



The gaming healthcare practitioner: How practices of datafication and gamification reconfigure care



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Abstract

This article explores how datafication, as an increasing use of quantified performance data (e.g. performance indicators, rating sites), and social media are enacted in everyday healthcare practice. Drawing on the literature about the quantified self, this article shows that datafication evokes practices of gamification: the application of frames of play and rewards to the healthcare setting. We discern three (intermingling) practices of gamification: adapting, ignoring and changing. ‘Adapting’ refers to the incorporation of quantifying features in healthcare, while ‘ignoring’ sheds light on how practitioners seek to circumvent quantifying mechanisms. Change refers to how practitioners actually embrace quantifying mechanisms in order to extend (and improve) their work and to highlight their quantified professional self. We elucidate how datafication of healthcare ‘opens up’ and reconfigures established practices of organizing care and caring – not only for the patient but also to (re)craft the professional clinical identity.

Keywords

datafication, gamification, healthcare, healthcare policy, professional identity

Introduction

In the past few years, healthcare organizations, particularly hospitals, have grown into data warehouses. Driven by outside demands for transparency and accountability as well as hospitals’ desire to better govern care processes and improving outcomes, all types of data are collected and processed, like complications after surgery, malnutrition among elderly and nurses’ level of caring competences.^{1,2} Also, data are generated by ‘others’. Patients, for example, are encouraged to write reviews and score their healthcare providers on rating sites.³ This desire for data collection has sparked the development of a wide range of instruments and technological infrastructures: electronic patient records are used to enable and standardize the registration of patients’ measurements

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(e.g. pain scores, fall risk, malnutrition) and facilitate the coding of treatments to enable billing and reimbursement, and clinical registries are developed to collect (and commensurate) data on patient outcomes.^{1,4,5} This datafication of care is widely addressed in the health informatics and medical sociological literature, ranging from medical records and self-care through e-health, to twitter heart operations.^{6,7} These literature outline how datafication creates new practices of organizing care and prompt questions on the normativities involved. Lupton,⁸ for instance, describes how patient experience data feed into an emerging digital patient experience economy as companies use the generated ('big') data also commercially. Others have pointed out the disciplining effects of the datafication of care on medical work, as performance data not only reveal 'what is really going on in clinical practice' but also render practices comparable (e.g. in rankings), distinguishing the 'good' from the 'bad' and inserting norms for good practice⁹ – something that Michael Power¹⁰ has strikingly pointed out as 'the Audit Society'.

In this article, we seek to inflect this disciplining view and aim to illuminate how the datafication of healthcare 'opens up' and reconfigures established practices of organizing care and caring. We build on an ongoing qualitative research programme in which we study performance management in hospitals in the Netherlands. Drawing on the emerging literature on the quantified self – that is, people gathering quantitative data about themselves, using mobile apps and always-on gadgets^{18,25} – we highlight the entrepreneurial and gaming features of datafication, elucidating the liberating and empowering capacities of the datafication of care.^{12,13} We use the notion of gamification to examine how healthcare practitioners use data (or, conversely, ignore them) to give shape to their caring work – for the patient, the hospital organization and for their professional identity. The central question guiding this article is: *How do healthcare practitioners use and give shape to the datafication of care, and how does this reconfigure caring practices?*

Gamification: playing the data game

In *Homo Ludens*,¹⁵ Johan Huizinga portrays the human being as intrinsically playful, and 'play' as a serious and necessary form of social interaction and cultural development. More recently, and linking the notion of play to technological development, gamification is coined to point out the 'pleasure of play, the promise of a game and the desire to level up and win (...) to inculcate desirable skill sets and behaviours'.¹² Gamification is described as the integration of game mechanics into a non-game environment in order to give it a game-like feel. Gaming in this understanding deviates from how gaming is often displayed in the health services and public administration literature, where gaming refers to the strategic behaviour of social actors producing an apparent change in the measure but not in practice, or as Bevan and Hood¹⁶ have put it, 'reaching the target but missing the point'. Rather, gamification here refers to the playlike character of social interactions, which is in this case supported by datafication of care as this forms the arena in which play can occur. It, moreover, draws on the quantified self-movement, pointing out how various self-tracking tools and applications, including emotion trackers, food trackers and pedometers, offer a new opportunity for people to understand their bodies, minds and daily lives as a series of quantifications or 'numerical phenomenon' that can be examined and acted upon.^{14,17}

In the realm of the (health) informatics literature, gamification is addressed as a mechanism for improving care. It is described how gamification, through persuasive technologies that monitor, self-track and provide feedback on behaviour as well as facilitate social support, is leveraged in developing web applications with the potential to better facilitate and incentivize self-management in persons with chronic conditions.^{19,20} In a recent study in CSCW, Handler and Conill¹⁷ describe how *The Guardian* involved readers in conducting an extensive document study ('crowdsourcing') to detect parliament members' wrongdoing. They point out *The Guardian's* strategy in using game

Table 1. Studies from which this article draws.

Study	Period	Purpose	Methods
A	2012–2013	Rankings in hospitals: how league tables and performance indicators are enacted in hospitals. Comparative research in three hospitals in the Netherlands	+ 300 h of observation, document analysis, semi-structured interviews (N = 56)
B	2016–2017	Quality rebels: how practitioners deal with quality regulations and quality systems. Comparative research in three hospitals in the Netherlands	+ 120 h of observation, semi-structured interviews (N = 25), three focus groups
C	2017	Performance indicators for supervision: the construction and use of performance indicators among the Dutch Inspectorate, healthcare associations and professional groups in the Netherlands	+ 15 h of observation, document analysis, semi-structured interviews (N = 40)
D	2017	Social media use among physicians in Dutch hospitals	Web research and semi-structured interviews (N = 10)

mechanics (e.g. leader boards of readers most contributing to the public investigation) to keep readers involved. Handler and Conill underscore the importance of the interface of open data, crowdsourcing and game mechanics as this interface allows for interaction between technological and social worlds, enabling civic participation.

In the academic field, participation is also pointed out by Hammarfelt et al.¹² who have coined ‘the quantified academic self’ to show how interactive evaluative digital media platforms such as ResearchGate and Impactstory allow scholars to constitute a self-representation of the academic professional self, displaying achievement and building scholarly reputation through ways of gamification. They uncover the playful interactions of professionals with numbering practices – opposing the disciplinary view of academic scholars being governed through evaluative techniques and accompanied technological platforms – showing the ways in which data themselves become manipulated, worked around and used by professionals. Hence, gamification is also about self-representation and ‘self-betterment’, portraying (and living up to) a certain image of the self. This self-image or quantified professional self, Hammarfelt et al. point out, is not only rooted in surveillance and disciplining but also has a liberating effect in the sense that it allows for new kinds of experimental interactions and presenting of the self in a professional arena.

Drawing on the gamification debate, in this article, we seek to get a better understanding how data are actually done and become meaningful in healthcare practices. We examine the everyday practices of working with data in hospitals, how data are played with and how this affects care and professional identities.

Methods

This article builds on an extensive and ongoing qualitative research programme on performance management in hospitals in the Netherlands, covering four sub-projects carried out between 2012 and 2017 (see Table 1). Relying on our theoretical background in Science and Technology Studies (STS), the projects share an interest in how data are enacted in the socio-technical practices of organizing and delivering care. Such practice-oriented perspective allows to uncover how gamification (as a playful activity rather than a predefined practice) is played out and made part of everyday healthcare processes and its impact on care.

Projects A–C investigate the construction and use of performance indicators and league tables in hospitals. We observed practitioners and managers in various hospitals in their daily work and conducted formal (semi-structured) and informal (in the course of observing) interviews (author reports)^{27,28,29}. Besides, document analysis was carried out. Project D concerns the use of social media among physicians in hospitals. We investigated how physicians use and present themselves through social media and how this impacts on their ways of providing care. To that end, we purposively selected 10 physicians in different hospitals who were known for their interest in social media. Selection was carried out through web research and snowballing. Interviews were semi-structured (author report)³⁰. Due to limited space, more detail about the different projects is provided in Table 1.

All studies address the datafication of care, which is described as ‘a technological development that is driven by a quantitative increase in digital data’.¹⁷ While the first three projects are about performance metrics (directly touching upon the issue of quantification), project D takes on a somewhat broader perspective, including (among others) Klout Scores and socio-technical practices as community building. Yet all studies involve data collection and data use, fitting our interest in the datafication of care.

In total, +300h observation and 131 formal interviews were carried out. Field notes were worked up in full observation reports within 24h, and (after permission) interviews were recorded and transcribed. Data collection was done in Dutch. For the purpose of this article, quotes have been translated into English. According to Dutch law, ethical approval was deemed exempt.

For the purpose of this article, all data were reanalysed by the first and second authors (I.W. and R.B.) together. Analysis was done using the method of abductive analysis,²³ meaning that we coded our empirical data inductively, constantly comparing our grounded codes with the theoretical concepts derived from the STS-informed literature on quantification and gamification outlined above.

Results

From the analysis, three practices of gamification appear: playing, ignoring and changing the game, which are teased out below. It should be noted that these three practices of gamification often intermingle, elucidating the rather playful and, we argue, experimental ways of dealing with and giving shape to the use of data in healthcare practice. This finding we elaborate on in the ‘Discussion’ section. Below, we discuss the three practices of gamification separately using excerpts and quotes from the fieldwork. The quotes refer to the four sub-projects (e.g. SC means ‘Study C’).

Playing the game

During a meeting of nurse managers, 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, and how much work is still needed. 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 are done and the challenges that still need to be met. The oncology manager nods vaguely, and shies: ‘it’s a hell of a job’. (Field notes SB, 17 January 2017)

Data work, as a way of collecting, processing and making sense of numbers, includes a lot of (creative) work. The nurse manager in the excerpt above has designed a review sheet to have an overview over the data collection and measurement work, establishing an interactive loop between

data collection and behaviour. During the observations, we encountered many examples of nurses and physicians seeking their way through – and making sense of – data collection and rendering this part of daily clinical routines. Although practitioners often complain about the work it involves, they also see the benefits of data collection and processing and use it to their own benefit. In all hospitals, some kind of benchmark was created to encourage nursing teams to collect and register data on patient outcomes according to the protocol (e.g. ‘registering post-surgical patient’s pain score two times a day’), also inserting an element of competition and fun:

During an interview, a hospital administrator criticizes the indicators, arguing that the hospital was some kind of a ‘death hospital’ according to the hospital ranking. While saying this he turns to a pile of papers on his desk, showing us the figures of the performance of the different hospital wards: ‘You see, ward Z did an excellent job, they will have cake and a picture with me on the intranet next Monday! [smiling] They love it if we celebrate good performance’. (Field notes SA, 22 May 2012)

Rankings and rewards are often used features to encourage data collection and quantify clinical work. Data work is rendered part of a game that actors play along: a competition to be won and that provides joy (and fame) to the ones who do well. This excerpt, however, also reveals the ambiguity of measuring and celebrating achievements; the way data are complemented, sliced and diced in new ways at other sites (for instance, by computing a league table of hospitals), may lead to (perceived) misconceptions and reputational risk,⁹ something we tease out further in the next section.

Ignoring the game

The use of performance data, we noticed, is often deliberate and part of a wider process of valuing and tinkering with (professional) norms and (policy) requirements or societal expectations. An example is ‘ZorgKaart Nederland’ (literally translated as *Netherlands Healthcare Map*), an online platform on which patients can share their experiences, writing reviews and grading their health-care providers – an example of the ‘digitally engaged patient’ who takes up an active role in producing and consuming care. While hospitals encourage patients to write a review, for instance, by putting invitational cards on tables in waiting rooms, physicians are more sceptical:

At a certain moment, we got invitation cards to encourage patients to write a review for ZorgKaart Nederland. I thought it too embarrassing, and I’m not doing anything with it, not anymore. I only did it once [giving a card to a patient] and then decided to never do it again. You know, there are doctors who fill them out themselves [to get a good score on the website]. (Cardiologist SD, 14 June 2017)

This physician feels uncomfortable handing out invitation cards to write a review, as, another physician later stated, ‘it feels like fishing for a compliment’, which goes against the traditional physician–patient relationship. Furthermore, interviewed physicians pointed out the ‘unfair play’ of other physicians, suggesting that some physicians cheat by giving themselves a good review. They thus refused to participate. Ignoring also happened in relation to performance measurement:

A striking example is fall prevention. [Following hospital’s policy] patients need to be informed about preventative measures through a letter in case they have a high fall risk. Well, we often have troubled patients in here who can’t even read and who may become suspicious if we give them the letter. Hence, we print out these letters as they are being counted as part of our performance dashboard, but then we throw them away. Tick the box. (Nurse manager SC, 3 November 2016)

This quote demonstrates 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 norms. Rather

than ‘just’ ignoring advertising (as in the example above) and scoring indicators, refusing to participate is part of practitioners’ reflexive attitude of weighing professional, organizational and patient values and goals. Practitioners and managers seek to balance ignoring and playing: doing away 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. Ignoring *some* metrics allows professionals to focus on those that they *do* find important for quality work. Practitioners thus juggle with the requirements and values laid down on them, exemplifying how practitioners can play the game by sometimes not playing through strategically weighing their opportunities and making deliberate choices.

Changing the game

A third practice of gamification is changing the game. Gamification brings in elements of creativity and (strategic) play, leveraging new opportunities to pursue professional and personal ambitions. An anaesthesiologist, for example, explained how he, in close collaboration with the Dutch Healthcare Inspectorate, used meetings on performance indicators to develop quality policies. This happened behind closed doors:

These are moments we [the association of anaesthesiologists and the Dutch inspectorate] sit together and discuss the problems we signal in our field. Things we can discuss with the inspectorate without making it official, in which we can say: ‘Well, we signal something [a quality issue] and how to deal with this? May this ‘thing’ be something you [the inspectorate] can address during site visits? Or could this be something for a performance indicator? (Anaesthesiologist SC, 5 October 2017)

In this excerpt, data work (developing new indicators to measure performance, discussing results of data collection) enables to develop strategies to improving care. Such ‘overflow’²⁴ of data work is also visible in the use of social media, like Twitter and Facebook. During an interview, an Ear-Nose-Throat (ENT) specialist recalled how he uses Facebook to inform patients about developments in his clinical area, translating recent scientific results (i.e. recent publications in scientific journals on tinnitus) to a group of patients suffering from the disease. He argued that Facebook enables to better inform patients about their disease. He frequently tweeted on other ENT topics as well, addressing a wider public and working on his klout score:

It was an item on the youth news broadcast, just one or two weeks ago, that we can expect a fast worsening of grass pollen, and hay fever. Just two lines text, saying that ‘there will be many ‘pollen’. About 450,000 people saw it on Facebook and Twitter. And people having hay fever posted a reply. I thought, this is really not interesting, it’s something that happens every year, but it’s something that keeps people interested (...) So I thought, I’d better post on hay fever or a cold than on tinnitus. (ENT specialist SD, 11 May 2017)

This physician had entered the Top 100 of twittering physicians in the Netherlands. He sent various messages during the day and kept an eye on his Klout Score, noticing it dropping during summer holidays and going up after a tweet on hay fever. He joyfully contended that he could never compete with urologists and gynaecologists as ‘they have much more funny pictures and anecdotes to share’. Furthermore, he acted carefully not to intervene in colleagues’ relationships with patients when giving information (‘you must always put it in a general sense’). He and other interviewed physicians were highly aware of the delicate line between gaining publicity and (possibly) harming patients or being accused of such a thing. This is illustrated by the next quote from a cardiologist who uses Twitter to inform women about their cardiac risks as well as to build a network with foreign colleagues:

Tweeting on a disease may give a strong response among certain patients who feel threatened by their condition. Yet, such tweets may also connect you to people in the United States, which help to extend your network. (Cardiologist SD, 14 June 2017)

This cardiologist revealed how Twitter enables to warn women about female heart disease and extend the professional network and reconfigures the doctor–patient relationship as social media shortens the distance between them. Through email, Twitter and Facebook, patients possess new ways of approaching physicians and are more knowledgeable about their ideas and preferences. For that reason, physicians were careful not to tweet on their personal life – although, following their Twitter accounts, we noticed a thin line. The cardiologist confessed it was hard not to tweet on US president Donald Trump, and a paediatric oncologist posted a picture of his medical group awaiting the soccer championship final featuring the local soccer team. The cardiologist revealed that patients become more demanding, even stalking her by repeatedly sending emails, postcards and showing up unexpectedly at the outpatient clinic. A pulmonologist stated that he had become more careful:

If you post a film clip or a text, it's gone. You can't control it anymore. A quote can always be misinterpreted. (Pulmonologist SD, July 2017)

Hence, social media, and broader 'datafication', enables physicians to reach a wider public, informing stakeholders (i.e. patients, the Inspectorate, peers) about health, clinical development and personal achievements or considerations. All excerpts reveal elements of playing and joyfulness: posting on grass pollen or the championship is 'fun' compared with the seriousness of clinical work itself and raises your Klout Score. The first excerpt on the encounter between the anaesthesiologists and the Inspectorate is not about fun but about playfully using metric practices to obtain quality purposes. Hence, changing the game (or changing established practices) is about changing the rules of the game and through that setting in motion new practices of care delivery. In doing so, the professional clinical self is leveraged; practitioners gain recognition for their expertise, and enhance their professional network, furthering clinical and scientific careers and fame. Changing the game thus involves deliberate and creative work of discovering new possibilities, as well as their side effects.

Discussion

Gamification, as a way of playfully enacting data practices, encapsulates practices of playing, ignoring and changing the game. Performance indicators, rating sites and rankings, evoke creative practices in which good scores are rewarded ('cake with the CEO'), and 'senseless' or (perceived) harmful indicators and ratings are reflexively ignored and social media is enacted to create new ways of caring, for instance, through posting (and translating) clinical findings and answering patient questions on Facebook or Twitter. These practices of gamification intermingle in day-to-day organizing and delivering care: physicians and nurses are subjected to data collection and actively make use of them to come to grips with performance targets and to do well on benchmarks that embark upon a hospital's reputation, yet at other times they strategically work around such measurements (i.e. printing out information letters but not giving them to fragile patients). Furthermore, social media is embraced to better inform patients and keep up with one's Klout Score (as well as keeping an eye on those of competitive twittering peers) but is also handled carefully to prevent misunderstandings and commotion.

Our research ties in with broader literature on the quantified self, and particular those that show how datafication promotes 'a wealth of practices' as it enables to explore, unsettle and transform existing ways of doing.²¹ Rather than disciplining practitioners through inscribing norms through collecting

and processing data (i.e. benchmarks, patient online reviews and performance indicators that define good practices and preferable measured outcomes), gamification, this research shows, comprises experimenting and inventing new ways of caring, hence reconfiguring professional and organizational practices. Gamification through datafication leads to extended practices of care, comprising care for the patient, care for the hospital and caring for the quantified medical professional self. Datafication, and here our findings suit with the work of Hammarfelt and colleagues on the quantified academic self, is liberating and enables to work on 'self-betterment' following the neoliberal paradigm of 'doing better' and accounting for one's achievements – for example, having a high Klout Score and establishing a prestigious international network through Twitter. Hence, what is considered good care and good professionalism is shaped and reshaped through datafying practices, not just by being reactive to them but also through using data practices to experimentally create new ways of caring.

Conclusion

As we have shown in this article, datafication evokes practices of gamification. Those practices are multiple. Performance management, as is often described in the literature, is not just a matter of commensuration – implying some form of standardization as actors move towards a certain target defined by the indicators or benchmarks.²⁶ Rather, playful and simultaneous practices are employed in which data practices are adapted, ignored and changed. These practices, we have shown, open up existing ways of providing and organizing care, enabling practitioners and healthcare organizations alike with a broader repertoire of changing (individual) performance, as well as clinical and organizational identities.

This research has some limitations. First, although we build on various research projects and case studies, this research is too limited in scope to provide generalizable insights in how the datafication of care fleshes out in healthcare practice. Further research is needed to generate more in-depth insight in how datafication shapes and reconfigures healthcare, also in other institutional contexts (i.e. other healthcare fields, other countries). Second, and related to the former, we have discerned three practices of gamification, but also other forms of gamification might occur. More insight is needed to better understand how gamification is enacted and with what purposes and consequences for organizations (in this case, hospitals) and professional identity evolvment. Third, our study has revealed some evidence that the datafication of care and its related practices as displayed in this research shortens the distance between physicians and patients – elucidating the socio-technical interface of contemporary healthcare systems. Although this is an often-wished-for consequence of contemporary shifts in healthcare systems (i.e. creating more responsive care), our research indicates that healthcare practitioners become more vulnerable as individuals. This should be studied more in depth.

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