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The Quantified Doctor/Nurse: How Quantification Infrastructures 'redo' Care

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Abstract. This paper explores how accountability metrics are enacted in unfolding healthcare practices. We examine the socio-technical infrastructures that underpin and enable quantification of care, and how users of quantified data not only react to quantitative practices and underlying infrastructures, but also actively give shape to them through practices of gamification. In the paper, we elucidate three ways of gamification: adjusting to quantification infrastructures, ignoring quantification infrastructures, and playing with quantification infrastructures. Such games, we show, are played within the context of, and give shape to emerging infrastructures of measuring healthcare. This opens up to a diversity of ontological practices in relation to quantification infrastructures, as well as to unfolding identities of the professional quantified self.

Introduction

In the past few years, healthcare organizations, particularly hospitals, have grown into 'big data houses'. Driven by 'outside' wishes for transparency and accountability, and 'inside' needs to governing care processes and improving outcomes, all types of data are collected and processed, ranging from complications after surgery to malnutrition among elderly, and from physicians' scores on their training of medical residents to nurses' level of caring competences. Furthermore, data is generated by 'others': patients, for example, are encouraged to write reviews and score their healthcare providers on rating sites (Adams 2011).

These measuring practices prompt the creation of a wide range of instruments and technological infrastructures: electronic patient files are adapted to enable and standardize the registration of patients' measurements (e.g., pain scores, fall risk, malnutrition) and facilitate the coding of treatments to enable billing and reimbursement, electronic forms are introduced to measure and compare practitioners' competences, and registries are used to collect data on

patient outcomes for different medical specialties (to name a few) (Wallenburg, Quartz, and Bal 2016). The use of metrics to display (and improve) performance is part of a much wider phenomenon of attention for indicators, performance and accountability, of what Michael Power has called 'the audit society' (Power 1997). A growing body of critical accounting literature discusses this desire for accountability metrics, pointing at their patina of objectivity and envisioned commensurability: numbers would not only reveal 'what's really going on' but also render practices comparable (i.e. rankings), distinguishing the 'good' from the 'bad'. In practice, however, numbers are often heterogeneous, plural, and contradictory (e.g. de Rijcke et al. 2016). Furthermore, indicators and rankings (as a way of valuing numbers) have constitutive effects; organizations may become overly focused on metrics rather than on the qualities the metrics are intended to assess. Similarly, attention might be diminished for what is not measured (Dahler Larsen 2012). Hence, metrics are 'reactive' (Espeland and Sauder 2016), exerting a form of disciplinary power; through processes of surveillance and normalization, metrics change how internal and external constituencies think about a certain field and about themselves.

Although we are attentive to this disciplinary view, we like to take the analysis one step further by examining how users of data not only react to quantitative practices, but also actively give shape to them through practices of gamification. In public administration literatures, gaming is often described as an unwanted effect such as 'hitting the target and missing the point' or reducing performance when targets do not apply (Bevan 2006). Gamification, in turn, as a rather new concept in the accounting literature, pinpoints the enabling and more 'playful' practices of quantification. Drawing on the emerging literature on the 'quantified self' – that is, people gathering quantitative data about themselves, using mobile apps and always-on gadgets[1] (Lupton 2016) – scholars highlight the entrepreneurial and gaming features of quantification, elucidating the liberating and empowering capacities of the emerging algorithmic professional identity (Hammerfelt, Rushforth, and de Rijcke 2016, Bal 2017).

To gain a better understanding of how quantifying effects are generated in the healthcare setting, and how metrics are purposed and repurposed in the attempt to govern care, we need to gain insight in how numbers are actually done, shared and get meaning in everyday practices of healthcare governance. In this

[1] These are also termed 'lifelogging techniques'; the use of sensors is a pivotal feature of self-tracking technologies, using mobile apps and always-on gadgets to track and analyze one's body, mood, diet and spending—just about everything in daily life you can measure. We see a connection here with the professional world of medicine and science in which increasingly performances (whether the distribution of drugs, the amount of hospital patients with a pressure ulcers or the reference scores of a scientific paper) are being collected, thus quantifying individual professional performance on all kind

paper, we examine the infrastructures that underpin and enable quantification of care, and how they are played with.

Research approach

The paper builds on three distinct yet related ethnographic research projects we have conducted on the quantification of care in the past few years. These projects all concerned the use of indicators and performance measurement in hospital in the Netherlands (2011-present). Relying on our theoretical background in Science & Technology Studies (STS), the projects share an interest in how accountability metrics are enacted ('how they are done') in the socio-technical practices of care provision and care regulation.

The concept of infrastructure is key here; numbers do not move freely in outer space, but are actively created, completed, and translated in and between settings. Infrastructures are commonly depicted as substrate: something upon which something else "runs" or "operates" (Star and Ruhleder 1996). STS literature, however, underscores the relational and emergent nature of infrastructures. Key to any infrastructure is its ability to permit the distribution of action over space and time. Rather than an accomplishment, infrastructures require continuous and active engagement, mediating exchange over distance, and bringing different people, objects and spaces into interaction (Larkin 2013). Through the infrastructures that make numbers move, numbers are complemented, sliced, and diced in new ways at other sites, giving rise to a continuous stream of new quantifications.[2] It is this relationality and heterogeneous character of infrastructures that we build on in this paper, focussing on how this gives occasion to new professional identities through practices of gamification.

Findings

Form our research, three ways of gamification emerge: adjusting to the quantification infrastructures, ignoring the quantification infrastructures and playing with the quantification infrastructures (Cf. Bal 2017). These three ways of doing often intermingle, elucidating the rather playful and, we argue, experimental ways of dealing with and giving shape to accountability metrics.

First ***adjusting***. Hospitals (managers, quality staff and practitioners alike) feel overwhelmed with accountability metrics. Each day, they are busy measuring

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of aspects, see http://blogs.lse.ac.uk/impactofsocialsciences/2017/05/15/advancing-to-the-next-level-the-quantified-self-and-the-gamification-of-academic-research-through-social-networks/

[2] Thanks to Anna Essén for pointing this out.

care, building and adjusting technical infrastructures to facilitate data collection and train practitioner in 'correct coding', and monitoring whether measurements are actually being done.

> During a meeting of nurse managers in a university hospital, one of the oncology managers displays a long list of performance indicators on a screen. She states that the department faces a long list of items on which they have to account for their performances, as the oncology registry and some large studies on cancer treatment require a lot of measuring from the nurses, which comes on top of the obliged hospital quality indicators. Each performance indicator is indicated with a coloured ball, reflecting how the department is doing on the specific indicator. The chair congratulates the nurse manager on this achievement; she has succeeded in bringing all requirements in one 'handy' schedule, creating a good overview of the things that need to be done. The nurse manager nods vaguely, and shies: 'it's a hell of a job.' (Field notes, 17 January 2017)

In our research, we encountered many of these examples: accountability metrics are here to stay and you better make them 'doable'. Although practitioners complain about the amount of administrative work, they also stress the importance of quantification quality work: "Thanks to the numbers we know what we are doing, and how to improve care in here" (Interview, 25 August 2016).

Second is ***ignoring***. Practitioners sometimes deliberately ignore accountability metrics, often with support of hospital administrators. For instance, when an indicator doesn't make sense (e.g. 'measuring fall risk for elderly at a paediatric ward') or when it doesn't add to quality of care, they are not filled out. A urologist, for example, pointed out how he was 'just box ticking' a list of quality scores requested by the insurance company, as, he argued, *'these questions don't embark on real quality issues'* (interview, 2 December 2012). Likewise, on a nursing ward for infectious diseases, towels were temporarily removed from the sink cupboards during an external audit to obtain the anxiously wanted JIC accreditation,[3] and restored immediately afterwards: *'We're keeping them in for good reasons; we have seriously ill patients in here, who are incontinent, we don't have any other convenient place to store towels and diapers."* (Interview, January 2017)

These quotes demonstrate a rather playful way of ignoring; practitioners do not fall out on the indicators, but only cosmetically comply with them, sticking to their own quality routines. Hence, ignoring doesn't necessarily mean 'doing nothing', but may also encapsulate box ticking or 'cosmetic compliance'. Practitioners and managers seek to balance ignoring and adjusting: doing away

[3] Joint Commission International, a prestigious international accreditation system for hospitals.

with all or too many required measurements would harm the hospital tremendously as accreditation would probably be lost or never obtained, and hospitals fear the risk of shaming and reputation damage. Furthermore, ignoring *some* metrics allows professionals to focus on those that they *do* find important for quality work, as becomes clear in the next theme.

A third practice is ***playing the quantitative game***, which is particularly exerted at the work floor level. Here, practitioners strategically deal with numbers to enhance performance. During our field work, we encountered a ward manager who checked each morning whether the nurses had done the obligatory scores, and filled in the missing ones. He distinguished the important from the unimportant ones, and confronted the nurses if they had failed to do the scores that are important for patient health: *"you should score an elder patient's mental stage, so you can signal if they develop a delirium, you should anticipate this*." (Interview, January 2017). Yet, he didn't mind the nurses not scoring pain or malnutrition when this was not applicable to a patient (yet) although it was required by hospital management.

On a different mode, physicians experimented with social media to provide new types of care, and to display themselves as 'good doctors'. They explained how they translated medical scientific knowledge for patients and put it on Facebook, informing patients about clinical developments and new medical insights. Next to informing, using social media is 'fun' and enables to be followed and be 'liked' by patients – represented through the cloud score. One of the physicians explained how he prepared his tweets early in the morning, automatically posting them in the course of the day: *"If I post 3 tweets at 7.30 AM, they're gone in the afternoon. So I prepare them; I get up at 6.30 AM and leave at 7.30 AM and the tweets are ready by then. I make sure they are posted at 8, 12 and 5 o'clock; those are the moments people get to work and have time to check their phones"* (Interview, May 2017). Physicians using social media (particularly twitter and Facebook) stressed the importance of being seen and read, for their own careers (the cloud score, getting recognition among colleagues and patients), but also to help (more) patients and provide care in a new and accessible manner, for instance by being a member of a Facebook webpage for patients. In similar vein, communication departments worked on the hospitals' website and cared for the hospital twitter account, displaying successes on academic output and care innovation. Hence, hospitals (and physicians alike) experiment with numbers; managers step in to fulfil the quantification duty but expect (and teach) nurses to know when measurements *do* matter. Furthermore, social media is used to display performance, and to be credited for that.

Conclusion & Discussion

Gamification 'redoes' care through ignoring, changing and playing quantification practices. Such games are played within the context of, and as such give shape to emerging infrastructures of measurement in healthcare practices. This short paper has briefly (and maybe a bit fragmentally) shown how quantitative infrastructures are created and experimented with in a hospital setting. What is considered 'good care' is shaped and reshaped through quantification practices; good care encapsulates ignoring scores, making up scores, carefully scoring a patient's status, and caring for your twitter account. The scoring forms in the electronic patient file, the patient Facebook webpage and the twitter account make up the emerging socio-technical infrastructure of healthcare governance; connecting, valuing, counting and experimenting with organizing care. Rather than 'gaming', which is usually considered something negative and to forestall change, gamification is a way of *working with* and enacting the quantification paradigm – thus actively constituting it. Furthermore, the concept of gamification helped us to escape the rather deterministic language of 'disciplinary' discourses, and to open up for a diversity of ontological practices in relation to measurement infrastructures—as well as the identities of the professional self.

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