DESIGN INTERVENTIONS AS MULTIPLE BECOMINGS OF HEALTHCARE

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ABSTRACT

Research on design of IT traditionally treats the production of scholarly knowledge and the design of new systems as related, but separate processes. We propose the fruitfulness of practicing a closer relation informed by interventionist design research (appreciating a problem through attempts at solving it) and actor network theory (reality is enacted and constructed through our engagement). Through three concrete design interventions with cardiatric healthcare, we illustrate how diverse agendas of sociological inquiry and practical design considerations are intertwined and come to enact healthcare in specific ways. We suggest this as a *strategy of multiple becomings*, wherein assemblages of patients, health professionals, diseases, information technology, prototypes, and design researchers together perform shifts between promoting new practical design solutions and raising novel questions on the socio-material complexities of healthcare.

INTRODUCTION

When the cardiologist-patient consultation was coming to an end, the design researcher intervenes to propose a new design-research concept in *myRecord* – a web-based prototype of a patient-centric health record.

Design researcher: *“There is one more thing. We’ve created what we call ‘assignments’, which are a little experimental, but in your discussion with Karl [heart patient] you indirectly ask him to do some tasks – that he must keep an eye on this and that – so, what should he write down [in myRecord]?”*

Cardiologist: *“Oh – Yes, okay [...] Karl, we've talked about that you need to find out how your breath is. This means that you every day have to go out on the street and walk until you need a break. Then it’ll say [in myRecord]; Monday 50 m., Tuesday 50 m., Wednesday 45 m., Thursday 70 m. – anything [...]”*

Karl strives to follow the cardiologist’s suggestions and almost daily for three weeks he records his weight and blood pressure in myRecord (picture 3). However, as the logbook in myRecord reveals, he is too weak to measure his walking distance. As we elaborate further in the case of ‘Patient Homework’, this snippet is meant to illustrate how design interventions enable us to enact entanglements of sociologically-inspired inquiries in healthcare practice and explicit and change-driven promotion of new design-research solutions for improved healthcare. Through design interventions new relations are performed in assemblages of healthcare professionals, diseases, information technology, prototypes, design researchers, and theoretical conceptualizations and themes from IT research in healthcare. We suggest that conventional approaches to knowledge production within the primary fields that do IT (design) research in healthcare, such as Computer-Supported Work (CSCW), Information Systems (IS), and Participatory Design (PD) can be fruitfully complemented by more interventionist approaches as practiced within contemporary design research (Medical Informatics is focused on evaluation of IT and less on the design process, thus not included in this positioning). By three cases of design interventions we engage multiple interests within interventional assemblages and show how new relations are performed between concrete design proposals and more theoretically conceptualized inquiries. We report from a PD project entitled Co-constructing IT and Healthcare (CITH), engaging heart patients and relatives, health professionals and us (design researchers) for nearly three years (2008-11) to explore and experiment with re-organizing current work practices through the design and use of seven hi-fi versions of myRecord ('Egenjournalen' in Danish). myRecord is essentially a prototype of a personal health record (Kaelber et al., 2008) – a patient-centric, collaborative, web-application that enables heart patients to produce, collect and share health related information with health professionals and other patients in their network (for details on CITH and myRecord see Andersen et al., In press).

IT (DESIGN) RESEARCH

Practicing interventions are not new to PD, CSCW, IS, or human-computer interaction (HCI). However, we find that design interventions as performative arenas for explicit instantiations of theoretical conceptualizations and themes are not thoroughly discussed. By employing design interventions we argue that a closer relation between, not only research and design but multiple logics come into being. Early studies at Xerox PARC (Blomberg et al., 1995; Suchman et al., 1998) as well as work coming out of the Scandinavian approach to systems design (Bødker and Grønbæk, 1992; Mogensen, 1992; Kensing, 2003) took on experimental and interventionist approaches to design and research. Influences from action research (Checkland and Holwell, 1998) and intervention theory (Argyris, 1970) pushed for intervention, which is much appreciated in PD today. In PD, methods and techniques from design practice are employed to support a combined research and development process. However, PD is mostly concerned with research on methods and techniques for the practice of participatory and democratic design and contributions rarely emphasize methodological discussions. The episteme of classic PD work could be argued as subscribing to Schön's (1983) reflective practicum, wherein problems are made intelligible only through attempts at solving them.

In CSCW, ethnography and qualitative methods are highly developed and the debate on workplace studies' role in IT design has been heavily debated (cf. Crabtree et al., 2009; Dourish, 2006; Plowman et al., 1995). It is widely argued that detailed analyses of work and technology-in-use create 'insights', 'implications', and 'recommendations' to *inform* system design (Plowman et al., 1995). A view that is also reflected in Crabtree et al.'s critical argument favouring ethnomethodologically-informed ethnography in systems design: *"Our purpose is to inform systems designers – i.e., those parties who are actively involved in the development of computing systems and applications [...]"* (2009, p.879). The practice of doing research (ethnographical work) and designing IT are traditionally kept as separated processes in studies that actually argue for the promising results of integrating research and design of IT (Luff et al., 2000; Crabtree et al., 2009). While the proponents of joining ethnographic practice and design are increasing (Wolf et al., 2006; Halse, 2008; Karasti, 2001; Simonsen and Kensing, 2005; Zimmerman et al., 2007), the debate on the role of ethnography in design of IT continues (Button and Harper, 1996; Crabtree et al., 2009).

Within IS, action research and design science seek to accomplish change relevant to practice by proposing a closer relation between the study of organizational work practices and the design and implementation of relevant IT artefacts (Hevner et al., 2004; Baskerville and Wood-Harper, 1996; Checkland and Holwell, 1998). However, the heritage from behavioural science combined with a wish for hypotheses-driven rigour renders the process of designing secondary, in that the artefact comes to play the role of a utility that (only*)* *"allows [for] many types of quantitative evaluations [...], including optimization proofs, analytical simulation, and quantitative comparisons with alternative designs"* (Hevner et al., 2004, p.77). Karasti (2001, p.211ff) critiques these disciplinary dichotomies i.e. descriptive vs. prescriptive, present vs. future, understanding vs. intervention and argues for a more *"appreciative intervention [which] calls for envisioning images of future system and context through a recognition of presence and change intertwined in the existing ways of working."*

In design research and increasingly in HCI, design practice is argued as a fruitful vehicle to drive research inquiries (Wolf et al., 2006; Zimmerman et al., 2007). Proponents of critical design (Gaver et al., 2004) use designed artefacts to 'instantiate' philosophical ideas whereas the design process becomes a necessary mode of inquiry. In this paper, we subscribe to a design research program and propose design interventions as situations of enactment with opportunities to live out and explore change potential as well as *"open new ways of conceiving the world"* (Halse, 2008, p.2). We claim that in one and the same poignant moment, understanding and designerly creation co-exist as inseparable modes of socio-material knowledge production.

STRATEGY OF MULTIPLE BECOMINGS

Koskinen, Binder and Redström (2008) review how researchers integrate design experiments in their research inquiries. Through three categories, *lab*, *field* and *gallery*, they describe how *"design researchers have developed several approaches that integrate design-specific work methods into research."* They make a division along the lines of traditional scientific methodologies and the arts, and argue that design research has been practicing extensions and sophisticated variations to more established institutional approaches to research. In later contributions the three categories converge and this could be seen as a movement towards design research achieving a degree of maturity, with less need to honour standards in other disciplines. Mattelmäki and Matthews (2009) expand this point and focus on the practical concerns of how those differences play out in a diverse set of ways. They recognize that Frayling's notion of *research-through-design* unites many and stress that it should not be seen as a method, but rather as a family of heterogeneous approaches to design research (2009, p.9). Their affinity lies in considering the design project, process or artifact as fundamental to the research contribution.

With this paper we propose design research as a making of explorative assemblages of not only 'design' and 'research', but multiple entanglements of patients' and health professionals' practices, diseases, information technology, prototypes, and design researchers. In particular, as we sketch out below, we are inspired by later developments in actor-network theory that treats 'being' as inherently performative and holds multiple interdependent realities (Law and Hassard, 1999; Pickering, 1995; Barad, 2003).

DESIGN INTERVENTIONS AND MYRECORD

On the CITH project we have engaged an interventionist approach as a way to extend classic PD with a more critical mode of design research-led inquiry. In the outset of the project we sat in on medical consultations, overlooked heart surgery, followed patient referrals in between hospitals, and observed work practices in several cardiac wards. We interviewed secretaries, nurses, doctors and bioanalysts on three related hospitals and visited patients and their families in their homes. A couple of months into the project, we began to put more emphasis on introducing proposals and discussions of premade and in-the-moment ideas of (IT) solutions as well as carrying out participatory design workshops. Alongside these activities we studied the literature on IT research in healthcare, e.g. (Mol, 2008; Berg, 1997; Pratt et al., 2004; Aarhus et al., 2009), and discussed how we could integrate a mode of inquiry that would add to the academic discourses found in the literature, but also how we could enact them concretely in the process.

This endeavor was particularly enhanced when we, a year into the project, introduced action cycles and turned the project into a cooperative prototyping process of a patient-centric web-application. It kick-started a long range of design interventions with myRecord wherein we engaged different health professionals and heart patients in various situations and locations. What moreover followed was many internal meetings and workshops where we inscribed theoretical conceptualizations and themes in myRecord through discussions and co-sketching interactions and wireframes. Typically, as continuations to ongoing dialogues with patients and health professionals we carried out co-design and use sessions at patients' homes. We then followed patients to consultations as observers of use but also as design research advocates enacting explorative and critical inquiries. The interventions, then, became a space for the simultaneous enactment of multiple logics, interests, and ideas. Our strategy of applying design interventions became instantiations of what Law (2004) calls *method assemblages*. By staging situations of (creative) use in realistic healthcare situations we were able to intervene and cooperatively interweave the current with enactments of new instances of healthcare. Moments, where not only relations between practices of 'design' and 'research' were performed, but multiple becomings of healthcare (Mol, 2002). A lot of work went into preparing for the interventions to allow for the otherwise absent (in the situations) to possibly become present. Priority was put on loading each intervention with the possibilities to enact patients' and health professionals' wishes as well as to enact and explore questions such as 'how to make patient participation a resource in diagnostic work?' and 'how to support patients' invisible work of bridging interinstitutional care?' (cf. Unruh and Pratt, 2007).

In the following, we present three cases of design interventions with myRecord in cardiatric healthcare, to show how an interventionist approach can be employed as means to enact and inquire into different healthcare practices together with empowered patients.

CASE I: MANAGING BY CONCEALING

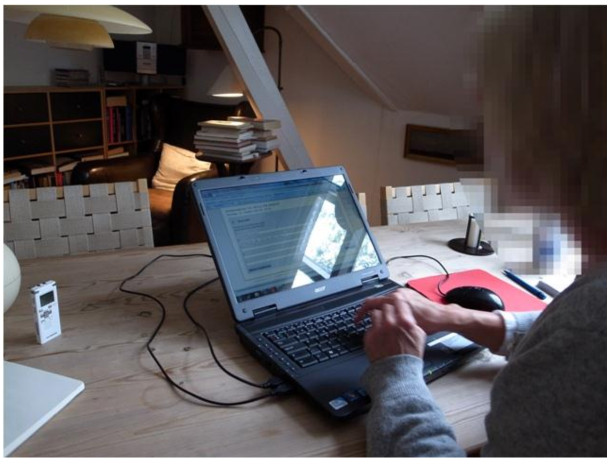
From our fieldwork on medical consultations we learned how precious time is spent at each meeting on 'getting to the point'. During the consultation, the physician and the patient work together to reach a shared understanding of which issue(s) should be made central to the consultation, and thereby the diagnostic work. The physician is constantly searching for indications of symptoms or other information vital to perform the diagnostic work. Patients often arrive with a set of (not yet fully conceived) questions regarding their health situation and recent experiences. However, once the consultation begins, we found that most patients were overwhelmed by the urgency of the situation and often held back or simply forgot to present their own questions. The different reasons for this ranges from patients forgetting or thinking, *"it's probably not that important anyway"* to feeling self-conscious about the very private character of their concerns (e.g. questions regarding either marital problems or issues of intimacy caused by their disease).

As our understanding of healthcare work practices matured through our initial fieldwork, we were inspired by Berg's (1997) analyses of medical work. In particular, how he characterises the work of physicians. Berg draws on the work of Fujimura (1987), who demonstrates how scientists make research problems doable through the iterative and seemingly mundane processes of continually aligning and reorganizing their work. Berg presents the work done by physicians during consultations as ways of making patients' problems manageable. Work that is *"characterized by the smooth interweaving of 'social' and 'medical' issues"*, in which patient-problems are transformed into 'doable' problems (1997, p.137). Berg shows the distributed character of medical work and stresses how *"the transformation of a patient's problem into a 'doable' problem is not a cognitive reconceptualization* *of the patient's case, but a collective achievement of an interlocked assembly of heterogeneous entities"* (ibid.). To understand the consequences of this making and becoming of manageable patients we chose to explore the ways in which we could design support for patients to become more manageable for the physicians. From the physician's perspective, this would mean having important information about the patient ready-to-hand (Ehn (1988) and Dourish (2004, p.109) invite Heidegger's notion to inform systems design) before the consultation, including the specific questions and symptoms the patient would like to discuss. We were curious to see how, if at all, the new way of patients preparing for consultations would be useful or just be considered 'more work'.

DESIGN INTERVENTION

The following case illustrates how the interventional setup and the use of myRecord worked as a way to query into aspects of patient manageability, and in particular how the intervention unexpectedly taught us the ways in which a patient take active part in collaboratively making the situation more 'doable'.

Mary (aged 54) and the design researcher, Jonas (aged 30), are sitting in her living room in front of her laptop, preparing for her upcoming consultation at the Heart Centre. Mary is going through the step-by-step preparation which involves answering a set of predefined questions, updating and approving her medication list, and indicating if she is experiencing any of nine specific symptoms.



Picture 1: The design researcher and Mary sitting in her home, preparing for the upcoming consultation

Lately, she has been feeling that her heartbeat is too rapid and is worried about the stabbing pain she sometimes experiences. Going through the symptoms section, Mary initially ticks 'abnormal heartbeats', but then pauses when she is to indicate whether the symptom appears during 'heavy', 'medium', 'light' or 'no physical activity'.

Mary: *"Hmmm, I would say… it's this one [pointing at 'during no physical activity']… Not necessarily during physical activity."*

Design researcher: *"Ok… so, that would mean you experience it at rest?"*

Mary: *"Not necessarily. It can come at any time. At rest or, for example, when bicycling or walking. But there is no category to capture that…"*

Design researcher: *"You would need a new category then?"*

Mary: *"Yeah, because if I state that I experience it during physical activity, then one would think that I have arteriosclerosis… which I do not! It can come at any time. But there is no category to capture that. Then it would easily be misinterpreted if I state that I experience abnormal heartbeats during physical activity –which is when the heart is at work – because that would typically indicate problems with stiffening of the arteries."*

Design researcher: *"I see. And when you so confidently state that it's not arteriosclerosis, it's because you somehow know and you therefore don't want to indicate it?"* (audio transcription, Mary's home, October 8, 2010)

To this, Mary explains how she has been suffering from abnormal heartbeats for a long time, and how she went through an extensive examination a couple of years back, which explicitly concluded no problems with her arteries. And as she states, *"If I then indicate it, the treatment will be different."* Mary finishes the preparation by selecting the option, 'during no physical activity'.

MULTIPLE BECOMINGS OF HEALTHCARE

As the intervention teaches us the patient explicitly refrains from indicating a specific nuance of an important symptom, whereby she actually ends up concealing information from the cardiologist. Mary's decision is based on her anticipation of what they will probably conclude again, which she knows is incorrect based on her earlier examinations. She specifically engages in the process of making her situation manageable for the cardiologist, but interestingly by taking steps to avoid the consultation from going in a, for her, worthless direction.

As regards to constructive insights for design, we come to understand that the symptom component should be redesigned to allow patients to briefly describe the situation in which they experience a particular symptom. Fixed symptom categories do not always enable the patient to provide sufficient diagnostic information, as we have also learned from Bowker and Star (1999). Most importantly though, with the intervention and Mary's use of myRecord, she starts to manage her physician by performing herself as an essential and guiding part of the diagnostic work, possibly to increase the manageability of her own case.

CASE II: BRIDGING INTERINSTITUTIONAL CARE

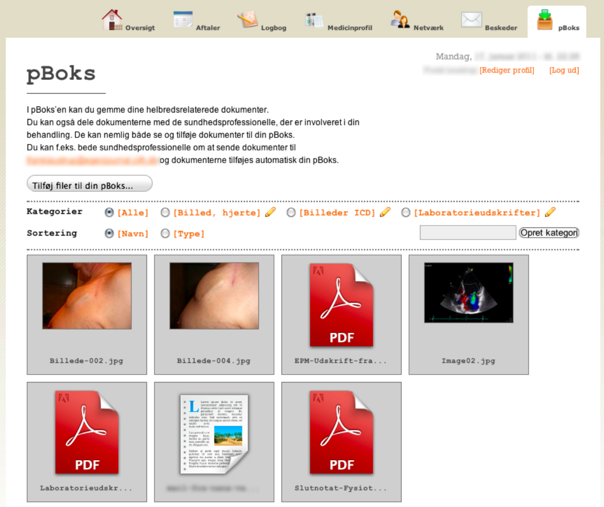
When treatment and care is distributed between institutions, as is the case in our study, the patient often becomes an even more central actor in managing and ensuring continuity of care. As argued by Unruh and Pratt (2008) one key task for such patients becomes to *bridge interinstitutional care*, whereby patients work to manage and bring together information from different sources in the distributed network of care institutions. Unruh and Pratt show how this type of work transforms the patient into an *information courier "shuttling medical information from one institution to another."* (2008, p.38) Having encountered similar situations numerous times during the interventions, we wanted to explore the phenomenon of bridging interinstitutional care further, in a more performative mode. Through several smaller workshops we, and the web developer, sketched and implemented a personal digital document archive (pBox) in myRecord to enable patients to easilier become information couriers. pBox enables patients and health professionals to archive and share documents easily. By storing documents in their pBox, patients ensure health professionals' contionous access to their documents. To illustrate the use of the intervention to explore 'bridging interinstitutional care' by co-enactment, consider the case of Fred who, through the intervention and myRecord, succesfully interrelates the diagnostic work between two heart clinics at different hospitals.

DESIGN INTERVENTION

A week prior to the consultation the design researcher, (Jonas, aged 30), is visiting Fred (aged 57) in his home to promote and encourage him to use myRecord's pBox (picture 2) to prepare for the upcoming check-up with his nurse. Fred's wife has joined the conversation and the chat goes on for close to an hour. The design researcher asks Fred if there is anything in particular he would like to discuss with his nurse. While they talk the design researcher pays particular attention to questions or issues that myRecord could support Fred in querying further into. At one point, Fred raises an issue in which he is confused with having received contradictory feedback on two identical scans of his heart done at two different clinics. The two statements report on the state of his heart and its strength, and are both based on echocardiographical scans of his heart. One statement reports he is doing well, in that his 'heart capacity' has increased from 10 to 25 per cent. However, the other statement concludes that his heart is enlarged to compensate for the non-functioning area. *"What am I to make of this? How can they be so different, when it's the same (type of) scan?"* Fred says slightly disillusioned. *"Am I doing progress or not?"*

The design researcher suggests that Fred upload the scan and statement from the other clinic and then use myRecord to raise his question. With help from the design researcher they formulate the questions for the nurse and upload the echocardiographic scan to his pBox together with the e-mail from the other heart clinic stating the conclusion about the enlarged heart area.

An hour prior to the consultation the design researcher meets with the nurse to explain the setup and hand her printouts of Fred's preparation and the uploaded images to simulate that myRecord is an integrated part of her daily routine. Half an hour into the consultation the nurse looks at Fred's preparation, including his questions. They reach his third question, where he correlates the statements from the two clinics, which reads: *"[Name of cardiologist] has scanned my heart and tells me that the well functioning area is enlarged, because it compensates to make up for the non-functioning areas. How does that fit with your recent statement that my capacity has improved from 10 to 25 per cent? (please, see the attached e-mail in my pBox)."* (myRecord transcription, November 2010)



Mandag, [redacted]

[redacted] [Rediger profil] [Log ud]

pBoks

I pBoks'en kan du gemme dine helbredsrelaterede dokumenter.
Du kan også dele dokumenterne med de sundhedsprofessionelle, der er involveret i din behandling. De kan nemlig både se og tilføje dokumenter til din pBoks.
Du kan f.eks. bede sundhedsprofessionelle om at sende dokumenter til [redacted] og dokumenterne tilføjes automatisk din pBoks.

Kategorier ● [Alle] ○ [Billed, hjerte] ○ [Billeder ICD] ○ [Laboratorieudskrifter]

Sortering ● [Navn] ○ [Type]

[redacted]

Picture 2: A screenshot of Fred's pBox in myRecord

After having consulted Fred's documents, the nurse agrees about the peculiarity of the two different conclusions on the same type of scan. But as she explains, she is legally hindered in obtaining information from the other heart clinic. She therefore asks Fred to obtain the information and then upload it to his pBox, where she is able to access it. Fred shakes his head indicating that he finds the situation a bit peculiar, but agrees to do it.

MULTIPLE BECOMINGS OF HEALTHCARE

With the intervention as arena, prepared by the design researcher's practical alignment of various actors including the pBox in myRecord, Fred enacts a connection between the two institutions. The new connection, where one clinical facility is confronted with another's different reading of 'the same' scan, concretely come to exist through his performance with myRecord. With the pBox in particular, he establishes relations that did not exist before by bridging two institutions that were not able to communicate. In this way he performs a *diagnostic agent*, as he takes part in carrying out this essential, but often invisible work of aligning and reorganizing interinstitutional information

(Oudshoorn, 2008, p.276). The intervention evolves from the initial inquiry into pBox as a tool to support the enactment of the patient as information courier to an exploration of the patient's role in detecting, preventing and recovering from ambiguous medical situations (Unruh and Pratt, 2007). In this sense the case becomes a concrete example of how responsibility is delegated to the patient. To continue the process of 'finding an answer' to Fred's diagnostic question, Fred not only has to act as a courier *"shuttling medical information from one institution to another"*, but has do more work to connect the two health professionals (institutions) in order to enable collaborate diagnostic work. Moreover, the case also brings us concrete design insights in how to enhance the pBox as a tool for health professionals. Through the situation, we learn that the pBox needs to support subscriptions to and the ability to classify content from a single health professional or institution.

CASE III: PATIENT HOMEWORK

This third case recalls a design intervention in a cardiatric consultation at the Heart Centre between the heart patient, Karl (aged 68), his wife, a cardiologist and a design researcher (Tariq, aged 30). It is the elaborated case from the paper's introductory snippet. Herein, we illustrate how the theoretical concept of 'homework' is made and becomes generative in multiple ways.

Grøn et al. (2008) coin the notion 'homework' to critically accentuate implications of the political shift in the organization of healthcare. They refer to the work issued by the healthcare system, but practiced in patients' homes. Here, patients are increasingly expected to take on more responsibility, which in turn becomes more patient work (Oudshoorn, 2008) and often collides with their everyday lives and unstable health. Field studies and Grøn's argument drew Aarhus and her group (2009) to make it a design principle in their project – not to add to the amount of homework in the development of an 'eDiary' for diabetics. However, others argue that active patient involvement generate greater improvement in health and patient satisfaction (Street et al., 2005). Being aware of this discourse, we deliberately wanted to sketched and implement 'patient assignments' in myRecord to critically inquire into consequences of letting cardiologists give patients' assignments and open up the space for multiple interpretations of homework to be performed. It moreover engaged design inquiries such as; *which features in myRecord are necessary, what data, and which text fields and buttons should we include?*

DESIGN INTERVENTION

In the design intervention, the cardiatric consultation, Karl and a cardiologist are having an intense discussion on whether or not Karl should be re-hospitalized and go through a high risk operation. The day before the consultation, Karl used myRecord at home to prepare for the consultation and the cardiologist read it before they meet and uses it many times throughout the consultation. During 43 minutes they discuss how Karl experiences shortness of breath and dizziness after the most recent operation. Their dialogue expresses their collective project of deciding on three optional moves, all based on Karl's interpretation of his health condition. After an intense conversation they still cannot make a decision and agree not to do anything, but let Karl stabilize and meet again in two weeks. When everybody stood up and were about to leave, the design researcher (Tariq, aged 30) intervenes and explains the idea of 'patient assignments' and asks if the cardiologist would give Karl a task to complete at home using myRecord.

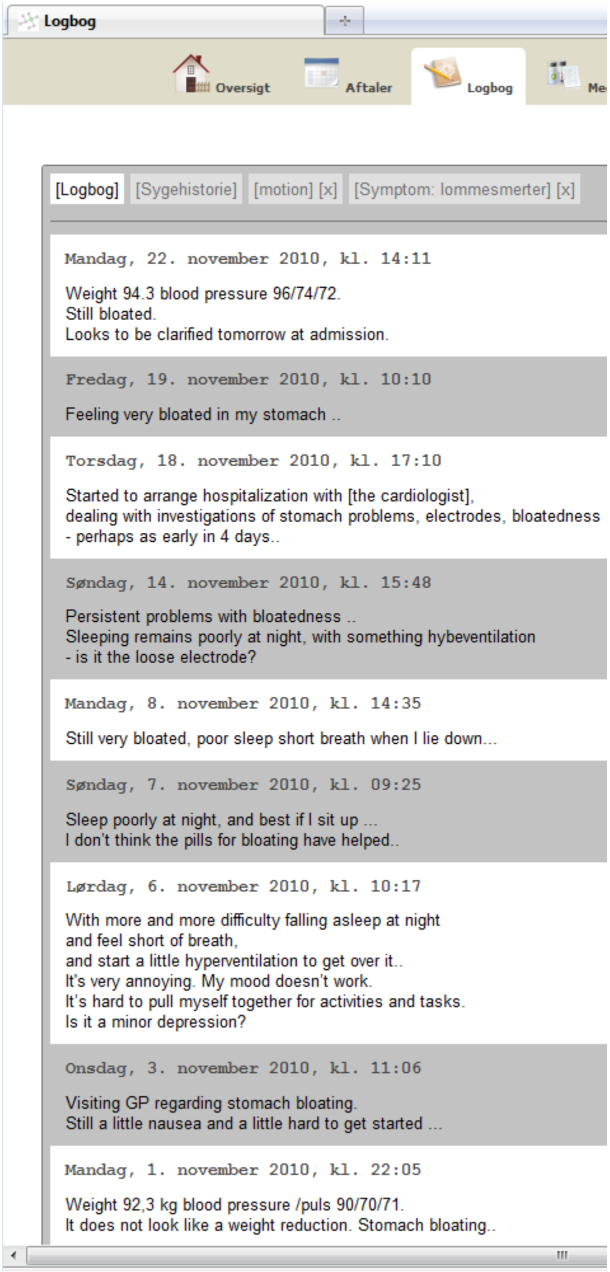
The cardiologist immediately says: *"Oh – Yes, okay [...] Karl, we've talked about that you need to find out how your breath is. This means that you every day have to go out on the street and walk until you need a break. Then it'll say [in myRecord]; Monday 50 m., Tuesday 50 m., Wednesday 45 m., Thursday 70 m. – anything [...]"*

"You see, it would be nice for me to have a very specific test, where you've gone out and seen how far you can walk - it need not be every day - let's say two times a week. But some tasks ... But then I want concrete answers to it that way. Walking distance, weight and blood pressure." (audio transcription, the Heart Centre, October 29, 2010)

Later that day, the design researcher enters the task into myRecord and almost daily, for more than three weeks, Karl writes his weight and blood pressure in the logbook (picture 3). However, he never writes about his achieved walking distance, but one time he mentions: *"My mood doesn't work. It's hard to pull myself together for activities and tasks. Is it a minor depression?"* Instead, Karl's logbook entries (picture 3) reveal that his stomach bloating increases and that he *"started to arrange hospitalization"*. Despite the increased attention from health professionals, Karl was admitted to the hospital after twenty days and he immediately stopped using myRecord.

MULTIPLE BECOMINGS OF HEALTHCARE

When analysing Karl's symptom log, his writings throughout three weeks (picture 3) also mirror what the cardiologist emphasized as important diagnostic information decisive for operation. Yet another, very important, diagnostic information that Karl performs could be characterised 'non-use' (Oudshoorn and Pinch, 2003) or non-completion of the walking-distance task. As a patient his active use and enactment of homework was dependent on developments in his illness and, as the case illustrates, he could not begin the task of measuring walking-distance – apparently because of his stomach bloating and physical and psychological discomfort. As such, changes in his health condition conflicts with his ambitions of writing in his Logbook. Eventually, Karl becomes unable to carry out that part of the assignment. Also, as soon as he got re-hospitalized he stops all activities of myRecord use.



Mandag, 22. november 2010, kl. 14:11

Weight 94.3 blood pressure 96/74/72.
Still bloated.
Looks to be clarified tomorrow at admission.

Fredag, 19. november 2010, kl. 10:10

Feeling very bloated in my stomach ..

Torsdag, 18. november 2010, kl. 17:10

Started to arrange hospitalization with [the cardiologist],
dealing with investigations of stomach problems, electrodes, bloatedness
- perhaps as early in 4 days..

Søndag, 14. november 2010, kl. 15:48

Persistent problems with bloatedness ..
Sleeping remains poorly at night, with something hybeventilation
- is it the loose electrode?

Mandag, 8. november 2010, kl. 14:35

Still very bloated, poor sleep short breath when I lie down...

Søndag, 7. november 2010, kl. 09:25

Sleep poorly at night, and best if I sit up ...
I don't think the pills for bloating have helped..

Lørdag, 6. november 2010, kl. 10:17

With more and more difficulty falling asleep at night
and feel short of breath,
and start a little hyperventilation to get over it..
It's very annoying. My mood doesn't work.
It's hard to pull myself together for activities and tasks.
Is it a minor depression?

Onsdag, 3. november 2010, kl. 11:06

Visiting GP regarding stomach bloating.
Still a little nausea and a little hard to get started ...

Mandag, 1. november 2010, kl. 22:05

Weight 92,3 kg blood pressure /puls 90/70/71.
It does not look like a weight reduction. Stomach bloating..

Picture 3: A screenshot of Karl's logbook entries in myRecord
[Entries are shortened and translated from Danish]

The assignment in myRecord is still there but Karl is no longer able to engage the underlying logic of performing a responsible and cooperative patient. He is hospitalized and hence, patient 'non-work' or 'non-use' might be considered essential categories and made as concrete components of the socio-material conceptualization of patient homework? As of constructive insights for design, this case and other similar interventions suggest that patient homework might benefit from enabling patients to signal that they have become unable to carry out or 'hand-in' homework. Maybe homework and assignments are less fruitful notions when considering design for a socio-material reconfiguration of healthcare? Perhaps the concept of 'patient work' (Strauss and Fagerhaugh, 1997) does a better job when engaged in myRecord – and consequently enactments of another healthcare and different practices?

DISCUSSION

One of the questions treated in this paper and particular to this discussion is *how one can study something that does not yet fully exist without relying entirely on speculation*, but retaining an open ethnographic curiosity towards what is evolving as important in the field under study. A basic challenge in much design research is how to move from a primarily documentary mode of descriptive knowledge generation to sketches and enactments of possible attractive future alternatives. Instead of focusing on this movement as a transfer or translation from one kind of documentary knowledge to a different kind of speculative knowledge, we draw on approaches from design research that seek to deconstruct this principal distinction: *"The central problem is that the challenge [...] is articulated as a gulf to be bridged between observations and interventions."* (Halse, 2008). Halse argues that this often articulated 'gulf' is an outcome, rather than a premise for design. Our empirical cases from healthcare fit this argument well, in the sense that they too work to destabilize some of the conventionally opposing categories of understanding and intervening.

The design interventions point to an ongoing controversy regarding the role of the experiment in design-oriented IT research. The case examples do not live up to the paradigm of purely empirical observational ethnographic research outlined for example by Hammersley and Atkinson (2007) or as practised within ethnomethodologically informed workplace studies (Luff et al., 2000; Crabtree et al., 2009). Nor do the examples live up to purely empirical experimental research where fixed and isolated variables are sought to ensure that the experiment can be reproduced with reasonably similar results. Instead the examples reveal the unsettled status of the experiment and show how the interventional assemblages enact quick shifts in the mode of inquiry: from suggesting and promoting myRecord as a relevant solution to a practical problem, to raising new questions about the socio-material complexities of healthcare.

The assemblage instantiates new practices that incorporate diverse agendas, without trying to purify categories of 'design' or 'research'. The notion of design intervention as we treat it here is meant to challenge a commonly held simplistic dichotomy between 'the existing' and 'the possible'. The intended goal of this project is as much to understand how cardiatric health care may *become something else* by means of IT as it is to create an accurate account of how it really is, when new technologies are introduced. The setup in these examples is far from stabilized and the issues under inquiry are changing during the intervention itself: from testing the relevance to practice and usability of a particular design feature to exploring what might be gained from enacting a theoretical concept such as 'patient manageability' and 'homework'. The status of the prototype can change during the intervention itself, because it is so explicitly entangled in the unpredictable interventional assemblage of e.g. patients (who may reject to use it), clinicians (who may feel challenged) and design researchers (who report to several distinct research communities); sometimes it seems as if the research questions serve the purpose of building a better prototype while at other times the prototype appears as a mere occasion for scrutinizing healthcare.

A terminological challenge to research-through-design is that it could imply that design is a passage, whereas research is what passes through to the other side. We do not wish to invoke this particular meaning according to which means and ends appear as pre-given distinctions. While it is not only very difficult to dissect the event and claim strong distinctions between ‘existing practice’ and ‘projected future practice’, or between ‘observation’ and ‘experimentation’ in the case examples, we find it more fruitful to avoid these dichotomies all together. The seemingly oppositional characters of *describing what is* and *intervening with new proposals* may appear commonsensical, but often become obstacles for integrating research and design efforts. (Sanders in Halse et al., 2010, p.116-120). Instead, the idea of time as emergent and open, (Pickering, 1995; Law and Hassard, 1999; Barad, 2003; Latour, 2004; Whitehead, 1979) allows us to expand the implications of *the present* as a moment of unsettled opportunities, a process of creative becoming.

Our claim is that myRecord as a prototype cannot be reduced to a methodological step towards discursive insights and conversely that our research insights about cardiatric health care cannot be evaluated without close reference to the embodied encounters with this particular working prototype. Because myRecord is fundamentally inseparable from the assemblage that enabled the particular kinds of interaction recounted in the examples of this paper. There are certain difficulties involved in employing design interventions as a design research strategy for exploratory questioning of a given topic rather than exclusively to test solutions. Long-standing ideals of accounting for the world *‘as it is’* and ‘independently of the process of inquiry’ are impossible to uphold with such blurred and changing distinctions between the subject, object and method of study. Above all, the interference with the subject matter by interests embodied and promoted by the individual design researcher makes this type of design intervention very hard to explain in the conventional scientific terms of validity and generalizability.

To practice this kind of design research requires researchers who are willing and able to make quick and improvised shifts in their attitude towards the research situation, rather than rely on rigorously defined methodological frameworks or step-by-step procedures. Making a daring move to present unfinished ideas to foreign project stakeholders must go hand-in-hand with humble and curious moments of listening and observing with an open mind in order to facilitate an authentic encounter between genuine concerns and projected possibilities. To appreciate the unsettled role of the assemblage of the design intervention, it is necessary to pay close attention to the bodily presence of the design researcher and his or her often intuition-based interferences with the parameters of the design intervention: not as contamination of the situation nor an interference with the object under observation but as an intrinsic quality of the practice-based inquiry.

CONCLUSION

With this paper we propose that the conventional approach to knowledge production within the fields of IT research in healthcare, such as PD, CSCW and IS, can be fruitfully complemented by a more interventionist approach. We suggest this as a *strategy of multiple becomings*. Furthermore, we advise that a constructivist stance towards ‘being’ as process will allow a reconciliation of understanding and intervention, present and future.

Through three cases of design interventions we have shown the mutual connections between design proposals and the more discursive space of ‘understanding healthcare’. The argument has been based on a foundational unsettling of both the mode of inquiry (observational *and* interventionist) and the role of the prototype (a solution to be evaluated *and* a research tool to generate new questions). In this light, the intervention is a manifestation of a projected reality, where a partly imaginative prototype (yet very concretely present) meets a patient willing to project her concerns and aspirations onto the prototype, whereby the lived practice that unfolds during the event entails both enactments of the past and enactments of the future. Through the emphasis on embodied encounters, design interventions present a concrete opportunity to practice and explore possible alternative realities before they are fully realized. Rather than postponing the materialization of new opportunities until the requirements are specified, we suggest to begin by instantiating ideas and hypotheses, while they are still only vaguely defined.

The design intervention is a way to supplement well-proven methods for questioning, such as ethnographic fieldwork with enactments of more material articulations of hypotheses and questions. The design intervention is an experimental inquiry that positions itself in-between what is already there and what is emerging as a possible future. With the design intervention, the assemblage allows for the multiple becomings of healthcare.

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