

Association for Information Systems AIS Electronic Library (AISeL)

Selected Papers of the IRIS, Issue Nr 8 (2017)

Scandinavian (IRIS)

Winter 12-31-2017

Coaching Self-Management Through Analytic Textualization

Alexander Moltubakk Kempton
University of Oslo, alexansk@ifi.uio.no

Miria Grisot
University of Oslo, miriag@ifi.uio.no

Margunn Aanestad
University of Oslo, margunn@ifi.uio.no

Follow this and additional works at: <http://aisel.aisnet.org/iris2017>

Recommended Citation

Moltubakk Kempton, Alexander; Grisot, Miria; and Aanestad, Margunn, "Coaching Self-Management Through Analytic Textualization" (2017). *Selected Papers of the IRIS, Issue Nr 8 (2017)*. 11.
<http://aisel.aisnet.org/iris2017/11>

This material is brought to you by the Scandinavian (IRIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in Selected Papers of the IRIS, Issue Nr 8 (2017) by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Coaching Self-Management Through Analytic Textualization

Alexander Moltubakk Kempton¹, Miria Grisot^{2,1}, Margunn Aanestad¹

¹Department of Informatics, University of Oslo

²Westerdals Oslo School of Arts, Communication and Technology
{alexansk, miriag, margunn}@ifi.uio.no

Abstract. Increased patient self-management is emphasized in literature and policy as an important factor in handling chronic diseases. In this paper, we study a project where patients are guided into self-management through remote care. Based on a semiotic approach, we analyze this as a case of digital textualization. We show how the health practitioners utilize an analytic understanding of health in their communication with patients. In these practices, they aim to motivate and enable patients to cope with their disease through digital representations. Our findings show that digital textualization is a constitutive feature of remote care's materiality. The digital is not only a medium, rather its materiality is partaking in shaping the social and the personal, and the meanings that can arise in their intersection.

Keywords: Digitalization, textualization, remote care, self-management

1 Introduction

In the coming decades, health systems in most developed countries will face an increasing pressure due to an aging population and growing number of patients with chronic diseases [1, 2]. Remote care is considered a solution to relieve some of this pressure. Chronic disease management requires routinely visits and continuous treatment adjustments to patients' needs. With remote care, patients can receive care in their homes through remote care and digital interventions. The aim of remote care is to improve the quality of patients' everyday life and reduce hospitalizations, homecare visits and other resource-intensive activities [3–5]. Self-management, taught and managed through remote care, is seen in both research and policy as potentially playing a central role in this [6]. Self-management has the potential to give patients both autonomy and a better quality of life, and to save resources in the health system, as aspects of disease management are transferred from the health system to the patients. However, learning and managing health through digital systems requires patients to make sense of, and be able to act through, digital representations. In a remote care setting, the health service provider takes the role of coaching such understanding and skills to the patients through digital interactions.

Zuboff describes the phenomenon of handling reality through digital technology as textualization [7]. While organizations used to be constituted through material objects for social cooperation and interaction with the world, they now operate on and

through representations. Textualization entails representing “events, objects, transactions, functions, activities and know-how” as text in the information systems, enabling observation and enactment [7, p. 179]. Understanding and handling reality through digital text – in a wide definition of ‘text’, including writing, visualizations, and so forth - has comprehensive implications for how we cope with the world. Kallinikos argues that textualization necessitates a cognitive reconstitution: it adds a layer of cognitive tokens and techniques between us and the material world which requires us to think and act accordingly [8]. Following this insight, we analyze remote care as a case of textualization. Adapting to a textualized version of reality is thus necessary for self-management to be successful.

We present and analyze a case of remote care offered to a group of patients with chronic obstructive pulmonary disease (COPD), diabetes or heart failure. The patients are expected to engage in self-management through digitalization. It is consequently a case that can give us insight into how information systems and services can support the cognitive reconstitution necessary for self-management. Conceptualizing digitalization as textualization leads us to investigate how physical reality is coped with through digital text. Consequently, we explore how the remote care service aids its patients in making sense of their health, and guides them into self-management, by asking the following research question: *How do health personnel work with their patients towards enabling self-management through digital textualization?* In this study, we thus take the perspective of the health service to understand remote care practices and system design.

As information systems are both semiotic *and* sociotechnical [9], we take a multidimensional approach to our research question. We draw on the semiotic methodology recently proposed by Mingers and Willcocks as a framework for IS research [10, 11]. This approach sensitizes us to analyze the co-constitutive relations between the personal, the social and the material when studying the relation between the semiotic content of information systems and the meanings that arise between the users. We emphasize the concept of sociation from the framework, which denotes the process of embodiment of social practices and conditions. In our analysis, we show how the health practitioners utilize an analytic understanding of health in their communication with patients, in order to sociate their patients into understandings and practices that can enable self-management.

The paper is structured as follows: we start with a brief review of the research literature on self-management in remote care. We follow this with presenting the digital textualization of health and a summary of Minger’s and Willock’s semiotic framework. We then present the case and how we have collected and analyzed data before we show our results. We conclude the paper with a discussion of our findings in relation to the literature on digital textualization and remote care self-management.

2 Literature on remote care and self-management

There has been extant research activity on remote care, with several papers emphasizing self-management [6, 12]. Self-management is generally encouraged for many groups of chronic patients. It can be defined as:

[The] individual ability to manage the symptoms, treatment, physical and psychosocial consequences and lifestyle changes inherent in living with a chronic condition. Efficacious self-management encompasses the ability to monitor one's condition and to effect the cognitive, behavioral and emotional responses necessary to maintain a satisfactory quality of life. Thus, a dynamic and continuous process of self-regulation is established [13, p. 547].

There is conflicting evidence on how successful self-monitoring through digital interventions is for inducing behavioral change [14–16]. However, Morton et al., who have done a systematic review of qualitative studies concerning digital interventions and chronic patients' self-management, identify a stream of research showing that "[u]nderstanding self-monitored physiological or symptom readings (...) appeared to give patients across conditions a sense of control over their condition and allowed them to assign meaning to their readings" [6, p. 625].

Research on self-management includes the perspectives and practices of health workers in relation to their patients. Such literature discusses issues related to the requirements of the technology and what could be improved to promote self-management [6]. However, as Mudge et al. argue, most literature on health workers is on their perceptions of what "patients need to do differently to successfully self-manage, with little obvious examination of the role clinicians play in" [17, p. 2]. There is in other words a need for more research on the practices of the health workers, e.g. what they do to promote and coach self-management. This includes the need for a better understanding of what role the digitality of the interventions plays in these practices.

Two papers on digital self-management exemplify this need for more research. In the first paper, by Dinesen et al [18], remote care is characterized in terms of communities of practice, where the patients were included in these communities. Their relationships with the nurses changed to a "relationships of dialogue, where the focus was on mutual learning" [18, p. 6195]. In other words, Dinesen et al. stress that learning self-management is foremost a social practice, formed in the relationships between patients, nurses and family. The role of technology is thus of an enabler of this social relationship, not of an active element forming how the relationship is enacted.

In the second paper, Mamykina et al. propose the theory of sensemaking to conceptualize self-management [19]. They argue that chronic patients normally iterate between two modes of making sense of their disease. The usual one is the habitual mode, where the patient follows established patterns and routines. However, if a patient experiences something current understanding does not account for, s/he goes into explicit sensemaking mode. In this mode, the patient analytically engages with the current situations to figure out what is happening and what an appropriate action could be. Mamykina et al. conclude that self-management solutions should optimize for the episodes of breakdown, offering information when the patient has a gap of understanding and seeks explanation [19]. The focus is thus on how technology can offer appropriate information at appropriate moments, while the role of the health providers is to configure information so that it is available when needed.

Our work differs from these papers, and contributes to the literature, by showing how information in the case under study is created and managed in the continuous interaction between the practices of nurses, the patients, and the technology. We argue that through their practices, the nurses manipulate information in specific ways to coach patients into an analytic understanding of their own health.

3 The textualization of health

As Kallinikos argues, the textualization of reality “adds a layer of cognitive tokens and techniques between man and the world on those that the organizing practices of modernity have already accumulated in the form of writing and notation of every kind” [8, p. 93]. This necessitates a cognitive reconstitution:

[Textualization] increasingly presupposes the cognitive capacity to understand and act upon these elaborate symbolic codifications of work tasks and processes produced by computerization. Cognitive skills are thus increasingly surpassing the bodily and, to a lesser extent, the social skills that characterized the working experience of the industrial age [8, p. 93].

In the three decades since Zuboff wrote her book on the smart machine, society at large has become increasingly textualized through the proliferation of digital tools and media. Within healthcare, domains are moving from being constituted by human physical practices supported by digital tools, to health and health care becoming phenomena that are understood and carried out digitally. Per Floridi, digitalization of health entails that the body not only becomes transparent through monitoring technology, but also typified, in that “‘My body’ can now be easily seen as a ‘type’ of body, thus easing the shift from ‘my health conditions’ to ‘health conditions’” [20, p. 77]. This duality of transparency and abstraction, or textualization in Zuboff’s terminology, of health is considered an opportunity not only to improve health care, but also to give individuals a whole new way of managing their own health. This sentiment is most outspoken among the quantified-self movement. As one of the founders of this movement, Gary Wolf, said in his 2010 TED talk:

these tiny sensors that gather data in nature (...) we think of these tools as pointing outward, as windows and I’d just like to invite you to think of them as also turning inward and becoming mirrors. So that when we think about using them to get some systematic improvement, we also think about how they can be useful for self-improvement, for self-discovery, self-awareness, self-knowledge [21].

In other words, technology has the potential of giving greater insight in the body, leading to the possibility of managing it in new ways. This resonates with Zuboff’s view of the potential of textualization when she argues that: “knowledge is freed from the temporal and physical constraints of action; it can be appropriated and carried

beyond the moment” [7, p. 180]. And as it makes events and processes available for examination, comparison and innovation, it allows more comprehensive, explicit, systemic, and abstract knowledge [7].

The textualization of health is an opportunity for new forms of understanding. However, fulfilling this opportunity necessitates, as in any other digital transformation, some form of cognitive reconstitution. Receiving information does not necessarily entail understanding them, and understanding information does not necessarily entail behavioral adjustments. The scant research that has been done on ‘ordinary’ people’s use of self-tracking devices to monitor health and fitness – ‘ordinary’ in comparison to the quantified self, who have been studied quite widely – seem to show that information from the devices is used in quite unsystematic ways [22], for example dealing “with unsatisfactory data by averting from the intended and designed experience” [23, p. 229]. Textualized health can in other words be studied in light of the literature on textualization of other domains of reality, but requires further investigation to be made applicable in the specific domain of health care.

4 A semiotic framework for studying textualized reality

Textualization in and through IT is entangled with its materiality and the social practices it is embedded in. Mingers and Willcocks have recently proposed a semiotic framework for IS research [10, 11], where they direct researchers towards the study of semiosis, the processes of sign usage. Having a semiotic approach entails studying why the information in an information system is ‘what it is’. As Mingers and Willcocks argue, this question cannot be answered without seeing that the collection of signs that are stored and displayed in an IS is simultaneously the product of three worlds - the personal, the social and the material - and the relations between these worlds.

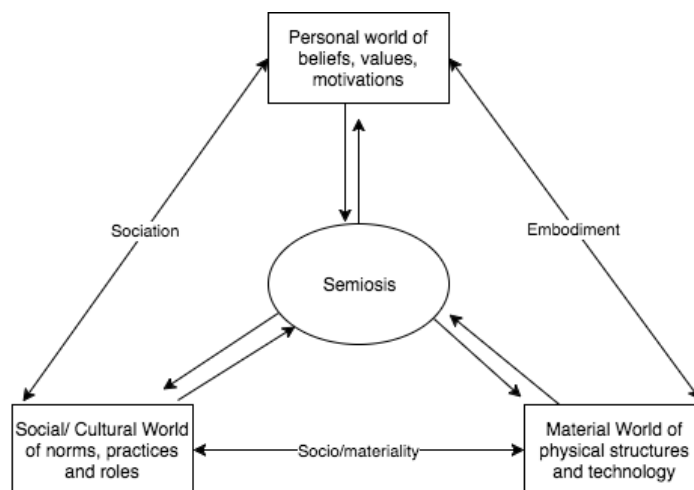


Figure 1. Semiotic framework adapted from Mingers and Willcocks (2014)

What semantic content did the sender intend to provide? Which social systems, norms, discourse or ideology are the representations part of or playing on? How does the hardware and software form and constrain the representations and possible meanings? In contrast to the sociomaterial stance in IS, where these factors are considered ontologically entangled and epistemologically inseparable [24], Mingers and Willcocks want us to analytically take them apart, while acknowledging that they would constitute entirely different phenomena if one piece was taken out of the puzzle.

In the center of semiotic framework lies the texts: the signs, symbols and signifiers stored and shown in particular sequences in the information system. These texts typically have producers, people or systems sending or initiating messages, and consumers, people or systems receiving and interpreting them. In today's digital media, producers and consumers are intermingled and roles change constantly; nevertheless, we attempt to analytically point out who does what. The messages are not freely produced by the producer, neither are they freely interpreted by the consumer. All human signification happens in a social and cultural context, we live within worlds of norms, practices, roles and meanings which are necessarily shared. Likewise, the material is also shaping the messages. A material object can be a producer of, or it can be shaped in a way that constraints, messages. Taking this into consideration, we need a multi-dimensional understanding of how any message is processed to explain it, that is, how semiosis occurs.

In this paper, we keep the whole framework in mind while focusing on one of the dimensions, sociation. Mingers and Willcocks describe this relation between the social and the personal in terms of an embodiment of social practices and conditions, much like Bourdieu's concept of habitus. We extend their framework by emphasizing the interpretive dimension of sociation. Gadamer described the situated understanding people have of the world as horizons of understanding, "the range of vision that includes everything that can be seen from a particular vantage point" [25, p. 313]. While people in the same society share much of their horizons due to commonalities of language and socio-historical situation, they might have differences based on experience and education. However, as argued by Gadamer, there is the potential of a fusion of horizons through conversation, where our understandings extend and include understandings of the one we converse with [25]. In other words, there can be a sociation of understandings.

In addition to sociation, we refer to Mingers and Willcocks' understanding of cognition defined as follows:

cognition as an active, embodied phenomenon (...) we, as human beings, are "structurally coupled" with our immediate environment of people, signification systems and materials. Signs act as affordances and constraints – they lead to particular interpretations and constrain against others – but this is always relative to the knowledge and intentions of the receiver [10, p. 60].

In other words, messages always get their meaning in a consumer based on that consumer's current state, which is based on prior experience and sociation. This current state is termed 'readiness' by the authors.

In the analysis of our case, we will use the semiotic framework to analyze practices among the health professionals that pertain to the sociation of patients into self-management. Although the actual cognitive reconstitution of any patient lies outside this study, we will in the discussion reflect on how the framework's concept of cognition relates with the sociation process we describe.

5 Research Setting and Methods

5.1 Case background

This paper is based on our current research project on patient centric architectures in Norway. We are following the national effort to create an infrastructure for remote care, which, among other things, consist of a national program for testing remote care in four municipalities. The outcomes of these four pilots will inform the national guidelines for service design and infrastructural architecture [26]. In remote care services, patient live at home and use various measuring devices that transmit data to a home hub, which then transmits the data to a remote care system at a health provider site [27]. These provider sites are typically staffed by nurses who follow the patients' data via a web interface and communicate with them.

In this paper, we report from a study of one of the four national pilot projects. This pilot differs from the others because it is run by a private vendor (HealthTech). This company also develops and operates ProAct, which is the remote care system used in the project. The pilot commenced in autumn 2016 and had per October 2017 around 150 users. These users are selected according to the criteria of having the mental capacity and the willingness to communicate about their health.

5.2 Data collection

Our research commenced august 2016. Subsequently we have collected qualitative data from multiple sites, using interviews, observations and document retrieval. In the last category, we have reviewed both policy documents and research reports. We have also tracked the effort in the national remote care program, by following meetings, interviewing and having informal conversations with participants in the program. We have participated in workshops with HealthTech, and we have been several times at their site for interviews, observations and informal conversations.

All interviews and audio from some observations have been transcribed. The two first authors conducted the observations, and they both wrote extensive field notes. Quotes have been translated from Norwegian by the authors.

Table 1. Fieldwork.

	Number
Workshops / presentations	4
Interviews with HealthTech employees	10

Interviews with municipality employees	3
Observation sessions of HealthTech employees	10
Observation sessions and interviews with other pilot projects / national project	20

5.3 Data analysis

Our overall study has predominately been exploratory, where we have iterated between inductive empirical work and the literature. We have used a strategy of theoretical sampling to investigate themes emerging from these iterations [28].

From the iterative process of data analysis, literature and theoretical sampling, a set of themes emerged as interesting for further analysis. Of these, self-management stood especially out. We followed this theme by reviewing the literature, analyzing the categories from previous coding, and then deductively going through parts of the empirical material to understand how HealthTech organized around self-management coaching. The semiotic framework was then used to make sense and structure the phenomena we had identified.

It is important to note that we do not have direct access to the running system and to the patient's information. Our assessment, conducted jointly with HealthTech, was that this type of access would entail higher ethical cost than scientific gain. However, we have seen example data, triangulated descriptions from the different interviews when it comes to their language use, observed the nurses while they were working, and asked them to resonate around their communication practices with patients.

6 Results: practices of organizing and teaching self-management through textualization

Our analytical focus is on practices pertaining to the sociation of patients into self-management. As underlined by the semiotic framework, sociation is one dimension of the personal-social-material phenomenon and must be viewed in consideration of the whole. We therefore start with putting the practices in their sociomaterial context. We then analyze the practices of sociation. We do this by showing how the nurses refer to an analytic understanding in their communication with patients, while simultaneously motivating them through goal orientation.

The sociomaterial configuration of HealthTech consists of its patients, taking measurements with their personal devices and communicating with the nurses through a tablet. The tablet is connected to ProAct, which runs on a cloud platform. Collocated in an office, the nurses monitor and communicate with their patients through the ProAct web interface. Correspondence between patient and nurse goes predominately through asynchronous text-based messages. Non-text based communication forms an exception in the HealthTech case. In addition to the messages sent back and forth between nurse and patient, both parties have access to histories of device readings. This data can both be viewed through a chronological

list, where the readings are color coded in relation to threshold values, and through a graph displaying the trend of readings over time. They also have access to the patients' answers to questionnaires. Both on predefined points in the patient path and on demand, the nurses will send sets of questions to their patients. An example of such a question could be: "how many meals do you eat per day?". The patient's answers to these questions are either binary, yes or no, or on a defined scale, e.g. 1-10.

The material dimension of the nurse-patient relationship is one of digital textualization. The systems' algorithms, devices, nurses and patients are all producers of these texts. The system constrains and transforms the messages sent by the different producers; for example, by constraining the form of valid answers to questionnaires or by algorithmically transforming a set of readings into a graph. Nurse and patients are both consumers of the text in ProAct. They have a common view of the patient data and of their past and present communication, readings and mapping of relevant information.

6.1 Practices of creating the patient's own record

That information in ProAct should be available to patients themselves was a fundamental requirement of HealthTech. As the CEO puts it, it's the patient's own record:

We wanted to put this upside down, we wanted to engage patients. So, we thought it was important to give him insight into his own health. Providing this, we would also make it the patient's own record. – (CEO)

He contrasts it with the standard electronic patient record:

Hospitals use different languages. If I go to the hospital, I think the doctors should use their Latin. Because that's a precise way of describing your condition, but it makes no sense for me to read. Whereas our patient record is for the patient to read, so we try to avoid terms that they can't understand. – (CEO)

One trait of this patient-centric language is its informal style. The messages are styled as those encountered in informal internet messaging apps. The nurses use first names, informal greetings - "hi" - and add small pleasantries, like writing a sentence about the upcoming holiday. The patients follow suit, and several of them use emoticons in their writing.

However, avoidance of technical terms and informal style are not the constitutive features of the language. As the CTO points out, the record exists to give the patient insight into their health. This insight is based on an evolving horizon of understanding of disease management among the nurses in the monitoring center. This understanding is merged with the textualization of the body that happens when the

patient measures himself with devices. To make this understanding relatable for their patients, the messages in ProAct is characterized by an analytical language.

6.2 Practices of analytic understanding

Consistently in the interviews, the nurses emphasized that the messages they write are rooted in medical knowledge. They have a professional understanding of the diseases and how to manage them, based on education, former experience, and the evolving practice in the monitoring center. The lead nurse explained how they assess a situation, which exemplifies this professional understanding:

How do you know [that coughing is a symptom of COPD exacerbation]? Is it a combination with fever? Is it when you blow in the spirometer, then the reading changes? One thing is the readings and the devices, that's simple. It's purely technical, the readings they detect, right. But health personnel need to know, what do we do when the readings change (...) you need to know, what does this mean? – (Lead Nurse)

Each week, the nurses have two formal meetings where they share experiences and develop their common understanding. Besides coordination, they discuss issues encountered while delivering the service and new learnings on chronic disease management. To exemplify, during one of the meetings the team discussed how to handle social issues, how these issues were related to disease management and how to advice patients. We also observed that the nurses' common whiteboard calendar had various planned learning activities. In the month following our observation, they were attending conferences on chronic disease management and visiting specialist hospitals to see how they work with these types of patients. They have also distributed different disease areas between them, making each responsible for keeping up on relevant medical and nursing literature. In other words, the nurses are sharing and evolving a specific horizon of understanding of health and disease.

We both observed and were told through interviews how the nurses utilized the understanding when communicating with their patients. For example, a patient had questions about a medical plan from his doctor, unsure on what effect the medication would have. The communicating nurse raised the question to her colleagues, and a senior nurse then reflected on the effects and rationale behind this type of medication scheme. After this conversation, where both nurses at the end agreed on an answer, the communicating nurse wrote back to the patient.

To make their understanding accessible to their patients, the nurses use an analytical language¹. The lead nurse told us that they want the patients to stop asking “what” when they consider their symptoms, but rather ask “why”. When the patient

¹ Analytic language defined as discourse that “dissects, analyzes, states laws and formulas, establishes principles and taxonomies, and determines procedures for the verification and analysis of information” [29]

tells the nurse about a symptom, e.g. high blood sugar, she asks contextual questions back. What did you eat, what happened before you took the measurement?

then I can explain it to her, and then, 'oh yes, is it like that, yes'. Right? They haven't thought like this before. Then they see it themselves, why is it like this in relation to that, then they can ask new kinds of questions. It's not "what do I do when my blood sugar reaches [a high level], what do I do then? They ask why. And then they get more knowledge. Now they see. – (Lead Nurse)

When the nurses see symptoms that indicates worsening of a disease, they aim at relating this worsening to what the patient has answered to the questionnaires:

Have you done something? Is it something special you see? How are the symptoms? I see that you are coughing more, you answer the question, more coughing, more mucus. – (Lead Nurse)

Following this, the nurses guide patients by showing the relations between the symptoms, the context and what to do about it:

'What does your treatment plan say?'-'It tells me to start with [medication]' (...)-'Do it', and then then it goes over, right? 'And next time then you can do this yourself, right?' Then maybe we must say it three or four times before they actually do it themselves. Or, some do it quickly. We try to help them interpret their symptoms, interpret their disease, we try all the time..we try to give all our contacts some knowledge. We never say anything without a why. Because it's all about knowing and understanding their own disease. – (Lead Nurse)

As seen from these quotes by the lead nurse, the analytic language is making device readings, the aspects pointed out by the questionnaires, the patient's own sensory understanding of his own body, doctor's treatment plans, etc., understandable as a related whole.

6.3 Practices of coaching and motivating

The CTO explained to us that a key insight behind their methodology is that it is quite hard for many chronic patients to change negative habits. As he said, "we respectfully try to coach them", and correlated the human-to-human relations that were enabled through remote care as a motivating factor for successful coaching. In other words, motivation is linked to communication. The informal language directed towards patients, as described above, is part of this story.

The more explicit motivational strategy used is goal setting. Early in the patient path, the nurses send out a questionnaire they use to map symptoms and other health factors. The lead nurse explained the following:

Because it is one of the things we do, ask them to think if they have a goal in what they are doing. Do they for example want to go down 10 kilos? (...) We try to find an area that we can work towards so they get a better health. Then we write this down [in the system], and then we work towards it. – (Lead Nurse)

Goal orientation is considered a general approach to communicate with the patients and to make information relevant for them. The following is an excerpt from our field notes on a discussion on how to approach alcohol and pill use:

(the nurse) says that they should ask in the same way as with the other aspects, for instance for the diet, they ask the patient if it is something they want to actively work on and need guidance, they could do the same with addictions and ask, 'is this something you want to work on?' The main aim is not to map how much they 'consume' but how they could be help to manage this problem better. – (Field note)

In other words, the information in the ProAct should all have a significance for the patient's self-management. And the way nurses make this significant and motivational for patients is through relating it to their goals.

6.4 Practices of working towards a sociation of understandings

As shown above, the nurses use an analytic, but informal, language, where bodily understandings are linked to device readings and aspects of life highlighted by questionnaires. The following is an excerpt from field note:

I ask (the nurse) what she sees as her overall task. She tells me that they want to make the patients relate the data that they see on their tablets to how they feel, and then relate this to the things they ask questions about. So, they ask questions about how they eat and which activities they partake in. Have you done today's training exercises? – (Field note).

The information in the ProAct is designed and managed not only in way that makes an analytical understanding of health possible, but that also can teach how to think in this analytic way. As the chief medical officer of HealthTech said:

They start to use concepts that they haven't used before (...) and they become more aware of their health situation. Someone experiences that they get a new vocabulary that makes it possible to describe things differently. Instead of saying that they don't feel well, they tell us 'my values are fine today'. Or 'normal values'. And some use it almost independently from us. They don't need contact, some don't need contact with us. They just use it. – (CMO)

7 Discussion, Conclusion, and Limitations

In this paper, we have studied organized coaching of self-management as a case of digital textualization. Our analysis shows how the nurses organize to sociate their patients into self-management. They do this by using an analytic understanding in their communication with patients, coaching them on how to relate the textualized and physical worlds, and motivating them through goal orientation. Based on our findings, we contribute first to the Information Systems literature discussing digitalization-as-textualization, and second to literature on self-management in health care.

Self-management in health care is usually treated in medical-oriented disciplines, like health informatics. We have applied an IS lens to the issue, showing it as case of handling physical reality through the digital, a phenomenon IS literature provides theories and methods to understand. Self-management entails that the patient can understand and act on reality through the textual world of the information system. As in the digitalization of other domains [7, 8], self-management requires a cognitive reconstitution for coping with textualized reality. Our findings contribute to the study of how health providers can organize for teaching this reconstitution, as we identify a set of practices performed to guide patients into it. To do this, we have used the semiotic framework to study how the information in the remote care information system is created in interactions between the social practices of nurses and patients and the digital materiality of the systems. Mingers and Willcocks argue that we as humans interpret incoming messages based on our readiness, our current understanding of the world which is based on prior experience and sociation [11]. As Floridi puts it, people attach meaning to data by repurposing it based on existing knowledge. Repurposing happens to make data available as resources in our interaction with the world [30], recursively forming our readiness to understand and act on information. Past interaction consists both of our bodily interactions with the world and social interaction. We have described the interpretive dimension of the social interaction as a sociation of understandings. Accordingly, the meaning we as people receive of any new information on our health states is always contingent on our readiness, and this readiness is formed by past embodiment and sociation.

This understanding of cognition gives us a sense of what HealthTech is working towards in the way they organize and manage the information in ProAct. We can presume that the patient and the health professional share much of their understandings due to commonalities of language and socio-historical situation, but differences include that they understand bodily symptoms of health and disease in different ways. The health professional has medical knowledge of the body and an analytical discourse to describe it, while the patient has knowledge on how they experience their disease. However, a sociation of understandings can happen through communication. If the patient can extend his understanding to the analytical understanding of the nurse, it is possible to analytically grasp the textual world of ProAct as meaningful in relation to bodily experience, and hence actionable. In the analysis, we showed how HealthTech's nurses explicitly use an analytic language and seek to coach patients into internalizing this way of grasping their disease. In other words, they work towards contributing to the cognitive reconstitution necessary to handle the textualized reality of health that self-management requires.

In relation to the self-management literature, we have argued that self-management through remote care is a personal-social-material phenomenon. It is consequently our contention that research like Dinesen et al., showing the social aspects of self-management learning, or Mamykina et al., showing the individual sensemaking involved in it, needs to be considered in relation to this whole. As our argument goes, digital textualization is a constitutive feature of remote care's materiality. The digital is thus not only a medium, rather its materiality is partaking in shaping the social and the personal, and the meanings that can arise at their intersection.

Our findings are based on empirical research on the provider side of the service-patient relationship, which shows the limitations of our conclusions. Further research is therefore needed to explore how the patients cope with textualized reality within this model of self-management coaching.

References

1. Chronic Disease Prevention and Health Promotion | CDC, <https://www.cdc.gov/chronicdisease/>. Accessed may 2017.
2. OECD.Stat: Health expenditure and financing, <http://stats.oecd.org/Index.aspx?DataSetCode=SHA#>. Accessed may 2017.
3. Dinesen, B., Nøhr, C., Andersen, S.K. er, Sejersen, H., Toft, E.: Under surveillance, yet looked after: telehomecare as viewed by patients and their spouse/partners. *Eur. J. Cardiovasc. Nurs.* 7, 239–246 (2008).
4. Andreassen, H.K.: What does an e-mail address add?-Doing health and technology at home. *Soc. Sci. Med.* 72, 521–528 (2011).
5. Ørjasæter, N.-O., Kistorp, K.M.: Velferdsteknologi i sentrum: Innføring av velferdsteknologi i sentrumsbydelene i Oslo. En kartlegging av effekten Delleveranse 2 av 2. (2016).
6. Morton, K., Dennison, L., May, C., Murray, E., Little, P., McManus, R.J., Yardley, L.: Using digital interventions for self-management of chronic physical health conditions: A meta-ethnography review of published studies. *Patient Educ. Couns.* 100, 616–635 (2017).
7. Zuboff, S.: In *The Age Of The Smart Machine: The Future Of Work And Power*. Basic Books (1989).
8. Kallinikos, J.: *Governing through technology: information artefacts and social practice*. Palgrave Macmillan, Houndmills, Basingstoke, Hampshire ; New York (2011).
9. Grover, V., Lyytinen, K.: New State of Play in Information Systems Research: The Push to the Edges. *Mis Q.* 39, 271–296 (2015).
10. Mingers, J., Willcocks, L.: An integrative semiotic methodology for IS research. *Inf. Organ.* 27, 17–36 (2017).
11. Mingers, J., Willcocks, L.: An integrative semiotic framework for information systems: The social, personal and material worlds. *Inf. Organ.* 24, 48–70 (2014).
12. Brunton, L., Bower, P., Sanders, C.: The Contradictions of Telehealth User Experience in Chronic Obstructive Pulmonary Disease (COPD): A Qualitative Meta-Synthesis. *PLOS ONE.* 10, e0139561 (2015).
13. Barlow, J.: How to use education as an intervention in osteoarthritis. *Best Pract. Res. Clin. Rheumatol.* 15, 545–558 (2001).
14. van Kruijssen, V., van Staa, A., Dwarswaard, J., in 't Veen, J.C., Mennema, B., Adams, S.A.: Use of Online Self-Management Diaries in Asthma and COPD: A Qualitative Study of Subjects' and Professionals' Perceptions and Behaviors. *Respir. Care.* 60, 1146–1156 (2015).

15. Roberts, N.J., Ghiassi, R., Partridge, M.R.: Health literacy in COPD. *Int. J. COPD*. 3, 499–507 (2008).
16. Hanlon, P., Daines, L., Campbell, C., McKinstry, B., Weller, D., Pinnock, H.: Telehealth Interventions to Support Self-Management of Long-Term Conditions: A Systematic Metareview of Diabetes, Heart Failure, Asthma, Chronic Obstructive Pulmonary Disease, and Cancer. *J. Med. Internet Res.* 19, (2017).
17. Mudge, S., Kayes, N., McPherson, K.: Who is in control? Clinicians' view on their role in self-management approaches: a qualitative metasynthesis. *BMJ Open*. 5, e007413 (2015).
18. Dinesen, B., Huniche, L., Toft, E.: Attitudes of COPD patients towards tele-rehabilitation: a cross-sector case study. *Int. J. Environ. Res. Public. Health*. 10, 6184–6198 (2013).
19. Mamykina, L., Smaldone, A.M., Bakken, S.R.: Adopting the sensemaking perspective for chronic disease self-management. *J. Biomed. Inform.* 56, 406–417 (2015).
20. Floridi, L.: *The fourth revolution: How the infosphere is reshaping human reality*. OUP Oxford (2014).
21. TED: Gary Wolf, The quantified self, https://www.ted.com/talks/gary_wolf_the_quantified_self. Accessed may 2017.
22. Didžiokaitė, G., Saukko, P., Greiffenhagen, C.: The mundane experience of everyday calorie trackers: Beyond the metaphor of Quantified Self. *New Media Soc.* 1461444817698478 (2017).
23. Sjöklint, M.: *The Measurable Me: The Influence of Self-tracking on the User Experience*. PhD School of Economics and Management, Copenhagen Business School, Copenhagen (2015).
24. Orlikowski, W.J., Scott, S.V.: Sociomateriality: Challenging the Separation of Technology, Work and Organization. *Acad. Manag. Ann.* 2, 433–474 (2008).
25. Gadamer, H.-G.: *Truth and Method*. Bloomsbury Academic (2013).
26. Ny metode for avstandsoppfølging, <https://ehelse.no/nyheter/ny-metode-for-avstandsoppfolging>. Accessed may 2017.
27. Finet, P., Le Bouquin Jeannès, R., Dameron, O., Gibaud, B.: Review of current telemedicine applications for chronic diseases. Toward a more integrated system? *IRBM*. 36, 133–157 (2015).
28. Charmaz, K.: *Constructing Grounded Theory*. SAGE Publications Ltd, London ; Thousand Oaks, Calif (2014).
29. Taylor, C.: *The Language Animal: The Full Shape of the Human Linguistic Capacity*. Belknap Press: An Imprint of Harvard University Press, Cambridge, Massachusetts (2016).
30. Floridi, L.: Perception and Testimony as Data Providers. In: Ibekwe-SanJuan, F. and Dousa, T.M. (eds.) *Theories of Information, Communication and Knowledge*. pp. 71–95. Springer Netherlands, Dordrecht (2014).