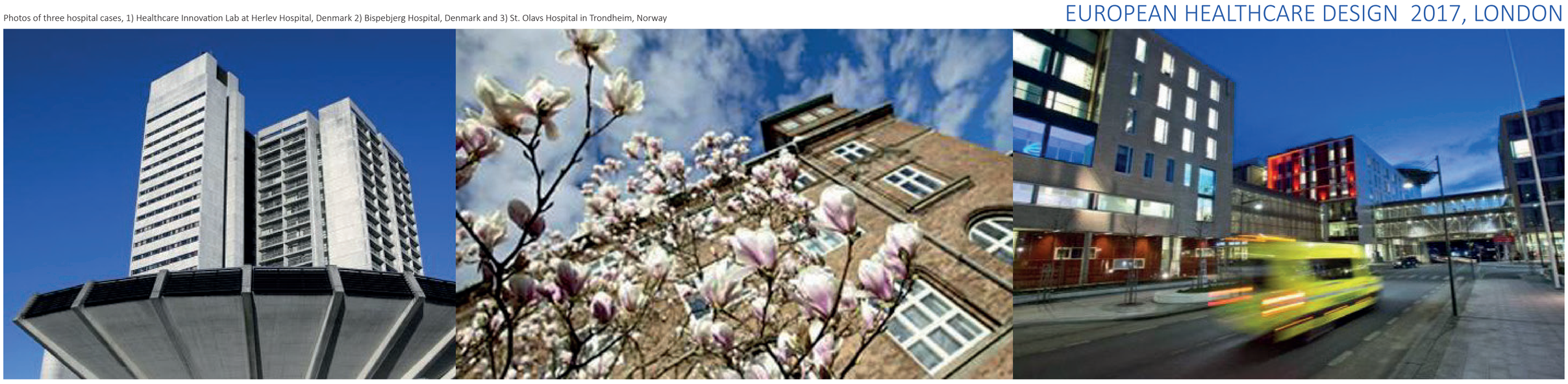

USABILITY BRIEFING FOR HOSPITAL ARCHITECTURE – EXPLORING USER NEEDS AND EXPERIENCES TO IMPROVE COMPLEX BUILDINGS

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SUMMARY

THESIS STATEMENT:

This completed Ph.D. research is a contribution to an ongoing debate in Europe 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 the process model for usability briefing for hospital architecture from a user perspective.

This conference poster and paper shortly summarise the results of the Ph.D. thesis, which was defended at the Technical University of Denmark in 2016. It contributes to achieving hospitals of excellent architecture and usability, supporting the needs of future patients, healthcare professionals and society.

METHODOLOGY:

The Ph.D. thesis is based on comprehensive literature studies, three long-term case studies at hospitals in Denmark and Norway, 140 events: expert interviews, presentations and workshops with architectural and engineering companies specialised in design or briefing for hospitals.

RESULTS AND CONCLUSIONS:

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.

Usability is a concept similar to functionality, but usability depends on: subjective view of users, context, culture, situation and experience. Understanding usability is achieved by involving users. The phd thesis extends the research in usability of buildings to include all building design phases, therefore not only proposes usability evaluations, but also defines usability briefing. *Briefing*, also called *architectural programming*, is usually understood as one of the first phases of a building project. In practice the process, led by experts, involves the users as data sources, and results in the program of requirements for the building.

The phd thesis synthesizes the research findings and proposes a usability briefing process model, where briefing is a dynamic and continuous process throughout all the building phases: from pre-project, through design and construction phases to handover and in-use. In the proposed usability briefing model the activities of briefing and design are not sharply divided, but support each other in frequent interactions. User involvement and evaluations support briefing and design by common learning, participatory data collection and analysis of needs. Therefore, the model combines all interrelated activities and provides a visual overview of them throughout all phases. Additionally, the model includes the focus, users and methods for each phase.

Furthermore, the practice could go further with user involvement, compared to the usual *user-centred design*, where users passively reveal their needs and the professionals continue with the design. Instead, this thesis proposes a move towards *user-driven innovation* and scandinavian *participatory design*, where users are seen as partners and co-creators, and where innovation and design are not done 'for' users, but 'with' or 'by' users.

Research results from the presented hospital cases demonstrate that user-driven innovation is possible even in the hierarchic and technically advanced healthcare environment, and that patients and medical staff can have a positive influence on the prospected architectural environment, provided that the user involvement occurs early and is managed properly.

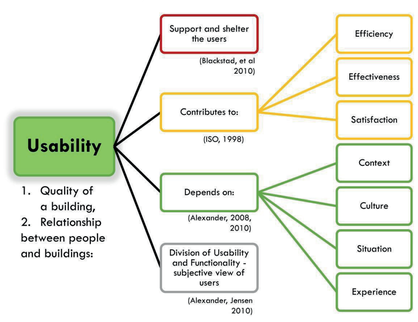
Moreover, the model incorporates the evaluation activities in the process, also at the front-end, where evaluation can give input to briefing and design, and can occur as participatory methods, i.E. Simulations. In order to choose an appropriate method, the various methods and tools for evaluating facilities are grouped according to their main focus: technical building performance, function/usability or form/beauty. Furthermore appropriate methods are selected specifically for hospital projects.

IMPLICATIONS:

The results are published in five scientific articles and are summarised in a phd thesis. It provides tools that contribute to satisfying the needs of future building users and maximising the usability of complex buildings, such as hospitals. The research results have relevance to researchers, architects, facility managers and client organizations planning new complex facilities, and especially for professionals working with briefing and design of hospitals.

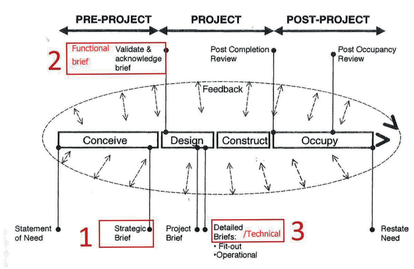
USABILITY

The concept of usability has its roots in evaluations of consumer products and user interfaces of computer software. In ISO 9241-11 it is defined as: 'The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use' (ISO 1998).



In the field of architecture the usability concept is known and often translated as functionality. Nevertheless some researchers prefer to make a distinction between functionality and usability (Alexander 2006, 2008, 2010; Jensen 2010; Fronczek-Munter 2011), where functionality in the building industry is objectively measurable, while usability introduces the subjective views of the users. The result of this is that usability can be evaluated differently by different groups of users. Furthermore, researchers suggested that usability depends on the context, culture, situation and experience (Alexander 2008, 2010).

BRIEFING



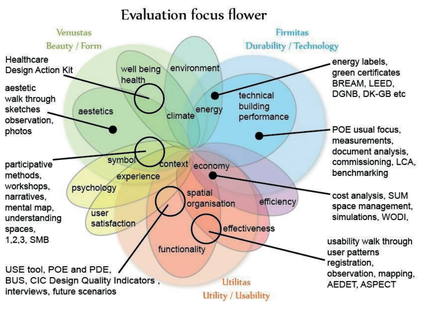
Briefing (American English: architectural programming) is usually understood as one of the first phases of a building project, before the design activities start. Briefing is a process that in practice often results in program documents (program of requirements, brief) that contains the client's requirements for the building.

Several researchers suggest that: 1) Briefing should be dynamic, 2) Briefing should be a continuous process, 3) proposed several different programs with different purposes.

Fig. Briefs in different building phases (Fronczek-Munter, 2016, ad. Blyth & Worthington, 2010)

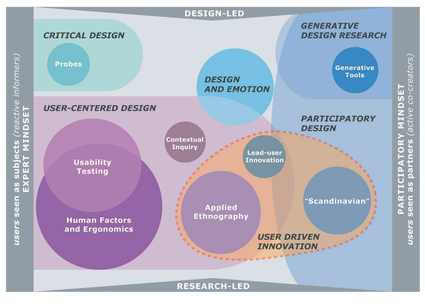
EVALUATIONS

Evaluation is one of the key processes to achieve usability and effective facilities. Various methods and tools exist for evaluating existing facilities. Post-Occupancy Evaluation (POE) is the most known building evaluation methodology. Preiser et al. (1988) and Preiser and Vischer (2005) define POE as 'the process of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time'.



The Figure presents the Evaluation focus flower (Fronczek-Munter, 2013), with an overview of evaluation methods divided in three Vitruvian focus areas of usability, beauty and durability. The many focus areas are represented by flower petals with overlaps. The methods are grouped and placed on the Evaluation Focus Flower model in order to easily find the right evaluation method fitting the focus area to study.

PARTICIPATORY DESIGN

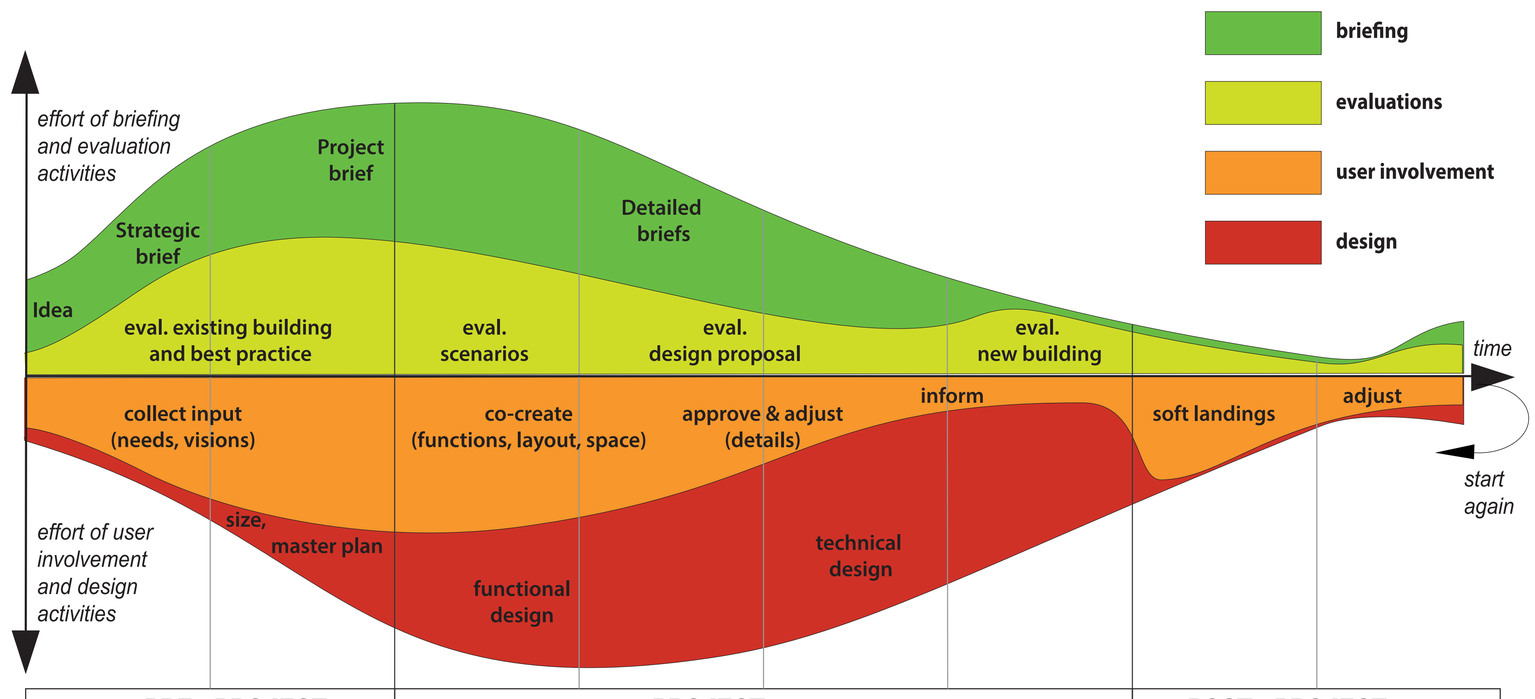


There are different approaches to user involvement, where users can be seen as either co-creators or merely data source. The methods are positioned in the framework with two axes. The vertical axis is stretching from design-led to research-led, while the horizontal axis is stretching from an expert mindset, where users are informants and design is FOR people, to participatory mindset, where users are co-creators and design is made WITH people.

Participatory design actively involves users throughout the design development and is gaining popularity. User driven innovation is the design process in which users are (co-) creators of design.

User involvement approaches, (Jensen, Alexander, Fronczek-Munter, 2011; ad. from Sanders, 2006)

Usability Briefing



	PRE - PROJECT		PROJECT				POST - PROJECT	
Phases	**0** Strategic Definition	**1** Preparation & Brief	**2** Concept Design	**3** Developed Design	**4** Technical Design	**5** Construction	**6** Handover	**7** In Use
Focus *- what?*	Estabilish a shared vision by top decision makers: ambitions, goals, strategy, organisation, collect data, prioritise 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	
Users *- with whom?*	Managers, top level users, define user groups	Lead users, patient organisations, 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
Tools, methods, boundary objects *- how?*	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

HOSPITAL PROJECTS – THREE CASE STUDIES

Bispebjerg Hospital project located in Copenhagen area, Denmark, studied in 2010- 2012, following the processes of user involvement and briefing for the master plan competition with additional buildings of 100.000 m2 and rebuilding existing buildings of 57.000 m2 until 2025. Interviews with managers, architects and workshop facilitators.

Healthcare Innovation Lab- conducted in 2010-2012 at the Gynaecologic Department at Herlev Hospital, a public-private collaboration project testing simulation and user-driven innovation between users and companies at Hospitals in the Danish Capital Region. Different ways of involving users in planning healthcare facilities. Participative 'action research', with active involvement in workshops with users / medical staff.

St. Olavs Hospital in Trondheim, Norway ,conducted in 2012-2013 partially as a historical study from literature, document reviews and interviews with Chief hospital architect and Chief medical manager, responsible for user involvement; site visits, trial of usability evaluation method USEtool