HOW ARCHITECTS AND CLIENTS INTEGRATE USER PERSPECTIVES IN CANCER CARE FACILITY DESIGN

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Abstract

Objective – This paper seeks to investigate the extent to which architects and clients involved in the design of cancer care facilities integrate the perspectives of users generally, and people affected by cancer specifically, in the design process.

Background – Increasingly, hospital users contribute to design briefs and participate as stakeholders in design processes. If the best available research and experience is to inform the design of cancer care facilities and ensure quality improvement in care, it is essential that user perspectives are engaged. Cancer patients are interesting to consult as they are exposed to different aspects of healthcare environments in a wide variety of situations. However, the literature suggests that users are inadequately addressed in design briefs for healthcare environments.

Research question – What supports and challenges can be identified regarding the integration of user perspectives in the design of cancer care facilities?

Methods – A multiple case study enquiry analysed two cases. The cases are information-rich and unique examples of completed building projects that encompass cancer care facilities. They enable an in-depth study of the design process as the phenomenon of interest. One case is a new general hospital in which cancer care is integrated. The other case concerns a renovation of an oncology consultation in a university hospital. Interviews were conducted with the project's 'client' and 'architect' and project documents were analysed.

Results – The integration of user perspectives is supported by individual staff members, and by the use of mock-ups and 3D images. A major challenge is that patients are only consulted with indirectly. Care professionals are a primary source of knowledge informing the design process with their own perspectives and that of patients. The more tangible a design becomes, the more feedback is elicited. A tension results between care professionals' ideas to make the design (more) effective and the ambition of 'building oriented' stakeholders to finalise decisions. Also, matters of spatial organisation established early on make it difficult to respond to the evolving organisation of cancer care.

Conclusion – For clients and architects to develop an affinity with the perspectives of people affected by cancer, it is necessary to reconsider how knowledge about users is acquired. Our findings suggest attention for patient perspectives may require focussing on spaces other than those utilised for the delivery of care. The approach taken provided insights into current practice and further suggests clients distinguish between staff participation for organisational reasons and spatial design activities.

Keywords: *Cancer Care | Design, Hospital Building | Qualitative Research | User Perspectives*

Introduction

A product can be considered to convey its designers' intent. However, designers have little control over the context of its use. The individual user and their personal context affect how a product is interpreted [1]. As such, meaning intended by designers and meaning ascribed by users do not necessarily coincide [1,2]. Furthermore, people differ in their sensitivities, abilities, and the opportunities they see. Through use, sensations are linked with actions that affect them, new opportunities come to the fore (or recede), and varied choices are made [1,2]. The design outcome mediates between designer intent and user interpretations [3]. Although this observation originates in the context of product design, similar considerations hold for individuals' interactions with designed environments [3,4].

The communication-based model of design describes users' evolving interpretation as resulting from an iterative process of "acting, perceiving and reacting" [4]. This aligns with understanding experience of the built environment as entangled with time, movement, and the body [5]. Underlying this framing of design as communication is the idea that building professionals differ from users in their understanding of what a successful building is. Architectural education shapes style preference [6] and experts and 'lay people' evaluate buildings differently. In light of this, interest is growing in involving user perspectives within architectural design processes, and the role of empathy therein [7,8]. Particularly for care environments, consultation with different stakeholders is vital to the success of their design

[9,10]. In research and practice, healthcare professionals are consulted, while less attention goes to patients and family members [11].

For people affected by cancer, the experience of environments where consultations, examinations, and treatments take place can be highly stressful. Awareness is growing of how this group is affected by design and the resulting spatial and sensory qualities [12–15]. Previous work shows that cancer patients visit multiple facilities (or places within a facility) for their care and that perceptions of their environment change over time and are affected by illness or side effects [16]. This should also be seen in relation to the body of knowledge resulting from Ulrich's [17] seminal publication, linking window views and nature to patients' health and well-being. If knowledge regarding patient experience is to inform design and ensure quality improvement in care, user perspectives should be incorporated in decision-making regarding care facility design. When little is known about spatial aspects affecting patients' experience, it is also challenging for those involved to realise a patient-centred care environment [18]. However, the literature suggests that users are inadequately addressed in design briefs for healthcare environments [19]. More generally, knowledge about users in design processes is fragmented and intangible [20].

Aim

Assuming that experiences of people affected by cancer will increasingly be consulted to inform the design of cancer care facilities, this study seeks to investigate the extent to which architects and clients involved in such designs integrate the perspectives of users generally, and people affected by cancer specifically, in the design process. We report on two case studies addressing the following question: what supports or challenges the integration of user perspectives when designing cancer care facilities?

Approach and methods

Research design

We align this study with a socio-ecological conception of health [21] and an understanding of the relationship between the user of a built environment and the building as one that is reciprocal in nature [22]. Attention for spatial aspects in the experience of the built environment is primarily concerned, not with user satisfaction, but with the extent to which the built environment is effective in supporting the movement and activities use entails. 'User perspectives' refers to a spectrum of diverse and collected experiences (for more on the complexity of the user see e.g., [20]). Based on previous research we consider people affected by cancer as (a) having much in common with other patients, using general care services and varied spaces in the hospital environment, and (b) having specific spatial sensitivities.

Two cases were selected for the study, not to gain insight into their specificities, but to better understand an issue [23] namely, integration during design processes of spatial aspects in users' experience. The projects' 'client' and 'architect' were interviewed, and project documents were analysed. To address the research question, we adopt a constructionist approach, allowing meaning to be co-constructed in dialogue with the participants and the collected documents [24].

The cases

The first case study looked at a general hospital newly built to accommodate two merging care organisations. It took approximately 15 years from 'intention to build' to the opening. When this study was conducted the hospital had been open for one year. The 'full oncological care program' includes facilities for diagnosis, follow-up and treatment on site, with dedicated units for oncological care of in- and outpatients [25]. As the board of directors' representative in the 'building team' (see Figure 1) the chief operating officer was interviewed as 'the client'. The project architect and an interior architect were interviewed together.
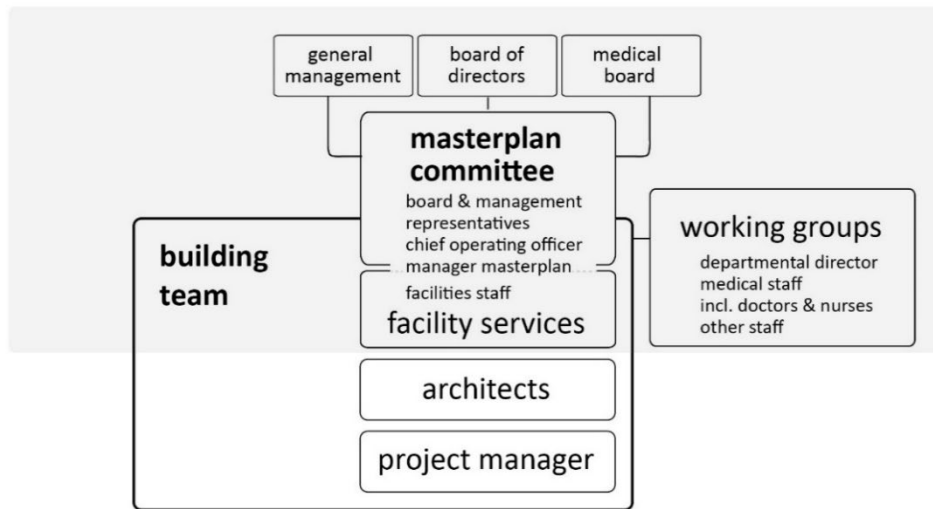
Figure 1. Organisational chart for the first case study, showing main actors in the design process. The grey rectangle indicates internal hospital association

The second case is an oncological consultation within a university hospital. A 34% increase in the number of consultations over 13 years (2001-2014) resulted in overcrowded waiting spaces and too few examination rooms. Reorganising available space allowed adding three consultation rooms and one room for bloodwork. A general refurbishment was also carried out. There were two years between initial conversations and moving back into the renovated space. During the renovation the consultation was located elsewhere in the hospital for eleven weeks. Interviews took place with the interior architect, working within the hospital's own spatial planning department, and the head nurse in the role of client (see Figure 2).
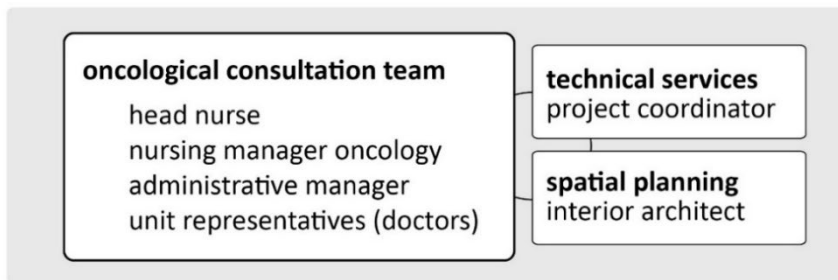

Figure 2. Organisational chart for the second case study, showing main actors in the design process. The grey rectangle indicates internal hospital association

Data collection and analysis

We used focused ethnography to identify supports and challenges regarding the integration of user perspectives in the design of cancer care facilities. All interviews were conducted by the first author (henceforth referred to as 'the researcher') and took place within the care facilities. For the first case additional visits included a tour by an oncology-coach, and a meeting with two members of the facilities department. Access to documentation regarding the design process was granted through the building team's file-sharing system. For the second case the researcher visited the consultation multiple times before and after the renovation and was granted access to the hospital's (hardcopy) archive of the project. Field notes made during visits to the facilities informed the analysis. Documents analysed included approximately 100 separate documents per case, each document consisting of anything from 1 (including images and plans) to 60 pages.

Data collection and analysis was conducted by the researcher who also translated excerpts included in the text from Dutch to English. NVivo software (version 11) was used to organise, search and code data. The qualitative analysis (roughly following the QUAGOL guide, see [26]) involved an iterative process of coding, memo-writing and the development of concepts and categories.

Results

Staff 'on board' in future-oriented design

The design of the new hospital was informed in a time-consuming and iterative process by 35 (initially 26) working groups comprised of staff. Doctors both participated in these groups and were consulted separately. Working groups offered input regarding their specialisation or unit, e.g., radiology, pharmacy or kitchen. Some had a broader scope e.g., circulation, cleaning and ICT. Generally, a unit's team was approached as a separate client whose requirements were integrated in the design within the conceptual guidelines of the hospital board, by and as shared responsibility of the building team (see Figure 1). The client and architect relied on the working groups to know what was best for their working environments and patients' use of the building. The documentation of the design process suggests that working groups differed considerably in terms of the amount of input they offered or attention they received. Reports of building team meetings also make clear that architect and client occasionally disagreed about whether or not to consult particular working groups again.

The architects spoke of their personal and professional experience regarding hospital environments as complementing staff members' input and supporting their understanding of use-related points of attention. They required negotiation skills to balance between those reasoning for 'the best for the patient', and others concerned with financial limitations. Different 'sources of knowing' about users informed the design, e.g., reference projects were considered valuable evidence of good and less successful examples, and necessary to verify working group input.

The integration of user perspectives in the design was supported by the approach of the hospital's master plan committee. The process of merging motivated them to encourage staff participation in the design process for organisational reasons. Staff perspectives were further integrated to ensure an ecological and ergonomically supportive employee-centred environment. The ambition to realise a healing environment that would minimise stress-inducing factors for patients relied on care professionals' knowledge. Simultaneously, the master plan committee seemed to play an important role applying guiding principles to decisions about daylight, air quality, accessibility, acoustics, orientation and circulation.

Mock-ups, realised at different points in the process, played a mediating role. Various room-types were built, tried out and feedback collected, which led to 'principal choices' for their layout (e.g., Figure 3), material finishings and the overall 'look and feel'. Individual staff members prioritised and repeatedly voiced concerns, translating their understanding of spatial aspects important to the experience of patients. Occasionally, 'claims' were backed by references to literature or related projects. For an atrium, it was decided to deviate from fire safety regulations and resolve compensatory measures. Future unknowns were dealt with by employing the concept of reconfiguration. For example, the hospital's skeletal structure was designed to accommodate changes and additions. Financial buffers allowed for unforeseen changes. Finally, communication throughout the decision-making process was helped by the use of file-sharing systems such as, filezilla, chapoo, and bricsys, and an external project manager who oversaw working group contributions.

Challenges regarding the integration of user perspectives were identified at multiple levels. Firstly, the working groups' scope of influence was limited by the spatial organisation established early in the brief. The chief operating officer (COO) explained:

> *The big picture had been sketched, the schemes were there, allocated surface areas had been determined per unit and at that moment it was discussed with the working groups as in, "within this part tell us what needs to happen but this is the philosophy we want to preserve and this is the structure that it'll have". So. There was an outline that they had to stay within but inside of that a lot of input was given.*

As a result, the care organisation ended up appropriating the building in a way that deviated from the design intentions. The initial allocation of square meters did not match the spatial requirements of units upon completion of the building. Secondly, tension existed between 'builders' (building oriented stakeholders) and 'carers' (care professionals).
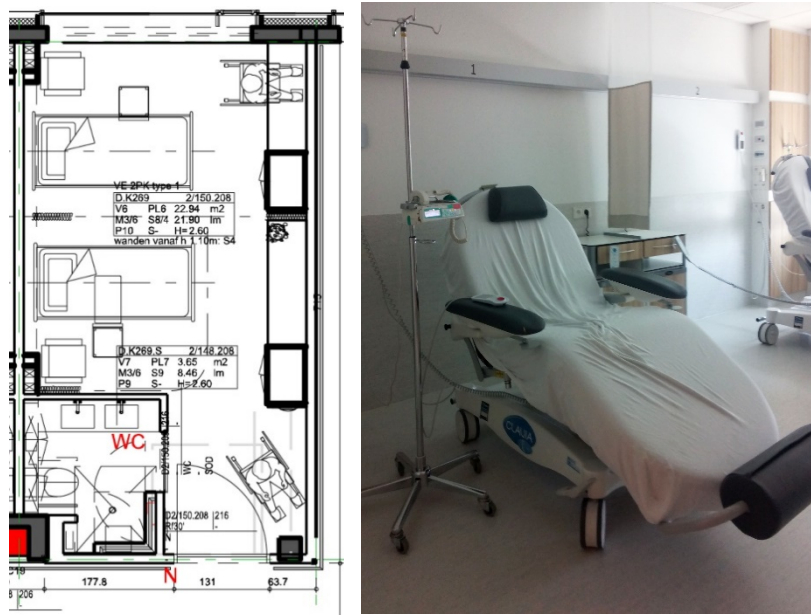
Figure 3. Plan of standard double room (left) where some beds have been replaced with reclining chairs (right) in the oncology and internal medicine day hospital

Builders, for example, sought to 'freeze plans', while the client aimed to continue integrating user-input resulting from evolutions in care. The latter stemmed from a desire to be a 'future-ready' hospital, requiring an openness to input from staff not previously involved. Finally, feedback from working groups was often seen to 'come late'. A discrepancy existed between the skills and availability of working group members on the one hand, and the expectations regarding their spatial insight and types of representations offered to them on the other. The architect indicated the inability to read plans was problematic:

> The people can't imagine what it'll be like any earlier, they can imagine it only once it is almost finished right? When the room is there and they walk through it, only then do they see it, as in, oh it's like that?

A puzzle to reorganise limited space

In the second case knowledge regarding patients was put forward by a variety of actors, based on their past experiences and interactions. In renovation design meetings, units functioning within the consultation were represented by a doctor (professor) (see Figure 2). Doctors' feedback was collected in an iterative process and focused on what was important for their care activities. The interior architect described it as follows:

> For them it was like, "look that room has to be just so. I have to be able to work well in it and I shouldn't have to walk too far to fetch my patients and I need a back-office corridor so that they don't see me walking by".

Nurses, repeatedly consulted by the head nurse, focused on practical details regarding their use of the space. The head nurse and nursing manager were considered guards of aspects that were important to patients. The interior architect supplemented this, for example, with recommendations to accommodate wheelchair users. Coordinating the temporary move during the renovation helped the interior architect gain insight into the consultation's way(s) of working. The current care practice, of one supervisor working with three assistants, largely determined the spatial re-organisation. The wish to realise an 'air bubble' for the overfull consultation provided a conceptual objective. To realise this, rooms adjacent to the consultation were incorporated to add new work spaces and square meters to the space available for patient circulation and waiting areas (see Figure 4).
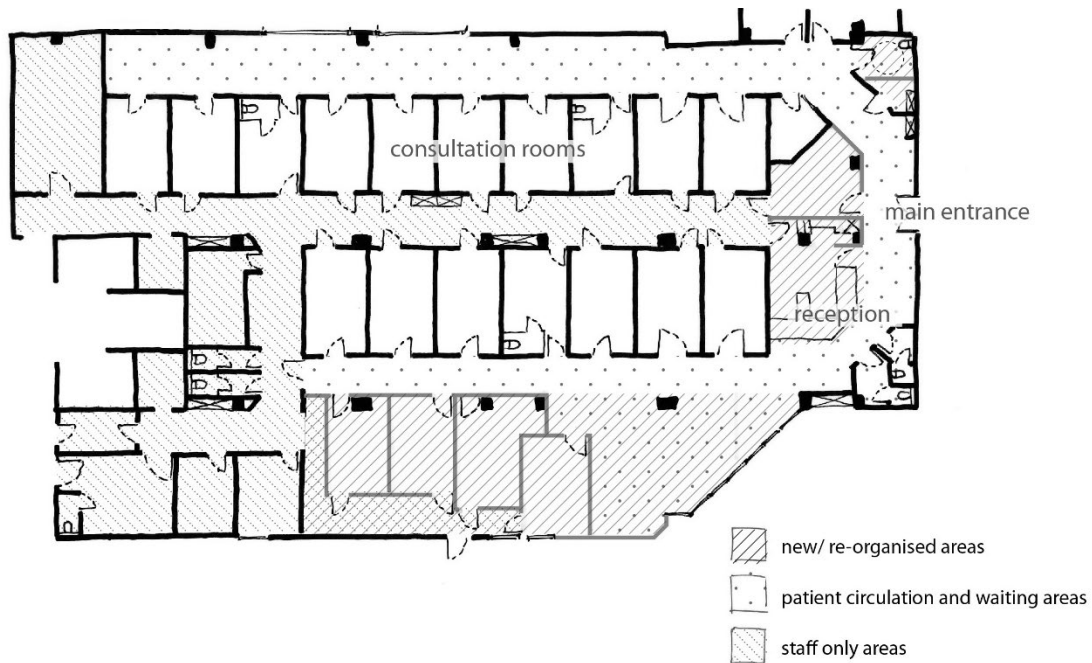
Figure 4. Plan of oncology consultation after the renovation highlighting patient and staff areas

For the interior architect, integrating users' perspectives in the design was supported by an openness to knowledge sharing, and an understanding of adjacent units and spatial developments elsewhere in the hospital. The interior architect and the head nurse were supported by frequent, responsive and multi-faceted communication and the feeling of shared responsibility. Discussions and negotiations allowed integrating different perspectives in the design. Negotiating with adjacent units and projects (for additional square meters, for another window) was necessary. Also, nurses successfully lobbied for a window in the staff kitchen after it had been removed from the plans for financial reasons. Design representations formed an important tool for those involved to know and communicate about requirements for the oncology consultation. Plans and 3D images elicited different concerns: for example, a plan elicited concerns about the workspace behind the reception counter, while notes on a 3D sketch focussed on the experience of approaching and using the counter (see Figure 5). Input from external experts included ergonomic advice, plans of examination rooms elsewhere in the hospital, and layout options for waiting spaces. When the exact use of an examination room was unknown, variants were developed to accommodate both types of medical examination conducted in the consultation.

Optimally integrating user perspectives in the design was challenged by spatial limitations. For the furniture in the waiting room, ensuring sufficient seating within limited space led to trading-off comfort. Although chosen seating was initially deemed suitable, cushions were ordered after patients complained. Acoustic issues for patients waiting near the reception area were also tackled as 'aftercare': design interventions added-on during and after the design was realised. Furthermore, prioritizing aesthetic reasoning led to underestimating the importance of daylight. The head nurse gives an example:

> *The disadvantage of some is … that they want it to be beautiful and the glass has to be positioned in such a way- Because, I, for example, didn't get a window because it would not have been synchronised. And then I think "guys! For me, if there had now been a horizontal window it would've given tremendous added-value to this office".*
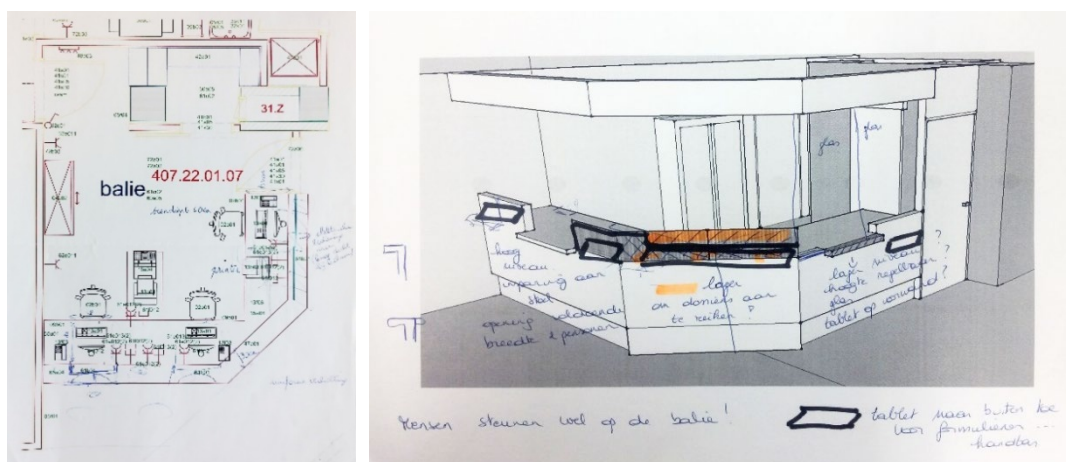
Figure 5. Annotated plan (left) and 3D sketch (right) of reception area.

The interior architect received requests as a fragmented stream of input. In most matters she had the final say. Aspects that could not be taken into account or fell outside of the program were carried forward towards a future design. Some staff members forced their input in the process. By deviating from usual communication procedures, they saw their ideas integrated, sometimes with negative consequences for others. For example, a receptionist refused to sit on a raised chair and therefore had a platform built behind the counter. This was not approved by the interior architect and created an unsafe situation. Ambiguity in the decision-making resulted from the project's open-endedness in terms of aftercare, and the fact that the project coordinator was responsible for the final phase of the renovation (paint colours, hanging of fixtures).

Cross-case analysis

Spatial implications of the evolution of care

In both cases, dealing with spatial implications of the evolution of care posed a major challenge. This challenge was characterised by open-endedness regarding the integration of user perspectives. The building projects were extended through last-minute input and aftercare, in response to users' feedback and complaints immediately following the design and execution of the plans for the (cancer) care facility.

In the new hospital, the sluggish building process conflicted with the future-oriented care vision. Emphasis lay on ensuring the design was updated to reflect the evolving care organisation, dealing with changing patient 'flows' and advances in medicine and technology. This was illustrated by the place of oncological care within the building. Initially, plans for a day hospital were developed, together with a working group. The day hospital, accommodating surgical and oncological/internal medicine significantly deviated from the layout of more standardised nursing wards. Eventually, the day hospital for oncology and internal medicine moved to a regular nursing ward. The COO explains the rationale:

> At a certain moment you have to calculate your patient volumes, the relational matrix between wards A, B, C, you take all of that into account and then you know "OK, I want approximately that many wards with that content, this many patients and I'd like them positioned about there". Then of course, when new insights come, when you're looking for certain rooms but you run out of space then at a certain moment you have to start thinking out-of-the-box.

In the new location, a lounge was added with reading materials, a kitchen counter, sofa's, a table and a space for facial/beauty care. It was considered important for the day hospital to be close to the nursing ward for oncology and respiratory care on the floor above.

Dealing with the spatial implications of the evolution of care was also challenging in the oncological consultation. Firstly, those involved recognized the renovation as a temporary solution situated within a greater whole. Their on-going engagement allowed the design process to be one of learning and interconnectedness, linked to past and future spatial and technological changes. Secondly, this case study highlighted a distinction between formal input applying primarily to back-office space and spaces where employees work, and much of the aftercare being necessary to improve patient experience in the waiting room.

A related challenge in both cases, albeit at different scales, links design representations with the input of care professionals. This may help to better understand the working group participants' tendency to focus on details more than the 'big picture'; the challenge of testing with the 'right people'; the difficulty participants had to recognise their own input; and the need to realise more mock-ups in order to fine-tune aspects of the design. In gaining understanding

of, and applying knowledge about user perspectives, there was a clear value to using tangible representations or 3D images.

Wearing two hats

To integrate user perspectives in the design, clients primarily tried to meet the requirements of care professionals. Although patients were informally consulted, information about them came indirectly to architects. In the first case the architect said:

> *We build for patients while we ourselves never have contact with patients. The only thing we do is of course reflect on our own, personal situations where we may already have been in-touch with such situations and these influences we obviously include in our designs.*

The care professionals formed a large and diverse group and held the knowledge required to define units' functional use. For clients and architects, they were indispensable as addressing care professionals' needs within their design required detailed insights. Incorporating their understanding of patients was seen as the obvious way to create an environment optimised for the delivery of care. How the space worked was prioritised. The (cancer) patient was considered a customer. People accompanying patients were expected to manage independently. On the client's side, key individuals behaved as guards of user perspectives. These were staff members with an overview of the requirements of a particular unit (spatial) or patient population (pathological). Alongside their 'regular' tasks and responsibilities, they showed genuine commitment to the design process.

Discussion

In the cases studied, the experience of people affected by cancer does not seem to be a primary concern during the design. The design is aimed at the staff, facility management, and hospital board, indirectly referencing patients. Staff are involved as representatives of the organisation and as part of a team. The spatial organisation the designs build on, seems to result from a model of care focussed on efficiently producing medical care [27,28], where the experience of doctors and nurses (e.g., privacy and distance covered) is prioritised over that of patients. Clients and architects voiced the will to enhance patient experience but key aspects of the process did not reflect this. The reality preceding the formulation of the brief restricts the extent to which user perspectives can be fully integrated, and further research should explore the role regulatory agencies and policies have in this.

There is little attention for differences between staff perspectives on patient experience and direct input coming from patients and their relatives. When patients are indirectly represented, it is critical to consider how. Generally, care professionals are considered to be well positioned to voice patients' concerns and they regularly stand in as advocates for patients in healthcare facility design projects (e.g. [29,30]). However, in both cases studied, issues that patients raise (in retrospect), concern non-medical spaces. Spatial aspects of patients' experience that are pathology- and unit-specific, as in the case of the oncology consultation, are acknowledged by various care professionals; while little attention is paid to patients' journeys throughout the building and spatial aspects relating to the possible complexity of their care experience. Where staff is predominantly concerned with their work space, hallways and waiting rooms may require their own advocates.

Participating care professionals are expected to show a high level of commitment. Integrating their feedback is time-consuming and requires facilitation and project management. This aligns with findings of related work [11, 31]. Simultaneously, architects may have limited enthusiasm for more direct user involvement and, limited attention for diversity, as they consider themselves as 'serving a general public'[20]. In this respect, informing (cancer) care facility design with empirical material that distinguishes between user perspectives generally and patient perspectives specifically may be worth exploring.

Finally, the clients and architects in these cases employ user perspectives to anticipate future developments. Expecting users to know the needs and situations of their future fellows is problematic [32]. However, expecting architects to determine future use autonomously may be seen as equally problematic [33]. Mediating objects such as mock-ups enable integrating feedback loops within architectural design processes to inform the final building. Such objects, as representations of space, can facilitate different types of communication and can be expanded on when they are simultaneously developed as a representation for user activities [34]. With this in mind, integrating user perspectives could further be supported by employing spatial representation materials and user-oriented design activities more intentionally. Distinguishing between supporting objectives and activities related to organisational participation and supporting those focused on spatial design may help to channel limited resources.

Concluding remarks

For clients and architects to develop an affinity with the perspectives of people affected by cancer, requires considering, how knowledge about users is acquired. Clients' role is key to deciding when and which user perspectives are integrated. In the cases studied clients' support of staff participation prioritised the perspectives of care professionals and laid the responsibility for providing relevant patient perspectives with them too. Yet, aftercare

suggests (cancer) patients' perspectives remain underrepresented. These may however, add value by alerting clients and architects to matters concerning experiences of hallways and waiting spaces. Adequately timing user perspective input remains a major challenge: early integration may solve problems before they arise, looking beyond matters of 'look and feel', whereas late input may delay the project while keeping up with evolutions of care.

Acknowledgements

References

[1] Krippendorff K.; Butter R. (1984) Product Semantics: Exploring the Symbolic Qualities of Form. Innovation. 3(2):4–9.
[2] Krippendorff K. (2006) The semantic turn: a new foundation for design. Boca Raton, FL: CRC/Taylor & Francis
[3] Crilly N.; Good D.; Matravers D.; Clarkson PJ. (2008) Design as communication: exploring the validity and utility of relating intention to interpretation. Design Studies. 29(5):425–57.
[4] Crilly N.; Maier AM.; Clarkson PJ. (2008) Representing artefacts as media: Modelling the relationship between designer intent and consumer experience. International Journal of Design. 2(3):15–27.
[5] Casey ES. (2003) From space to place in contemporary health care. Social Science & Medicine. 56(11):2245–7.
[6] Wilson MA. (1996) The socialisation of architectural preference. Journal of Environmental Psychology. 16(1):33–44.
[7] Annemans M.; Van der Linden V.; Karanastasi E.; Heylighen A. (2015) Learning to shape places of care by empathising with patients and caregivers. In: 2015 Conference on Raising Awareness for the Societal and Environmental Role of Engineering and (Re)Training Engineers for Participatory Design (Engineering4Society). 8–16.
[8] Carmel-Gilfilen C.; Portillo M. (2016) Designing With Empathy Humanizing Narratives for Inspired Healthcare Experiences. HERD: Health Environments Research & Design Journal. 9(2):130–46.
[9] Hoof J van.; Rutten PGS.; Struck C.; Huisman ERCM.; Kort HSM. (2015) The integrated and evidence-based design of healthcare environments. Architectural Engineering and Design Management. 11(4):243–63.
[10] Schepers S.; Dreessen K.; Huybrechts L. (2011) Methods for collective creativity in experience design processes for health(care). In: Proceedings of the First European Conference on Design 4 Health, 13 - 15 July 2011, Sheffield UK.
[11] Sanders EB-N.; Stappers PJ. (2008) Co-creation and the new landscapes of design. CoDesign. 4(1):5–18.
[12] Gharaveis A.; Kazem-Zadeh M. (2018) The Role of Environmental Design in Cancer Prevention, Diagnosis, Treatment, and Survivorship: A Systematic Literature Review. HERD: Health Environments Research & Design Journal. 11(4):18-32.
[13] Mullaney T.; Pettersson H.; Nyholm T.; Stolterman E. (2012) Thinking beyond the cure: A case for human-centered design in cancer care. International Journal of Design. 6(3):27-39.
[14] Rowlands J.; Noble S. (2008) How does the environment impact on the quality of life of advanced cancer patients? A qualitative study with implications for ward design. Palliative Medicine. 22(6):768–74.
[15] Timmermann C.; Uhrenfeldt L.; Birkelund R. (2013) Cancer patients and positive sensory impressions in the hospital environment – a qualitative interview study. European Journal of Cancer Care. 22(1):117–24.
[16] Jellema P.; Annemans M.; Heylighen A. (2018) At Home in the Hospital and Hospitalized at Home: Exploring Experiences of Cancer Care Environments. In: Langdon P, Dong H, Lazar J, Heylighen A, editors. Breaking Down Barriers - Usability, Accessibility and Inclusive Design. New York, NY: Springer Berlin Heidelberg; 2018.
[17] Ulrich RS. (1984). View through a window may influence recovery from surgery. Science, 224(4647):417–19.
[18] Annemans M.; Van Audenhove C.; Vermolen H.; Heylighen A. (2018) In-patients' spatial experience: Interactions between material, social and time-related aspects. Space and Culture. 21(4):495-511.
[19] Elf M.; Svedbo E.; Wijk H. (2012) An assessment of briefs used for designing healthcare environments: A survey in Sweden. Construction Management and Economics. 30(10):835–44.
[20] Van der Linden, V.; Dong, H.; Heylighen, A. (2019). Tracing architects' fragile knowing about users in the socio-material environment of design practice. Design Studies. (63): 65–91.
[21] Lawson HA. (1992) Toward a Socioecological Conception of Health. Quest. 44(1):105–21.
[22] Vischer JC. (2008) Towards a user-centred theory of the built environment. Building Research & Information. 36(3):231–40.
[23] Stake RE. (1995) The art of case study research. Thousand Oaks: Sage Publications

[24]   Savin-Baden M.; Major CH. (2012). Qualitative research: the essential guide to theory and practice. New York, NY: Routledge.

[25]   Volksgezondheid, veiligheid van de voedselketen en leefmilieu. (2003) Koninklijk besluit houdende vaststelling van de normen waaraan het zorgprogramma voor oncologische basiszorg en het zorgprogramma voor oncologie moeten voldoen om te worden erkend [Internet]. Available from: http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=nl&la=N&table_name=wet&cn=2003032133

[26]   Dierckx de Casterlé B.; Gastmans C.; Bryon E.; Denier Y. (2012) QUAGOL: A guide for qualitative data analysis. International Journal of Nursing Studies. 49(3):360–71.

[27]   Martin D.; Nettleton S.; Buse C.; Prior, L.; Twigg J. (2015). Architecture and health care: a place for sociology. Sociology of Health & Illness, 37(7):1007–1022.

[28]   Cartier C. (2003) From home to hospital and back again: economic restructuring, end of life, and the gendered problems of place-switching health services. Social Science & Medicine. 56(11):2289–2301.

[29]   Bowen S.; McSeveny K.; Lockley E.; Wolstenholme D.; Cobb M, Dearden A (2013). How was it for you? Experiences of participatory design in the UK health service. CoDesign. 9(4):230–46.

[30]   Broberg O.; Edwards K. (2012) User-driven innovation of an outpatient department. Work. 41:101–106.

[31]   Østergaard KL.; Simonsen J.; Karasti H. (2018) Examining situated design practices: Nurses' transformations towards genuine participation. Design Studies. 59:37–57.

[32]   Redström J. (2006) Towards user design? On the shift from object to user as the subject of design. Design Studies. 27(2):123–39.

[33]   Imrie R.; Street E. (2014) Autonomy and the socialisation of architects. The Journal of Architecture. 19(5):723–39.

[34]   Van Amstel FMC.; Zerjav V.; Hartmann T.; van der Voort MC.; Dewulf GPMR. (2015) Expanding the representation of user activities. Build Res Informat. 43(2):144–59.