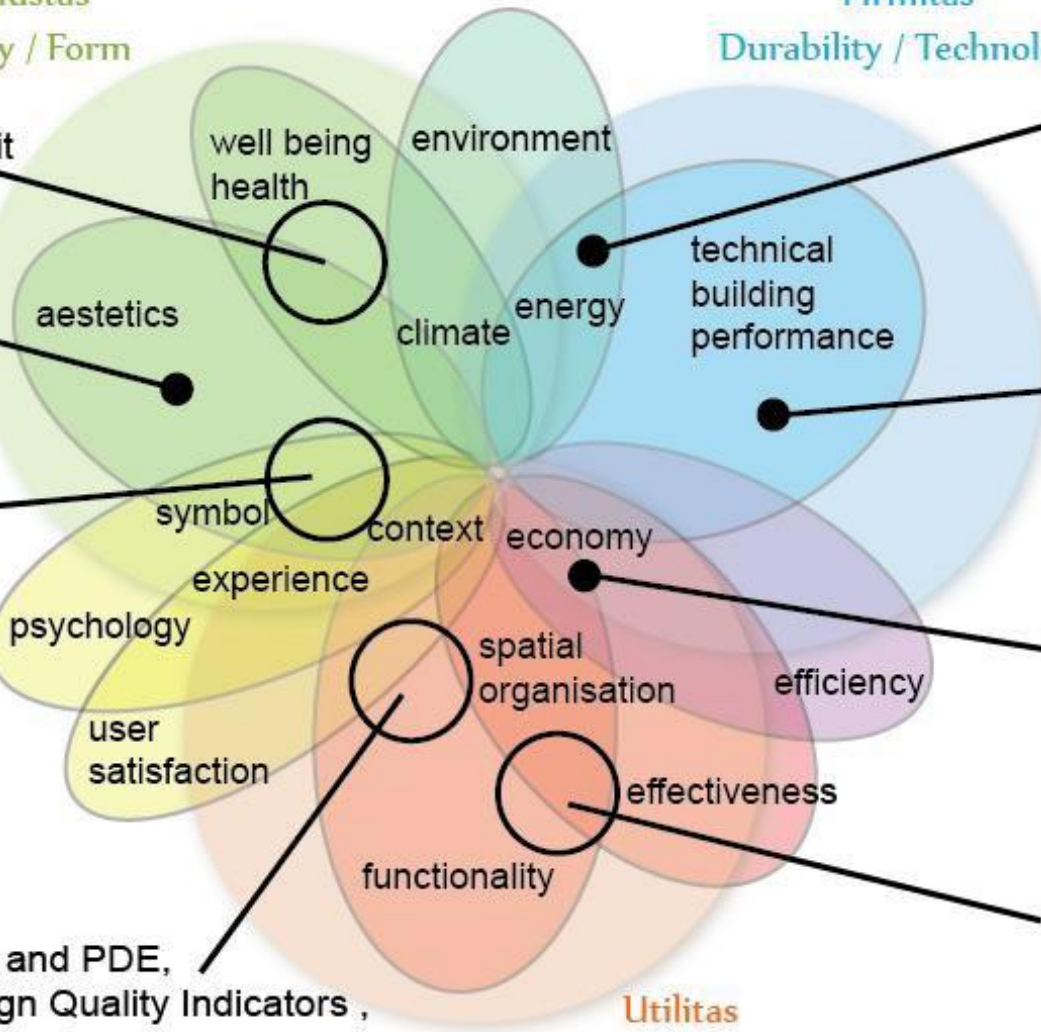
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Healthcare  
Design Action Kit

aesthetic  
walk through  
sketches  
observation,  
photos

participative  
methods,  
workshops,  
narratives,  
mental map,  
understanding  
spaces,  
1,2,3, SMB

USE tool, POE and PDE,  
BUS, CIC Design Quality Indicators,  
interviews, future scenarios



150 POE  
techniques

55 methods  
organised in PhD

Aneta Fronczek-Munter (2013)

# Usability briefing

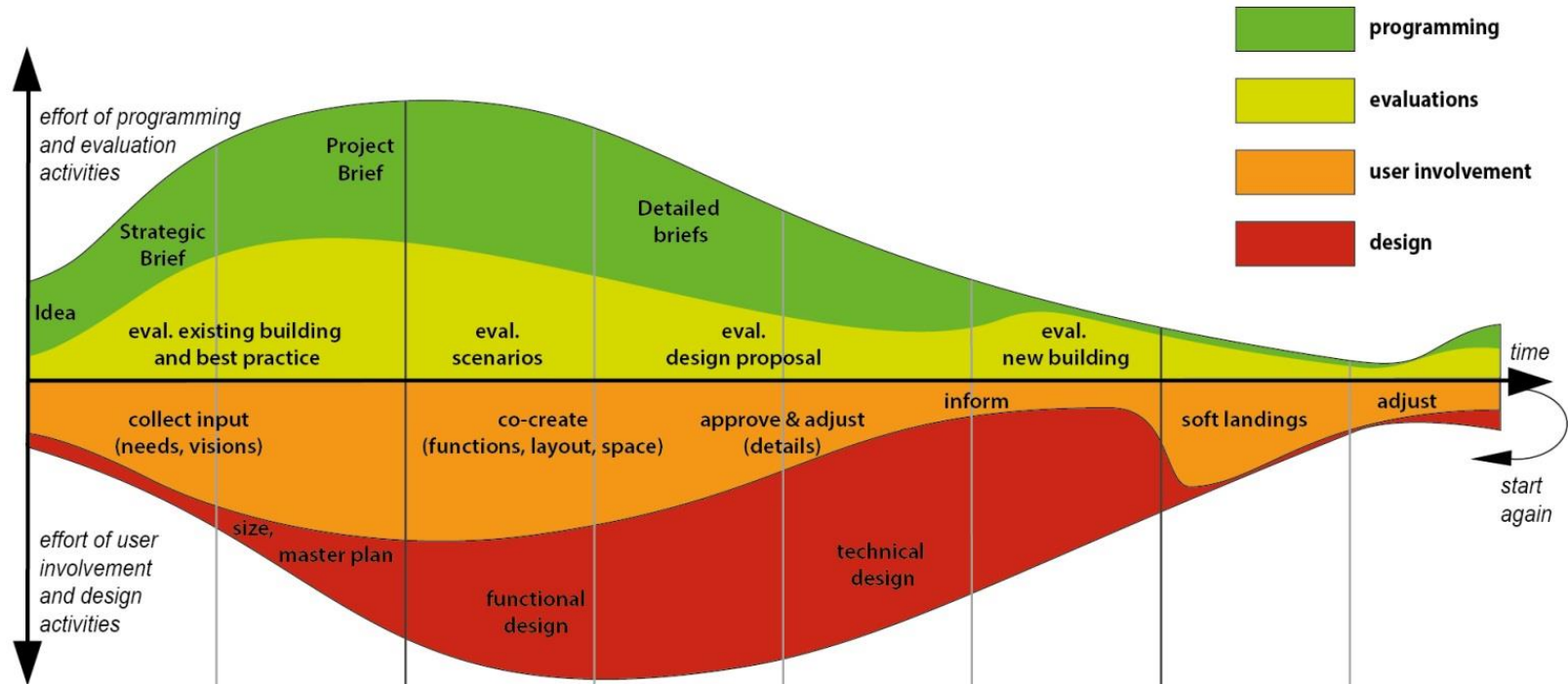
11



|          | PRE - PROJECT             |                          | PROJECT                    |                                      |                       |                   | POST - PROJECT  |             |
|----------|---------------------------|--------------------------|----------------------------|--------------------------------------|-----------------------|-------------------|-----------------|-------------|
| Phases   | 0<br>Strategic Definition | 1<br>Preparation & Brief | 2<br>Concept Design        | 3<br>Developed Design                | 4<br>Technical Design | 5<br>Construction | 6<br>Handover   | 7<br>In Use |
| Faser DK | 1.1<br>Idé oplæg          | 1.2<br>Byggeprogram      | 3.1<br>Dispositionsforslag | 3.2 Projektforslag<br>3.3 Forprojekt | 3.4<br>Hovedprojekt   | 4<br>Udførelse    | x<br>Aflevering | 5<br>Drift  |

# Usability Briefing

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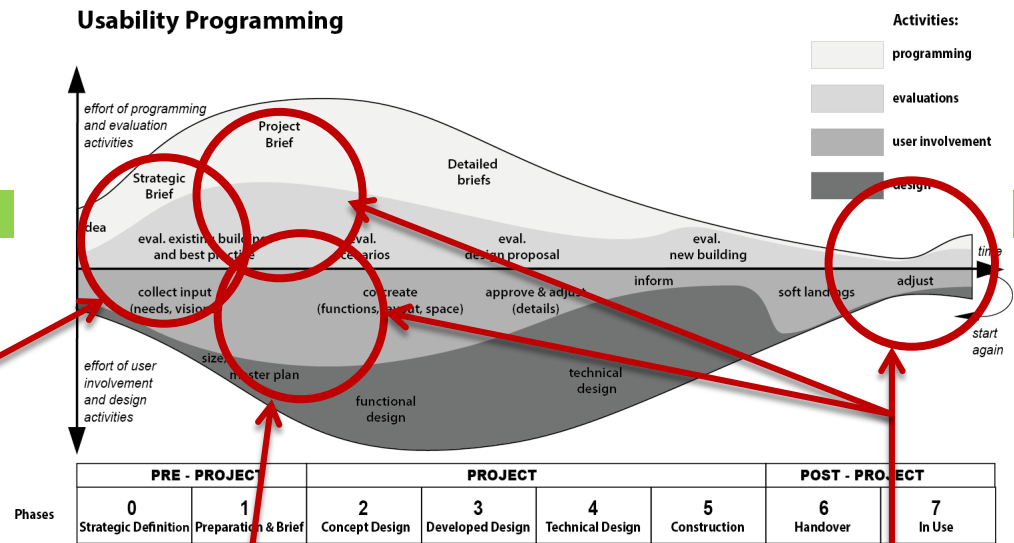


- Activities:**
- programming
  - evaluations
  - user involvement
  - design

|  | PRE - PROJECT  |   | PROJECT   |  |  |  | POST - PROJECT   |   |
|--|--|---|---|--|--|--|--|---|
| Phases   | 0<br>Strategic Definition  | 1<br>Preparation & Brief  | 2<br>Concept Design   | 3<br>Developed Design  | 4<br>Technical Design  | 5<br>Construction                      | 6<br>Handover  | 7<br>In Use   |
| <b>Focus</b><br><i>- what?</i>                           | Establish a shared vision by top decision makers: ambitions, goals, strategy, organization, collect data, prioritize decisions |   | Architectural vision, layout, rooms, co-learning, co-designing, usability, innovation   | Usability and functionality of design proposals, transforming visions to prioritized needs and solutions, from general to detailed and operational |  | Maintain usability while changes occur | Successful move-in, learning how to use the new facility, evaluations - requirements tests, further improvements |   |
| <b>Users</b><br><i>- with whom?</i>                      | Managers, top level users, define user groups  | Lead users, patient organizations, managers, top level users                      | Various users/stakeholders: patients, relatives, doctors, nurses, architects, secretaries, facility managers, service staff, operational staff  |  | Nurses, doctors, technical users, facility managers  | Varied groups of users                 | Varied groups of users   | Varied groups of users  |
| <b>Tools, methods, boundary objects</b><br><i>- how?</i> | Meetings, feasibility studies, document reviews, dialogue, visioning, pick a picture, walk-through                             | Surveys -BUS, brainstorming, evaluations: PDE/POE, usability assessment - USEtool | Participatory workshops with users, design games, pictures, observation, charrettes - collaborative sessions, visioning, Healthcare Design Action Kit; simulations: table top, Virtual Reality, AEDET, prototypes, mock-ups |  | Workshops, user approvals, evaluations of building quality, commissioning, certifications DGNB, LEED |  | Soft landings -users learning building operation, building evaluations   | Satisfaction surveys, WODI, DQM, POE, ST&M, ASTM standards, 5-years check |



# Examples from case studies



## Case 1 (BH)

6 thematic user groups  
& briefing,  
+continuous user group



## Case 2 (HIL)

Co-creation, methods  
Design games,  
simulation



## Case 3 (SOH)

Evaluations, USE tool  
Patient involvement



# Case Bispebjerg Hospital, DK

14

- Existing hospital
- Listed buildings
- Garden
- Case study 2010-2012





# Masterplan competition

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Bispebjerg Hospital Masterplan  
Denmark

6 thematic user groups: example- Garden  
Masterplan competition brief –additional  
100.000 m<sup>2</sup>, rebuilding 57.000 m<sup>2</sup> until  
2025

Dilemmas: traffic, parking and infrastructure,  
easy orientation, whilst preserving historical  
identity, small intimate rooms and niches



# Case Healthcare Innovation Lab, DK

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Case study 2010-2012

Public-private collaboration testing simulation and user driven innovation

Hospitals and companies in Danish Capital Region

Ways of involving users, design games, active involvement, innovation





# Case St Olavs Hospital, Norway

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Winner of seven awards at design & health international academy awards 2014:  
Best international health project Case study 2012-2013





# Hospital and city

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# Conclusions

Usability briefing process model :  
visual overview,  
4 continuous activities

Frequent interactions,  
support each other  
**Briefing** is not one phase, but  
continuous process with changing  
focus.

Enable users, client and  
designers to co-create and take  
evidence-based decisions  
Result in more usable hospitals  
for the future



## USABILITY BRIEFING FOR HOSPITAL ARCHITECTURE — EXPLORING USER NEEDS AND EXPERIENCES TO IMPROVE COMPLEX BUILDINGS

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### SUMMARY

**INTRODUCTION**  
The usability briefing is a multi-disciplinary approach to hospital architecture design. It involves the collaboration of architects, usability experts, and healthcare professionals. The goal is to create a building that is not only aesthetically pleasing but also functional and user-centered. This process involves identifying user needs, conducting usability research, and integrating findings into the design process.

**OBJECTIVES**  
The primary objective of the usability briefing is to ensure that the final design meets the needs and expectations of the users. This is achieved through a series of iterative activities, including user interviews, usability testing, and prototyping. The process also aims to foster a collaborative environment where all stakeholders can contribute their expertise.

**CONCLUSIONS**  
The usability briefing process is a continuous and iterative one. It requires ongoing communication and collaboration between all parties involved. By following this process, architects can create hospital buildings that are more usable, efficient, and user-friendly, ultimately leading to improved patient care and healthcare outcomes.

### USABILITY



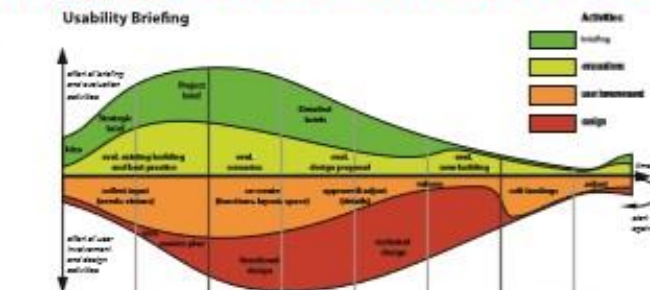
### BRIEFING



### EVALUATIONS



### PARTICIPATORY DESIGN



|              | PRE - PROJECT |   |   | PROJECT |   |   |   | POST - PROJECT |   |
|--------------|---------------|---|---|---------|---|---|---|----------------|---|
|              | 0             | 1 | 2 | 3       | 4 | 5 | 6 | 7              |   |
| <b>PHASE</b> | 1             | 2 | 3 | 4       | 5 | 6 | 7 | 8              | 9 |
| <b>PHASE</b> | 1             | 2 | 3 | 4       | 5 | 6 | 7 | 8              | 9 |
| <b>PHASE</b> | 1             | 2 | 3 | 4       | 5 | 6 | 7 | 8              | 9 |
| <b>PHASE</b> | 1             | 2 | 3 | 4       | 5 | 6 | 7 | 8              | 9 |
| <b>PHASE</b> | 1             | 2 | 3 | 4       | 5 | 6 | 7 | 8              | 9 |





# Conclusions

## Evaluations

**NTNU** **ST. OLAVS HOSPITAL**

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**THESIS STATEMENT**

Justified design of hospitals can be supported by a comparison between different spatial design solutions and evaluation of best ones.

This paper presents a research project identifying a set of evaluation methods for hospital architectural quality and usability, including patient and staff experiences.

The aim is to assess usability in the dimension on architectural quality of hospitals and provide data and tools for future hospital projects.

A few evaluation methods are specifically designed for hospitals, but many of them include similar techniques. To share parts of different methods that seem to serve all three leges.

**THEORETICAL BACKGROUND**

In order to map the central leges we use the Evaluation Focus Framework (Franczek-Munter, 2017).

**CONCLUSION**

This shows a set of methods for evaluating environmental quality and usability of hospital buildings. From the multiple methods for evaluating buildings, we chose seven methods that appear to serve most three areas on the Evaluation Focus Framework and are specifically suitable for hospitals. This paper presents the preliminary results of the five tested evaluation methods at the rehabilitation centre Stene Olav at St. Olavs Hospital in Norway.

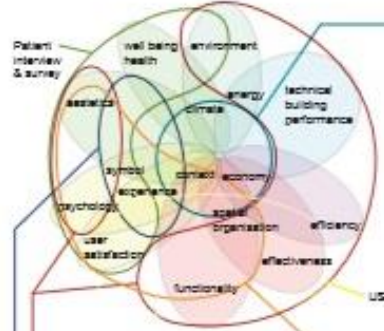
The selected methods can assist further improvements of existing facilities, or development of programmes of requirements for new hospitals, based on evidence based cases.

The preliminary results confirm our hypothesis, that the combination of methods is necessary. The seven evaluation methods together give a good overview of most leges at the Evaluation Focus Framework.

# HOW TO EVALUATE HEALTHCARE BUILDINGS?

## SELECTION OF METHODS FOR EVALUATING HOSPITAL ARCHITECTURAL QUALITY AND USABILITY - A CASE AT ST. OLAVS HOSPITAL IN NORWAY

### Evaluation focus flower and 7 evaluation methods



**Key stakeholder interview**

Starting about the environmental quality in the facility questions about the air and how much light enters through the large windows (...) that is quite good compared to other hospitals. But if you are in a (functionally) you are something else.

We interviewed 12 key stakeholders, which included: patient and former board members (2); members of the former project organisation (2); user organisations involved in the design process (2) and; heads of clinics at the current hospital organisation (6).

The results from key stakeholder interviews both at a strategic level and specific experiences at a site particular level. Following topics were covered: spatial organisation, efficiency, economy, user experience, ergonomics, usability and well-being.

The do not see the difference that you see in the old hospital, when you walk through the hospital, it is good.

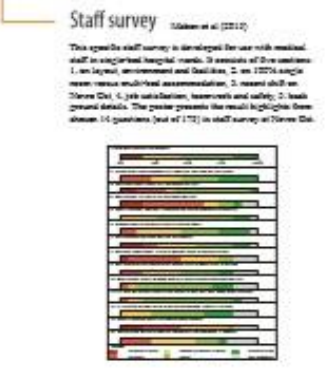
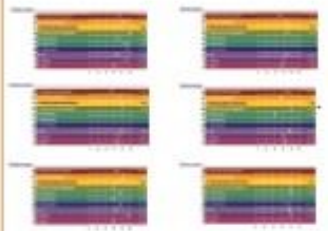
**AEDET survey** *Following Healthcare Design Evaluation Toolkit (2012, 2016)*

AEDET Evaluation Toolkit and its three online guides to assess many leges: aesthetics, psychology, technical performance, effect-reuse, energy, Sustainability and spatial organisation. It provided an overview of the strengths and weaknesses of the quality of architectural design at Stene Olav rehabilitation centre. Moreover, in this case, a few professionals only did accept to answer some groups of questions. The summary of survey results is presented below.

**Reflexive photography & Semantic differential scheme** *Ståken et al (2012)*

Staff members take photographs of spaces during the focus of 'reflexive' discussion. This method is present, but also part of hospital evaluations by Ståken et al (2012). Additionally, we added a scheme with 2 parameters (Ståken, 2011), including: disease as: simplicity, complexity, pleasantness, and we selected neutral - personal, short explanatory notes ideas.

The photos are put as slides on posters (positive and negative), which gives an easy overview of specific examples of needs and successful solutions in hospital architecture. Themes covered are: aesthetics, content, well-being, spatial, ergonomics.



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# CONTACT



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