Working in an Analytical Cage: The Paradox of Agency in Workplace Datafication

Completed Research Project

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Background and Motivation

Markus describes workplace datafication as "the technologies and work practices by which people and organizations are sorted and classified, scored and ranked on various dimensions, and prescribed or predicted, often with the aim of manipulation" (2017, p. 232). The datafication of workplaces is driven by technologies that enable the pervasive production, integration, analysis and visualization of data about employee behavior and performance. Let us call these datafication technologies. Such technologies usually entail various ways in which data are automatically or semi-automatically harvested from different systems and fed to algorithmic management, big data analytics, and artificial intelligence systems. For example, sophisticated people analytics systems are increasingly present in organizations with the aim to turn employee performance into data (Gal et al., 2020; van den Broek et al., 2021). Workplace datafication then stands for continuously turning into data aspects of work that have not been previously quantified, and subsequently integrating, analyzing and visualizing them for the purposes of managerial intervention into work activities.

In this paper, we focus on what happens to employee agency under workplace datafication: do employees become more like cogs in the machine or can they unleash their creativity to perform ever better in the datafied work environment? Literature offers conflicting findings regarding the impact of datafication technologies on work and employee agency. On one hand, we see considerable enthusiasm and ample evidence suggesting that datafication technologies enable organizations (Brynjolfsson et al., 2016; Davenport et al., 2010) and individual employees (Leonardi & Contractor, 2018; Ransbotham et al., 2016) to do more: obtain new knowledge and insights, generate new value, develop novel products, services and business models, or engage in new professions, broaden the scope of work activities, or create completely new streams of work and income. On the other hand, more critical researchers and practitioners alike highlight the opposite impact of datafication technologies that limit what organizations and individual employees can do, for example by creating legal and governance issues (Constantinides et al., 2018), prescribing narrow ranges of activities possible (Alaimo & Kallinikos, 2016, 2017), or subjecting employees to restrictive algorithmic management and evaluation (Faraj et al., 2018; Möhlmann et al., 2020; Rahman, 2021).

We thus argue that there is an apparent paradox in studies about workplace datafication which show simultaneously an increase and decrease of employee agency. Yet, both

positions have accumulated substantial empirical evidence and therefore there would seem to be at least some truth to both of them. Thus, we assume a position that both views may be right and ask the following empirical question: *how does workplace datafication simultaneously increase and decrease employee agency?* To answer this question, we draw on a theoretical distinction between instrumental agency that refers to the individual employee's resources, skills or rights to engage in day-to-day, managerially prescribed activities at work (Emirbayer & Mische, 1998; Leonardi, 2011), and transformative agency that describes employees' capacity to shape working conditions and structures that enable their actions (Levina & Orlikowski, 2009; Tuominen & Lehtonen, 2018). These issues have recently gained renewed attention due to the pervasive datafication of work (Burton-Jones, 2014; Galliers et al., 2017; Lycett, 2013; Newell & Marabelli, 2015), especially as more and more workplaces adopt remote working arrangements during the pandemic (Leonardi, 2021). This approach allows us to provide a more nuanced lens on employee agency by investigating it in more depth in the light of the apparent conflict in literature.

Research Design

To answer our research question, we conducted an exploratory case study (Eisenhardt, 1989; Yin, 1994) to analyze changes to instrumental and transformative agency emerging from the adoption of datafication technology in an academic institution. The setting offers a perfect opportunity to study tensions between instrumental and transformative agency as academics have traditionally enjoyed considerable freedom to shape the context of their work. As our research site, we chose a UK-based business school (the School) that has pioneered the use of a learning management system and is expanding the use of analytics across its teaching programs. The analytics system offers a range of features, including the aggregate number of views per resource, named view per resource, date and time viewing statistics (called "*usage statistics*"), the number of comments made, the aggregation of data into quartiles, and aggregate data per teaching week. These are available to course leaders, tutors and staff members involved in the overall planning and delivery of teaching programs. Other analytics available in the system include assessment grades, aggregated grades for previous years and cohorts, as well as overall course feedback from previous years. The evolution of the system is a good example of the progressive datafication of a workplace where members of staff are encouraged or even expected to make use of analytics in their day-to-day work. The analytics system investigated was used for learning analytics to monitor and improve student learning outcomes, but our focus in the study is on the analytics of student as well as staff activity used to monitor and evaluate their performance as employees. The higher education sector has exhibited both considerable enthusiasm about the possibilities brought on by analytics, as well as concerns regarding the impact of progressive datafication on academic autonomy and freedom (Kallio et al., 2016; Macfadyen et al., 2014). We collected data from observation of the analytics system, semi-structured interviews and committee minutes to obtain a detailed understanding of the case and triangulate our observations (see Table 1 for summary).

Table 1. Empirical evidence			
Source	**Amount and type of data**		**Period of collection**
Analytics system	Observation notes covering 24 hours of observation, screenshots of selected functionality, total of 25 documents, plus 5 documents supplied by interviewees		03-01/2018
Interviews	31 semi-structured interviews with 29 informants, totaling 1,528 minutes, average lengths 49 minutes, shortest 24 minutes, longest 85 minutes		06-09/2017
	Professional area	Main responsibilities	No. of int.
	Administrative and professional services staff	Operations and program management at both undergraduate and postgraduate levels, as well as teaching and learning support roles and administrative roles within the registrar's function	14 (2 shared roles)
	Teaching staff	Academic responsibilities solely in teaching and administration of teaching courses, but no research activity at the time of research	8
	Technical staff	Three members of the in-house development team, and two members who were technical but embedded in program management teams	5 (2 shared roles)
	Academic staff	Main responsibilities at the School related to research and only a small proportion of their time was devoted to teaching	4
Committee minutes	30 sets of committee minutes from formal meetings of the IT Strategy Committee held between 2013 and 2016, totaling 700 pages		January 2018

Findings

We find that workplace datafication indeed allows employees to engage in several activities demonstrating increased instrumental agency, which is aligned with studies showing the bright side of workplace datafication. Operations become more efficient and, at least in some ways, more effective with datafication. At the same time, we find considerable evidence that the transformative agency of employees diminishes in a number of ways. We trace these changes back to the specific features of the learning analytics system and theorize three mechanisms that explain the implications of the technology on agency: *reactive discipline, dynamic standardization, and analytical acceleration*. Together, the three mechanisms give rise to an *analytical cage* whereby datafication technologies simultaneously increase instrumental and decrease transformative agency. These findings are summarized in Figure 1.

Discussion

The three mechanisms describe a bureaucratic form that we call an *analytical cage* reminiscent of the Weberian iron cage. The cage is analytical because it emerges out of inherently statistical, computational analytical technologies, and it is a cage because the mechanisms prescribe individual behavior, therefore shaping the agency of those inside it. Yet, the analytical cage differs from the Weberian iron cage, as well as the digital cage (Peeters & Widlak, 2018) and the invisible cage (Rahman, 2021). Instead of rules and performance targets set by superiors, the analytical cage operates through the mechanisms of reactive discipline whereby employees self-regulate their behaviors in response to comparative data, dynamic standardization where standards are constantly redefined on the

basis of data pulling employees towards the collective mean, and analytical acceleration that spurs actors to ensure constant data generation at a cost of reflection and sensemaking. Thus, regulation, discipline, and comparison conducted by managers are supplanted by employees' urge to engage in self-discipline through comparative data. Instead of fixed standards, at the center of the analytical cage there are targets that are in flux. The incessant speed of data generation puts premium on compliant data-generating behaviors that are monitored constantly through datafication technologies. In sum, the analytical cage is a new form of bureaucratic control that arises with datafication technologies, increasing instrumental agency and decreasing transformative agency of employees at the same time through the mechanisms of reactive discipline, dynamic standardization, and analytical acceleration.

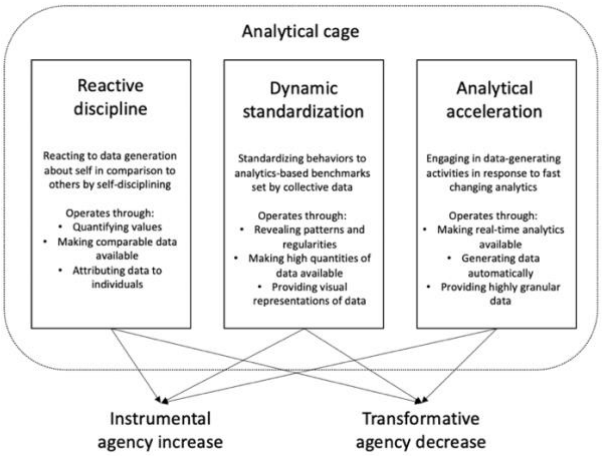

Figure 1 The three mechanisms affecting agency

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