

An anthropological inquiry by design towards improving indoor air quality within hospital settings

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State-of-the-art in the research domain & references to literature

Since air is normally invisible and intangible, it has been largely neglected in studies of architecture from an anthropological perspective. In discussing the ‘atmospheres’ of buildings, scholars have focused on interactions between people and things and the feelings these interactions generate. Yet without air there could be no such interactions: not only do we need air to breathe; it is also the medium of all perception. Thus the quality of the air is likely to have affects that exceed the purely physiological, to include the varieties of sensory experience. Changes in indoor air quality have demonstrable affects on patient recovery and quality of life. I argue air quality must therefore be integral to any architectural design brief for designing hospital settings.

Annemans et al. (2016) show how hospital design has an affect on spatial experiences of people who engage with a design and these experiences are shaped by an interrelation of material, social and temporal dimensions. Considering how sensorial experience and perceptual acuity¹ might be involved in architectural and environmental design towards improving air quality of hospital settings, an ongoing project led by Heylighen, *Building Support* (2016-20) sets out to investigate how the spatial experiences of people affected by cancer can inform the architectural design of hospitals.

Van der Linden et al. (2016:512) however highlight the difficulties of integrating findings from scientific research into architectural design processes of healing environments. They indicate that this may be in part due to the lack of an integrated framework to inform design processes. Main findings from their study of architects’ experiences of designing cancer care facilities, indicate that architectural designs emerge from close social interaction with the client and the architectural brief; observations of spatial dynamics and inspiration from everyday experiences of engaging with healing environments rather than design concepts being based upon scientific research. The authors offer two main suggestions for making the experiential empirical findings gained from conducting research with patients, staff and visitors more accessible for the purposes of informing hospital design: consider different ways of communicating everyday experiences of healing environments to inform architectural design and future making practices of designers; understand the potential of experiential knowledge to improve the architectural design processes of healing environments. The research project and associated workshops *‘From care(ful) research to care(ful) design’* (2015-17) by Heylighen et al. expand upon these suggestions to find ways of communicating their findings, in ways that a multi-disciplinary design team could draw upon research materials to begin generating design concepts informed by sensorial experiences of healing environments. In parallel, they have begun to develop a framework for involving qualitative research of patient sensory experiences of hospital settings to inform architectural design processes. (Annemans et al. 2014).

This focus on the importance of finding ways of moving scientific research concerning sensory experience and perceptual acuity into architectural and environmental design processes involving both qualitative and quantitative methods (Baetens and Saelens 2016)

¹ In the context of the proposed research, I refer to sensory experiences as related to perceptions of hospital interior environments and by perceptual acuity, I refer to how different senses are interrelated in perception through movement within these environments (Ingold 2000, 2013).

parallels my own research. Here, I build upon main findings from my previous research in the areas of indoor climate and quality of life (2008-11), the design of the electricity SMART grid (2012-14) and involvement of biotechnology for improving air quality in hospital interiors (2014-ongoing). This includes: limitations and potentials of uptake of user knowledge in innovation practices (Gunn and Clausen 2013, Clausen and Gunn 2015); challenges associated with involving a broader grouping of people within design processes and practices who would otherwise be excluded (Buur and Matthews 2008); how to reconcile differing meanings of environment, which play with and against each other during collaborative processes of designing (Jaffari, Boer and Buur 2011) and finding ways of communicating the nonvisual and non-verbal qualities of perceiving indoor climate to engage different stakeholders within architectural and environmental design engineering processes (Gunn and Donovan 2012, Gunn and Løgstrup 2014, Gunn and Gilby (forthcoming)).

Clear hypothesis or research question(s)

As an anthropologist, my research is concerned with the affects that design processes and future making practices have on people who engage with products, buildings and urban landscapes. This has been underpinned by a longer-term aim to understand how people's sensory experience and perceptual acuity can be involved during architectural and engineering design processes and future making practices. Central to this inquiry, I argue it is necessary to make partial connections between the movements of designing and movements of ongoing *intra-action* (Barad 2003)². In the fields of architectural design and environmental engineering, I ask what kind of forms and material practices could we imagine being made in the future based upon this proposition? One proposition, for example, might be to consider combining architectural and environmental engineering design while improving indoor air quality operating across the fields of energy, health and environment. From this positioning, the principle research question to be addressed in the proposed project is:

How could scientific research concerning patients', staff's and visitors' sensorial experience and perceptual acuity be involved in architectural and environmental design and future making practices of care(ful) design concerned with improving indoor air quality of hospital settings?

Research aims and objective(s)

The first aim is to consider architectural and environmental engineering design processes and future making practices of care(ful) design as an anthropological exploration of creativity whereby people shape and are shaped by their ongoing *intra-actions* with buildings (Barad 2003, Ingold 2016). The second is to expand the notion of *anthropology by means of design*. In anthropology disciplinary investigations of architectural design and environmental engineering design practice(s) have been limited to anthropology of design and *for design*; *by means of design* is however less developed. And the third is to initiate collaborative research between myself, Research[x]Design (Dept. of Architecture) and Building Physics (Dept. of Civil Engineering) at KU Leuven.

Description of the methodology and work-plan

Central issues underpinning my methodological positioning are: identify anthropological methodologies and theoretical concepts that would support architectural and environmental engineering design and participatory future making practices of care concerned with improving indoor air quality in hospital settings; define, describe and

² As Barad says of the notion of intra-action, '... (in contrast to the usual "interaction," which presumes the prior existence of independent entities/relata) represents a profound conceptual shift. It is through specific agential intra-actions that the boundaries and properties of the "components" of phenomena become determinate and that particular embodied concepts become meaningful' (2003: 815).

discuss forms of architectural and environmental engineering design practice that would support participatory future making practices of care towards the improvement of indoor air quality in hospital settings; further development of aspects of sensorial ethnography to enable the movement of scientific research into architectural design processes and participatory future making practices of care through anthropology by means of design in hospital settings; explore new ways of combining qualitative empirical and quantitative data in a common research project of improving air qualities within hospital settings.

Work packages

The fellowship will run from 15th January 2017 to 15th of January 2018. During that period, I will complete four work packages in collaboration with members of the Research[x]Design group and Building Physics section. Depending on the results, I will explore possibilities for structural collaboration, which may lead to joint grant applications in the future.

Work package 1, M1-5

Work package objectives: to investigate how to nurture health and well-being of patients, staff and visitors by improving air quality in hospital settings.

Description of activities: international mapping and comparison across methodological positioning of projects giving focus to the benefits for patients, staff and visitors of involving sensory experience and perceptual acuity within the architectural and environmental design of hospital settings. E.g., best practice design, evidence based design and ethnographic approaches.

Timetable and milestones: M4 Submission of joint article, M5 Methodological tool kit

Outputs and deliverables: Joint article, possible journal HERD Health Environments Research & Design

Work package 2, M5-8

Work package objectives: to study how qualitative analysis of sensorial experience and perceptual acuity of air quality could be involved in the architectural and environmental design engineering of hospital settings.

Description of activities: a) build upon Research[x]Design's existing qualitative analysis of patients, staff and visitors sensory experience and perceptual acuity of hospital air quality b) refer to perform measurements with equipment from Building Physics' to substantiate claims in WP1 that involving sensory experience and perceptual acuity of patients, staff and visitors in architectural and environmental design could improve air quality in hospitals.

Timetable and milestones: M7, M8 Joint article submissions

Outputs and deliverables: Joint articles. Possible journals: Building Research and Information, Indoor and Built Environment, Indoor Air, Building and Environment.

Work package 3, M8-10

Work package objectives: to demonstrate potentials of involving sensory experience and perceptual acuity of patients, staff and visitors as parameters in the architectural design and environmental design engineering of hospital settings.

Description of activities: a) literature review focusing on measuring hospital IAQ b) based on findings of review design an experiment, that in a follow up-project project can be used to measure hospital IAQ to be coupled with qualitative data from Research[x]Design group. c) presentation of experiment as part of multi-stakeholder workshop in WP4.

Timetable and milestones: M8 Completion of literature review; M9 Design of experiment; M9 Joint article submission. M9 Joint conference presentation.

Outputs and deliverables: Joint article. Possible journals: Building Research and Information, Indoor and Built Environment. Possible conference: Design4Health

Work package 4, M10-12

Work package objectives: integrate insights from WP1, 2, 3 towards the design of multistakeholder workshop involving architects, environmental engineers and healthcare professionals from Research[x]Design's and Building Physics' networks for involving sensory experience and perceptual acuity within the architectural and environmental engineering design of healthcare settings.

Description of activities: a) organise and facilitate multistakeholder workshop utilizing findings WP1, WP2 and presentation of IAQ measurement experiment WP3 b) co-analysis of workshop documentation c) communication of results.

Timetable and milestones: M10-11 Facilitation of multistakeholder workshop, M10-11 Development of framework for co-analysis of workshop materials, M12 Publication of findings

Outputs and deliverables: joint papers aimed at an international community of architects and environmental design engineers. Possible journals: Architectural Engineering and Design Management.

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