Self-Tracking & Sousveillance at Work: Insights from Human-Computer Interaction & Social Science

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Introduction

In this chapter we consider whether and how new collective practices of shared aggregation and curation of individual data stand to enrich our understanding of the physical and emotional impacts of work and undergird coordinated responses to contemporary societal and industrial challenges around wellbeing and productivity in the workplace and beyond. Specifically, we are interested in whether there is something potentially emancipatory in these individualised and individualising routines and practices of self-quantification. Can workplace AI, algorithmic measurement and control and other tools for self-quantification be repurposed and wielded in support of collective resistance?

Under the post-war settlement, the industrial concord between workers and employers allowed the former to bargain with the latter over productivity compromises based on a quantitative understanding of work, time and effort achievable due to the standardised character of the labour that took place in large, unionised industries and the standardised systems of measurement that followed. The contemporary political economy of the UK, meanwhile, is characterised by a very different set of circumstances: deindustrialisation and the rise of the service sector, the decline of trade unions and the destandardisation of employment relations towards a proliferation of precarious working patterns. All these contribute to work regimes that seemingly render unreproducible the kinds of measurement – typified in bits rolling off a production line in a given period of time – upon which workers once bargained for better.

But, at the same time, the use of distributed technologies of data capture and analysis increasingly characterise the changing world of work. In diverse contexts - the platform economy, warehousing and logistics, the hybrid spaces of creative and freelance work - individual behaviour is measured, monitored and predicted by sensors, apps and algorithms. Whether as a tool of managerial control or as a means of ensuring personal productivity and wellbeing, this 'quantification of the self' is both socially individualised and performatively individualising. Management use wearable tech and other means of data capture to identify sub-optimal individual performance among the workforce. At the same time, individuals themselves deploy the same or similar tech to develop more productive working practices inside and outside the workplace.

As we will see, there is always a collective dimension to the individualised subjectivity that self-quantification projects. Moreover, there is also a potential for new collective practices of shared aggregation and curation of individual data that enrich our understanding of work and hold the possibility of undergirding coordinated responses to contemporary societal and industrial challenges around wellbeing and productivity in the workplace and beyond. There is potential, we propose, not only for a greater understanding of the physical and affective impacts of contemporary work but a framework of bargaining over the terms under which that work is performed and remunerated in a world where clear measures and values of one's work

and its worth are increasingly abstract and out of reach. Specifically, we suggest, this centres on a form of 'sousveillance', which we understand here as an inversion of surveillance, in other words the monitoring of management practices by and for workers rather than the other way around.

In this chapter these issues are explored by means of a literature review examining the intersections, and potential gaps, between the fields of Sociology and Human-Computer Interaction (HCI) on the use of self-quantification technologies in the workplace, and their potential to be used by employees for collective resistance against workplace exploitation. The structure of the chapter is as follows. First, we chart some of the key themes of relevance in the literature on self-tracking. Second, we look at how practices of surveillance and sousveillance are addressed across the social sciences and the field of HCI. Third, we look specifically at workplace applications of both self-tracking and, fourth, sousveillance. Finally, we explore both individual and collective representations and practices of self-tracking as a form of resistance in and beyond the workplace.

Personal informatics and self-tracking

In HCI, self-tracking is often understood as a form of *personal informatics*, a class of systems that help people collect and reflect on personal information to improve self-knowledge (Li et al. 2010). Personal informatics models have been developed because such systems are believed to help change one's behaviour, with the most common perceived benefit among users to be 'consciousness raising' (Kersten van-Dijk et al., 2016). A key theme of HCI research on the personal informatics is how designers use the representation of data to engage and influence people in processes of tracking and reflection. Data is usually selected and represented in a way that, designers hope, will allow people to reflect and so generate insight into their behaviour.

Because of this aesthetic and speculative dimension to data, several researchers have been investigating alternative ways of representing and visualising personal informatics data and its impact upon how users remember and reflect (Whooley et al 2014; Epstein et al 2014; Khot et al 2014; Elsden et al 2016). The embodied experience of users interacting with their own data is also an important strand within this field of research (Gardner & Jenkins 2015). Increasingly the use of such technologies is 'enmeshed' in everyday lived experience such that 'lived informatics' encapsulate lapses in, and even the abandonment of, tracking (Epstein et al 2015; Rooksby 2014). In particular, the "Quantified Self" movement based on 'self-knowledge through numbers' has led to many commercial self-tracking technologies (Wolf, 2009) aimed at everything from eating to physical activity and health-related issues.

It is important to note here that these definitions and models often assume that ownership and agency over data collection belong to the user, whose data is being tracked. However, personal informatics can include tracked data about any individual, not just one's 'self' (Li et al 2010). This has been a key theme of social science engagement with the topic and with HCI research around it. The move towards 'self-management', 'responsibilisation' of the individual, or a 'control society' is a key theme addressed in this literature (Lupton 2016; Moore & Robinson 2015; and Neff & Nafus 2016). Lupton (2016), for example, identifies a gap in the existing HCI literature on self-tracking insofar as "in their focus on the individual they do not explain the wider dimensions of the practice' of ''self-tracking cultures'". According to Lupton, "this juxtaposition of the personal with the sociocultural aspects of computer informatics has yet to be fully explored and articulated in relation to self-tracking" (Lupton 2014:78). The bringing to bear of sociological perspectives, therefore, may help in

identifying the more collective processes and potentialities latent in what appears as an individualising and individualised set of technologies and uses.

Workplace applications

HCI papers often focus in detail on the design of a specific app or device, reviewing user experience and creating recommendations for improving design; for instance, reviewing the boundary management issues created by smartphone email use and recommending improvements to email apps to help users maintain a healthy work-life balance (Cecchinato et al 2014; 2015). HCI research of this kind has been particularly innovative and design-focused, even prototyping a Quantified Workplace system to gather various data and survey what employees found useful, providing design recommendations for future systems (Mathur et al 2015).

There have also been attempts to understand how companies use tracking technology in the workplace to monitor worker performance or fatigue, capture mood and interpersonal influence or emotional awareness, correct sedentary behaviours, augment physical or cognitive processes, track movement or steps, evaluate time management and work breaks, identify individual workers, or deliver messages or other content to workers (Maman et al 2017; Hänsel 2016; Whittaker et al 2016; Moore & Robinson 2015). Specific case studies have focused on construction (Choi et al. 2017); occupational health (Schall et al. 2018); the police (Eneman et al. 2018); warehousing and logistics (Moore 2019), Amazon Mechanical Turk (Lascau et al 2019), and assembly lines at Foxconn and Olivetti (Moore & Robinson 2015).

A specific area in which such an inquiry has been taken up in both social sciences and HCI is around the topic of time or ‘rhythm’ as a feature of self-tracking practices (Pitts et al 2020; Iqbal et al. 2014). In a recent contribution, Davies (2019) looks at the desire to control rhythm - both of work and bodies - which is facilitated by wearable devices and real-time data. This attention to time often throws up a similarity between self-tracking in the workplace today and the forms of measure and control through which workers were tracked in the Taylorist factory. Daechong (2017) uses speculative future scenarios to look at how 'expected self-empowerment and self-improvement of users' [is] 'rewritten as a "digital nudge", "extreme Taylorism", and "intimate surveillance" in [digital healthcare and labour management] settings'. Moore, meanwhile, traces a line between Taylor and the Gilbreths’ 'Scientific Method', where management attempted to find a single perfect way to do work and standardise all work, and the Quantified Workplace, where individual workers self-manage using data as a tool to improve their own productivity (Moore 2017).

Moore's work in particular marks a substantial contribution to the critical social-scientific understanding of the implications of self-tracking for the practice and experience of work. Specifically, she highlights how the pressure to self-manage and self-track is an outcome of the precarious conditions (zero hours contracts, uncertain work futures), and expectations of agility (adaptability to constant change) imposed upon contemporary workers, the result of which is a commodification of emotional and affective labour (Moore 2018; Moore & Piwek 2017. Examples covered in Moore's research include both voluntary self-monitoring, as in a Dutch company who took part in a Quantified Workplace experiment (Moore 2019) and technological tracking enforced by management in various contexts, for instance in large corporations such as Tesco (Moore & Robinson 2015). This kind of top-down tracking and algorithmic control is also common in new platform-based work (Wood 2018).

Power and control in tracking

Noting the tendency for work to blur into leisure time due to an 'always online' culture (Cecchinato et al 2017), HCI research uses the term 'boundary management' to describe the problem of maintaining work-life balance and setting appropriate boundaries to tracking. This is imperative when the use of personal informatics at work brings into the domain of workplace measure issues typically considered outside the scope of the employment relationship, like health, sleep and mood – an accounting process that Moore describes as 'wellbilling' (Moore 2019:137). In light of this, both social science and HCI literature identify user privacy at work as a key concern, highlighting the importance of transparency over data usage and usage permissions (Mathur et al 2015; Moore & Piwek 2017; Schall et al 2018).

Where does the locus of control lie in the collection of tracked data, the analyses performed and the decisions being made about it? For some scholars, the trend for self-tracking feeds into existing fears around increased everyday surveillance. The relationship between self-tracking and the wider role of data in contemporary capitalism rests upon an ownership and commodification structure whereby data is not privately available to the individual; most devices require uploading information to a cloud-based service, allowing corporations to benefit from either personal or anonymised datasets, and leaving the individual with little control over their data. In a work context, managers may have access to data which individuals cannot see (or may not know is being collected), and it may be unclear how data is being used to assess performance. In this sense, the social scientific and HCI scholarship on self-quantification takes a critical perspective based on self-tracking's position within a wider political economy of data that infringes upon the privacy and freedom of individuals in a number of ways and establishes limits on the potential of self-tracking for social good.

From this critical perspective, data collection only represents the individual within their existing conditions within the social relations to which they are currently subject at work and in everyday life. Where self-tracking seeks to capture productivity, health and wellbeing impacts, the onus falls on the individual to enact change based on the data they gather, to enhance their productivity or desirability and gain advantage, applying an individualised and competitive mindset to both their personal and professional life. Moreover, the data is not situated within a group or local context in such a way as to place responsibility on any powerful agencies to create wider change.

There are other ways of harnessing tracking data, though. *Sousveillance* is the idea that tracking can provide "watchful vigilance from underneath" (Mann 2002) rather than just providing a way for firms and the state to monitor behaviour. The small body of work on the potential for tracking to hold power to account through sousveillance tends to focus on isolated instances rather than the broader principle, with cases including police body cameras (Eneman et al 2018), healthcare technologies (Morgan 2014), supervision and ethics in nursing (Freshwater et al 2013), and Open Source Intelligence used by citizens to understand and challenge the actions of publicly-funded organisations (Marshall et al 2016). Few of these directly address work, workers or the workplace as a specific focus for the implementation of or experimentation with techniques of sousveillance. One example of work-focused sousveillance is *Turkopticon* (Irani & Silberman, 2013), where workers on Amazon Mechanical Turk –a crowdsourcing gig platform– collaborate to report on employers. This involves simple ratings of employers: collective selection, curation and aggregation of individual measures are not features of the tool.

Sousveillance is necessarily a shared endeavour. Large monolithic actors like corporations and governments have the capacity to aggregate data at scale. Individuals can only achieve similar scale by pooling their data. Users and designers alone face limits to the extent of the changes they can achieve to how self-tracking technologies are deployed. It is necessary for "self-tracking communities [to] form coalitions with other peer production-oriented groups, open source developers, crowdfunding communities and scientific research institutions" in order to develop alternatives (Jethani 2015). The individualised character of 'quantified self-experimentation' may take 'n=1' as its sample but is made meaningful only in relation to larger bodies of people and larger audiences with which data can be compared, and with institutions capable of articulating these links up to the level of whole populations.

Conclusion

Along with some other examples (Khovanskaya et al. 2013), the above represents the developing thinking of an emergent but still relatively small field of inquiry. The review suggests the need for further research and practical experimentation into uses of self-tracking technology and especially the collective use of such technology. The challenge is to understand the potential of self-quantification technology for collective resistance strategies and a shared understanding of productivity and wellbeing - specifically work's bodily and mental impacts - around which workers can better understand their work, potentially as a basis to organise and bargain. There is always a dual character to measurement in the workplace. It can be used by management to dominate workers but can also be used by those same workers to organise around and negotiate improvements in programmes of concerted collective bargaining. Shared forms of measurement present in the industrial workplace – such as the managerial clipboard of the Taylorist factory – saw established forms of measure used to both dominate workers and by those same workers to organise around and negotiate improvements in programmes of concerted collective bargaining. In this sense they represented a common, if contested, basis around which management and workforces could construct industrial compromises around time and productivity. But the fragmented and deregulated contemporary workplace often lacks clear frameworks of measure around which new compromises can be struck in pursuit of productivity gains and better working practices.

In light of this impasse, can distributed technologies of data capture and analysis through wearables and sensors support the remediation of industrial relations? Moreover, can the collective or aggregated quantification of the physical and emotional effects and impacts of working practices enable workers to better evidence, understand and negotiate around wellbeing issues, even in workplaces where the physical aspect of the work is not as transparent as in traditional industries? This could begin with subversion of existing top-down tracking or by developing entirely new measures for workers to collect data. This might incorporate, for instance, data that can be analysed algorithmically to identify and analyse certain patterns of movement (e.g. posture, or gait, speed/angle of getting up out of a chair) - charting the movement (of lack thereof) and expenditure of energy by workers in their places of work may help evidence the physical impacts of work even where these are not immediately apparent, in order to pursue improvements in workplace health and wellbeing. This data, in turn, could be combined with the collection and analysis of other kinds of individual and collective data around the practice and experience of work activities and the time in which they take place - e.g. wearable data and productivity management apps.

The question is how to collectivise what is currently a process of individualised and individualising commodification and control. What platforms, infrastructures and forms of ownership and permission are necessary to construct a framework for the shared 'bottom-

up' collection and curation of individual data? The pooling and shared 'curation' of data may be one way to institutionalise a capacity for the data of quantification and self-quantification to be turned to the ends of a 'workers inquiry' centring on 'sousveillance' as the bottom-up ability to monitor managerial practices against, and not in support of, exploitation and domination in the workplace. To realise this potential, we need to develop practical and empirical tools that will allow us to explore which kinds of data pooling might be useful and (importantly) acceptable to workers. As with any commons, it will also be necessary to determine how these self-tracking communities will be able to self-regulate so as to maximise the benefit for the community.

Acknowledgements

This research was funded by the ESRC Productivity Insights Network. Thanks to Freddie for research assistance, Donna Poade for her involvement at an earlier stage of the project, and Jamie Woodcock for comments on an earlier draft. Some elements of the chapter were developed in a blog for the Digital Societies Faculty Research Group at University of Bristol.

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