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Being wheeled through the hospital: designing for hospital patients’ spatial experience in motion

Introduction
How we move or are moved shapes our experience of the built environment. Thus architects and others designing spaces through which many people move are confronted with the challenge of taking into account people’s spatial experience in motion. Locations where patients spend a considerable amount of time moving or being moved, such as hospitals, could benefit significantly from a better understanding of people’s spatial experiences in motion. Based on an improved understanding of wheeled patients’ spatial experience we look for ways to inform architects’ design processes. By providing architects with relatively ‘raw’ visual and narrative data which have had only limited post-processing (Annemans et al., 2012), we aim to gain insight into the impact of different information formats that introduce motion in design. We argue that close consideration of information formats should inspire and trigger architects to focus on spatial experiences in motion, as such creating buildings based on an improved understanding of the mobile subject.

The chapter reflects upon a workshop in which participants were asked to design a lift using research data in various formats on hospital patients’ spatial experience in motion (Annemans, 2015). We analysed the workshop’s design outcome and design process, paying specific attention to the affordances of different information formats. The resulting design ideas offer important insights into the relationship between space
and motion. The workshop findings illuminate the ways in which design outcomes emerge within and through the representations of different information formats.

Introducing patients’ experience in motion in the design process

Designing for patients’ well-being requires an in-depth understanding of their experience. Empathy with users in the design process can be developed in various ways (Kouprie & Visser, 2009). Ideally designers obtain information through interaction with real target users, i.e. patients, allowing to develop a more thorough understanding and empathy with them (Kouprie & Visser, 2009; McGinley & Dong, 2011). However, since time and money restrictions in a typical design process result in minimal user engagement (Cassim, 2010), designers are often unable to obtain this direct input from users and become dependent upon indirect sources of human information (McGinley & Dong, 2011).

Various techniques have been developed to bring designers closer to users' experience (Kouprie & Visser, 2009; McGinley & Dong, 2011; van Rijn et al., 2011). Most methods aim to foster designers’ empathy with those for whom they are designing. The specific situation of particular users affects the degree to which actual interaction can be achieved. In the case of patients being moved through a hospital, practical and ethical restrictions make it hard for designers to actually engage with them in the situation under study. Therefore, we set out to explore which formats could be suitable to inform design about hospital patients’ spatial experience in motion. We aimed to find a format that meets the designers’ requirements and was able to communicate data about motion.
The development of a story, like that of a patient’s hospital experience, and the trajectory along which it develops often happen in parallel (Ingold, 2011). An information format aiming at informing design should ideally reflect this parallelism. In a traditional design briefing the parallel development of a patient’s story and trajectory is often unclear: there is a tendency to focus on functional and organisational matters. Including user information is often limited to attention to the values of the (care) organisation (Bogers, van Meel, & van der Voordt, 2008; Elf & Malmqvist, 2009; Elf et al., 2012), without attending to patients’ stories. Research suggests that an alternative approach to the design brief with a focus on personal stories (Van der Linden et al., 2016) improves a designer’s ability to relate to users’ experience. Introducing real users’ experiences in the design process allows designers to relate to people’s specific situations (Annemans et al., 2014; van Rijn et al., 2011). In product design, co-creation and other forms of designer-user interaction are fairly common (Howard & Somerville, 2014). However, bringing this human-centred approach to architecture and planning is apparently “a big nut to crack” (Sanders, 2009).

Designers are particularly motivated by visual communication and like information to be graphically presented (Lofthouse, 2006). Moreover, they often mistrust data that have already been through a process of interpretation (Restrepo, 2004) and seem to prefer raw data in a format that is condensed to be design-relevant (McGinley & Dong, 2011). These insights, together with the difficulty of grasping the experience of motion in words, mean that visual communication tools would seem to be promising in transferring patients’ impressions of moving to architects. While static images can trigger reflection upon motion (Annemans et al., 2012), video seems even better given its mobile character. Video material can be introduced into the design process in
various forms (Ylirisku, 2007); and can be collected by designers themselves or by an intermediate researcher. The degree to which the offered information is interpreted can range from raw data collected through an ethnographic approach to design documentaries (e.g. Raijmakers et al., 2006).

Research set-up
In a workshop three teams were provided with different formats addressing information on real patients’ spatial experience in motion. These three teams paired an architect with (1) a geographer, (2) a pedagogue and (3) an anthropologist. The workshop started with an initial brainstorm session focusing on the meaning of being a patient and being wheeled through the hospital. Subsequently participants were asked to design a lift on the route from the ward to the operation room (OR), based on specific inputs. The task combined designing a moving building element (a lift) for a mobile subject (the patient), supported by a mobile object (the bed).

In a first phase each of the three teams received a different information format:

- (1) a written design brief (fig. 1), mentioning dimensions and other practical information but differing from a traditional brief due to its focus on experiential information (**design-brief-team**).

- (2) a video of a patient’s route from the ward to the OR (fig. 2), made by a researcher lying in bed and subtitled with the researcher’s reflections on embodied perceptions along the route. During the video quotes from real patients appeared when relevant to what was shown (**video-team**).
• (3) a former patient with a background in architecture to talk to (patient-team).

Initially each team consulted only the information format assigned to them, after which they presented the results and the design process. Later the teams made use of all sources of information and could adapt their design resulting in a final presentation focussing on the adaptations. The workshop was audio-recorded, transcribed verbatim and analysed in combination with the design documents generated by the teams.

A final discussion of the design process addressed where, how, and why adaptations took place (or not) and considered what role the provided information played in this process. This allowed identifying how the use of the different information formats influenced participants' sense of patients' experience and how this was translated into the design.

Findings

From the brainstorm
During the initial brainstorm session we aimed to achieve a common basis as to whom the different teams would be designing for. Three questions were asked: what does it mean to be a patient (in bed)? What does a hospital mean to you? What does it mean to be transported through a hospital? Participants mentioned aspects such as sensory perceptions, social interactions, and duration of the stay, which was similar to themes identified in an earlier study (Annemans et al., 2011). Most participants had at least some personal experience of being a patient, upon which they drew when responding to the questions.
According to the participants, being a patient in bed means in the first place being under the control of and dependent on a stranger. Due to a patient’s changed perspective, a participating anthropologist mentioned that visual perception is largely reduced—and an architect added that indeed mainly the ceiling is then visible. One participant told about her experience in an MRI machine: since patients are unable to see who is present, their experience of others’ presence relies more on sound. Another gave the example of a nurse breathing above a patient’s head. Thus smells and sounds become more important; and the soundscape can be altered.

Participants described the bed as patients’ only home in the hospital. They live in it, sleep in it, are transported in it, and it is used to transport their personal belongings. As one participant explained from her own experience: “When staff came and changed the blankets, that didn’t feel nice, because they made it all new, and I lost my home.” Someone else mentioned that the bedcovers in a hospital are really thin, and always leave patients feeling cold. The conversation then shifted to how patients experience the bed and the hospital with their whole body: lying in bed, feeling their own things close to them and the given hospital sheets around them.

Participants reflected upon how patient and bed become one, and how patients thus experience the built environment through the bed. A hospital building is for most people a strange place, disconnected from everything they know or with which they are familiar. Typical sounds emerge from the building, like the plong-sounds of the lift. Often the built environment does not seem suitable for the activities taking place. Patients are parked in the hallway to wait. Moreover, many hospitals are said to be
ugly, worn down and in desperate need of maintenance. A participant wondered: "if the building is in such a bad shape, then what will they do to me?"

The group concluded that patient, bed and building are connected through transport. Although the hospital bed ties patients to themselves, they are mobile as long as someone is moving them. Being wheeled around compromises patients' sense of orientation: it is difficult for them to know where they are or are being taken: building up a mental map seems almost impossible. Moreover, as patients are often not told where they are being taken, being transported makes them feel like an object being processed rather than a person being taken care of. Movement sometimes happens very suddenly, which can be disturbing. Conversely, one participant recalled that having been in the hospital for a long time, being taken out of her room and wheeled around through the building was also a positive experience.

From the design session

*Design ideas*

Based on the dimensions mentioned in the experiential design brief, the *design-brief-team* started by making a small 3D model of the space they were asked to design (fig. 3), a “type of tunnel shaped elevator” as they called it. From there they made adaptations based on experiential information mentioned in the brief and the ideation during the brainstorm. The design aimed to create a protective corner so people stepping into the lift would not directly bump into the bed. Therefore, one wall of the lift would be curved. They positioned the lift at an outside wall of the building, making the curved wall in glass, so patients would be able to look outside, having a broader perspective and not feeling oppressed. Staff were invited to stand in the additional space generated by the curved surface so they could easily reach the panel to operate
the lift. As the architect in the team put it: “through the shape we want to give directions on how to use this space.”

The bed itself also was taken into consideration. In the adapted design, beds were equipped with a cover, like a baby pram, with LEDs inside to create a personal ambiance. This would give patients the possibility to withdraw, “like raising the sheet over your head.” The design-brief-team also listed technical details that would facilitate interaction between patient, bed, and building. They mentioned a map of the hospital at the wall so patients would know where they were, a moving platform to smoothen entering the lift from the hallway, and an indication of the floors high enough on the wall so a patient could see it from the bed.

Consulting the patient and watching the video made the design-brief-team list four adjustments to their design. Changing the window to a screen depicting a landscape could create a better ambience in the lift. It was also a practical decision since this allowed the lift to be situated at any place in the building, not just at an outside wall. Additional ideas were to provide information technology on the ceiling, or create a daylight ambience. The idea of installing a mirror above the bed so the patient would be able to observe what was happening when the doors behind the bed opened, was abandoned in dialogue with the patient who thought seeing yourself as a patient could be frustrating. Finally also the area in front of the lift was made more pleasant.

Starting from the video the video-team (fig. 4) started thinking about the lift but “a little bit broader than the lift, the lift as a system that connects the floors.” As they put
“[now] the experience of the space is a little box with a very hard threshold to the surroundings. What if we can see it like a space that’s just a continuation of space?”

The video-team proposed a “paternoster lift”, [ADD IMAGE] an existing concept but adapted to the hospital context. Patients would be picked up at the ward and then reside in the lift until they were dropped off at the OR: being wheeled along the hallway would be reduced to a minimum. The concept’s disadvantages were transformed into advantages: “For example it’s too slow, but it also holds some good insights, it can be a combination of rooms, so you don’t feel oppressed. You just enter and you have a continuous going and maybe the time that you spend, the surplus time that you spend in this loop, is maybe more pleasant than when you have to wait.”

Specific attention was given to entering the lift. The hallway was designed such that the entrance would be smoothed, reducing unnecessary manoeuvring with the bed and bumps at the ridge of the lift door. A connection between patient, caregiver and building was stimulated through the use of mirrors, offering patients a broader perspective than usual when lying down.

In the workshop’s second round, the video-team continued to work on their “slow lift.” They aimed to create a place where you want to be and relax, a continuation of broad spaces rather than an interruption on your route to the OR. This concept was further elaborated in the lift’s interior design. A bench would allow the accompanying caregiver to spontaneously sit at eyelevel with the patient lying in the bed. A screen displaying images of nature would provide an interesting focus.
The **patient-team** (fig. 5) did not have an elaborated design when presenting after the first round. They identified the route as the most important aspect of the patient's story, beginning in her room and moving all the way through to the OR and back: “like a loop she did in the hospital.” This loop demanded personalisation, which they wanted to achieve by creating a cover for the bed (just like the design-brief-team), however they quickly abandoned the idea because the patient “was not that into it.”

The design idea proposed by the patient-team was a personalised path that would unroll for the patient through media architecture. Ideally “the bed would be recognized as your home, and the building would recognize where it would go.” The ceiling and walls would then be used to display something visually interesting but not entertainment. The patient had mentioned several times that “reading the magazine she was given or watching TV is frustrating because it’s so stressful, the situation is so stressful that this kind of normal entertainment is apparently a little bit banal in that situation.” Making use of media architecture would provide patients with something on which to focus, changing the uniform white spaces without interfering with medical procedure.

Consulting the video opened participants’ eyes to the awkwardness of the built environment, and the ugliness of some places. This made them look for ways to make the interior more appealing. It made them think more about the hospital interior’s materiality: a plain white wallpaper or paint that could be turned into a patient’s colour of choice. They further elaborated the ideas of the media architecture, offering patients the opportunity to choose their own theme or colour travelling with them along the corridors, into the lift, and in each room they stayed. In a space like the lift where the
bed stood still, the paper could be given additional information, like the estimated time of surgery. The essence of the idea lay in the bed communicating with the building when moving through it, so there would be no need for manoeuvring to call or start the lift. The caregiver would be able to concentrate entirely on the patient.

**Design process**

The design process of the three teams diverted considerably. The **design-brief-team** started from the most traditional information format, an (experiential) design brief. This resulted in a design that kept close to the assignment. The architect in the team found the brief easy to work with, and mentioned that he might be biased because he is used to this kind of information. Still, both team members felt supported by all the functional and experiential requirements listed as they provided a framework to keep focused. Some requirements, like the dimensions, also restricted them to a rectangular shape. By stepping back and shifting focus to the patient the team felt empathy through the brainstorm and were able to expand this limiting information. Watching the video and talking to the patient made them scrutinise their own design decisions from a different angle, abandoning previous options: “when we saw the video we started to downsize our ideas. Just because we were confronted with the harsh reality of entering the lift. [before, based on the brief] we had to create it in our visionary perception.”

The **patient-team** indicated how different their design process was from the one explained by the design-brief-team. Instead of the spatial focus common in design, dialogue with the patient drew their attention to her story, which took time, also because they reworded her story several times focussing on different details. This resulted in a much more temporal and experiential focus of the design process rather
than a spatial one. As one of the team explained: “Her experiences happened on a timeline, so we kind of went through this path, [...] to me it unfolded as a path, a spatial path but [...] even though I saw it as a spatial path the process was definitely more verbal. Definitely a lot more verbal than usually, definitely more to do with senses and feelings [...] We didn’t get down to the solutions.”

Given the importance of the path, or route, it was very hard for the team to focus only on the lift. Emphasizing the patient’s perspective also made them wonder about the experiences of other actors, like the caregiver. Taking into account all these different perspectives was felt to be limiting the design possibilities. Designing this way was considered rewarding and eye opening, but very time consuming. Watching the video drew their attention to the actual material, spatial reality, they said.

The video-team’s design process was shaped by the combination of a “fresh visual experience”, the video with patients’ testimonies, and the brainstorm session. Seeing the movement of the lift, reading quotes from different patients, and being able to situate these in a real environment gave them a broad basis to start designing. Several times they addressed sensory perceptions as a motivation for a design decision, for example: “you could see the ceiling and it made you very sick to see the lines there, so it enhanced the perceptual feeling, so that was one detail that you had to choose the ceiling materials and forms carefully.”

Even in the second round of the design, the video-team said that they consulted the design brief not at all, and the patient only very briefly, because there were too many items on their to-do list. As one explained: “we didn’t exactly come to a design, more to
design typologies or things we want to implement. [...] We used this as a communication tool in combination with the video. So it was also time consuming to come to an actual design.”

From the discussion
The design processes were shaped by the information formats consulted initially, but regardless of the order in which they were consulted, each had its own merit. As one participant from the patient-team explained how her focus shifted from the literal perspective of a patient in a bed over the flow of space to the patient’s story: “the [patient’s] story was a lot more compelling than the main exercise but during the first exercise I thought well, if I’d have to start designing right now, maybe I’d lie down on one of the desks here. But then I watched the video and I thought - what struck me most was the flow of spaces [...] entering the lift was dreadful, but in the whole video it was about really being able to move through spaces. I got that from the video, so I got different things from each thing. Her story obviously didn’t have the [dimensions] the brief had. So if I’d really have to do some work, design work, I’d need that.”

The value the different teams assigned to the brainstorm session varied. The design-brief team highly valued it: “We had the traditional, even mechanical brief from the client, but this session before, that affected a lot of things.” The design-brief team became aware of their own experience through the brainstorm; and described it as a primary layer, not directly related to the design assignment, but essential for their design. As they said: “We started the process like, let’s imagine we were lying down, the perspective you pointed at and how it would feel. We didn’t start from the brief.” For the other teams the brainstorm session guided the final result to a lesser extent.
Despite its experiential character, the brief could not compete with a real testimony:

“When I started reading the brief, the first sentences were about [the experience of] lying down and being in a weird position. But it was striking, after listening to [the patient] for 45 minutes, [the text of the design brief] felt really flat, obviously.”

However, the same person referred to the dimensions in the brief as essential for an actual design. Whereas the brief still had to be analysed and confronted with the ideation from the brainstorm, the video clearly identified the problems of being wheeled in a bed, as such easily allowing the video-team to start thinking of solutions:

“I had the feeling that we could step over some phases to come to a design. I’m not sure, but we went straight to- [...] nobody had to tell us anymore what the problem was.” As mentioned above, it showed the flow of spaces, something that the other sources did not seem to do. “The video really feels like you’re walking in someone’s shoes,” (participant from the design-brief-team)

**Implications**

Developing empathy with the mobile subject and understanding the specific situation one is designing for is indispensable for designers. Their understanding of patients’ specific situations was influenced by the information formats they received. The ideation during the brainstorm made them reflect on personal experiences (if any) in the given situation. Although the session sensitized those who did not have personal hospital experience, their insight could not go further than imagining.

A mobile perspective (on the environment) is multifaceted. Spatial experience in motion is a complex, layered phenomenon combining sensory perception, social characteristics, and time related aspects (Annemans et al., 2011). Sensory aspects were
mentioned, but not yet fully developed in the designs. The designers argued that implementing these aspects would come in a later phase when they started thinking about the materials. The mobile subject is composed of and determined by social relations. In the case of a hospital bed, patient, caregiver, and bed are moving together. The perspective from which patients observe their environment while lying in a hospital bed largely determines their interaction with others. In relation to time all teams addressed the spending of unoccupied time.

Experiencing space while moving is not a linear process. Although different spaces are moved through sequentially in time, various impressions are perceived in parallel. The hospital environment is known for its uniformity. Most wards and corridors look identical: they have plain white, grey, or beige walls and suspended ceilings. Many design elements seem to be determined by unspoken hospital procedures. A traditional hospital brief does not challenge designers to think beyond what is known. Further, because textual communication on its own is intrinsically sequential, it seems unsuitable for capturing spatial experience in motion. Although verbal communication with a patient provided designers with a rich, profound insight into her experiences, they appeared to gain insight mainly from a time related perspective, grasping moments, not spaces. Despite the valuable input from the patient and the video, a member of the design-brief-team said to the patient: “it would be different if we could be in the room with you, if we could go through the route, we could sense the environment ourselves. I don’t know how to translate it to the design, but still it would be very different [...] even watching it from the video, you don’t get all the senses.”
Conclusion
An analysis of workshop outcomes allows us to formulate recommendations about what should be communicated and how to mobilise design in the hospital. The workshop’s aim was to gain insight into how different information formats introducing mobility in design influence architects’ design processes. We conclude that in order to create empathy, information formats should address designers’ background and experiences. In order to attend to mobile perspectives the information format should depict the flow of space in combination with personal stories in a layered, not necessarily linear way. For a nuanced and rich design result, architects need to feel the environment, not from one person’s perspective but from several perspectives, including their own.

Despite its experiential character the design brief fell short of addressing the nuances and details of patient’ experiences. Talking with a real patient in this case worked as an eye opener for the designers. However given that the selected patient was trained as an architect, we can assume that she had a significant advantage in communicating her spatial experience. We cannot expect all patients to be able to do so as eloquently. Although consulting real patients is advisable, fully addressing user experiences can be challenging, even for architects who are strongly committed to such projects (Sanders, 2009).

Whereas video material showed the flow of spaces and thus drew designers’ attention to space in motion, the patient’s story was obviously personal, inspiring a personal space that moved with the patient. The design solutions point to two distinctly different interpretations of mobile space: an actually moving space in which patients can reside,
or a virtual space, moving along with them. The meaning addressed through language, as in dialogue with the patient, differs significantly from the meaning conveyed through embodied use as presented in the video (Clapham, 2011).

The workshop's results suggest, however, that providing designers with different information formats makes them question the environment as a static given. Combining words and images or even better moving images, seems promising but obviously lacks the interactive element of a conversation. In line with work by McGinley & Dong (2011), we can conclude that the challenge of introducing insights regarding spatial experience in motion in architects' design process relates both to the content and format of the information. The content should be as close as possible to raw data, reflecting patients' own testimonies. The information format should be able to convey a nuanced image of the research findings and preferably facilitate interaction. Passing on video material supported by an extended narrative, with the opportunity to consult more information than what is initially provided in the flow of images, seems promising in supporting design for mobility in the hospital context. Further research is needed to develop a format that can actually support this aim.

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Moving designs for moving real people: Designing an elevator and the according experience

Hospitals are locations in which a supportive environment is most desired. As a patient, you tend to experience these buildings from a rather atypical perspective lying in a hospital bed. Apart from being atypical, the perspective is also multi-layered.

- The bed as a material object, with its specific accessories, interacts with the built environment around it. Its dimensions and practicalities influence how it is used and experienced by patients.
- However, the bed also has a significant influence on the social interactions you, as a patient, experience while being in the hospital. Unknown people entering your personal space and relatives and friends keeping a distance are commonplace.
- Moreover, both physical and social interactions are not limited to one location or situation. A hospital bed travels with you through the entire building, as such adding a motional aspect to the hospital experience.

In the elevator all of these and even more elements of the spatial experience of hospital patients are condensed. Therefore, this specific space forms an ultimate challenge to start designing from patients’ perspective.

PURPOSE OF THE DESIGN

Obviously an elevator is meant to move people and things up and down in a building. For patients, on the route from a ward to the OR, a hospital elevator is also a transition zone where many actors come together.

Due to the limited size of the space, the built environment comes oppressively close to the bed and the person in the bed. As a patient, you are never on your own. A nurse accompanying you pushes your bed in the elevator, and it may have to lean over the bed reducing your private space even more. Complete strangers can try to squeeze in or leave the elevator when the patient enters.

Patients are wheeled in and out of the small cage of the elevator, but also when the bed stays static, they still move closer to their destination.

An elevator, and its influence on the according experience, is thus an example of how a thoughtful design could result in a supportive environment.

REQUIREMENTS FOR THE ELEVATOR

The elevator should be:

- a place of transition between the spaces before and after
- spacious enough, so it doesn’t feel like a cage
- made of a warm material, not something that seems to closed down on you
- pleasant in temperature, so it won’t be associated with an oven
- easy to operate, without unnecessary reaching of personal to get to the buttons
- supportive in manoeuvring the bed
- able to make people feel at ease

PRACTICALITIES

The elevator should be suited to be loaded with

- a stretcher
- a hospital bed (for which you need reinforced door steps, both at the platform and the cage + a reinforced floor)
- An elevator for bed transport is approximately 1.4 x 2.8 x 2.3 m (W x D x H)
- The elevator should be able to stop at each floor (6)
- Users should be able to get in and out of the elevator at two opposite sites in the longitudinal direction.
- The operation panel and badge reader should be easily reachable.
- Each platform should be equipped with operation buttons and a badge reader.
- Sliding doors are required.

OVERALL

The elevator should make people feel better rather than worse.

Some things are obvious:

- pleasing lighting
- optimally privacy without patients feeling to be neglected
- suiting patients’ state of mind

Fig. 1: Experiential design brief
Fig. 2: Original videomaterial complemented with participants’ quotes and observations of the researcher while being wheeled in a bed (original recording 16.07.2012 adapted October 2014 based on V2 chapter 3)
Fig. 3: Design design-brief-team (images made by participants)
Fig. 4: Design video-team (images made by participants)
Fig.5: Design patient-team (images made by participants)