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Discretionary Technology Bootlegging Tensions in Institutional Healthcare Work

Abstract

We explore individuals who take some of their technology use ‘underground’, described as ‘bootlegging’, to enhance healthcare work. We find that healthcare professionals’ informal use of mobile applications in healthcare work sometimes ‘sticks out’ and this produces professional identity tensions: (a) conflict with perceptions of professional behavior, and (b) defilement of expert judgment. Our analysis, moreover, reveals that identity work (i.e., ‘accepting’ and ‘sensemaking’) provides a coping mechanism to deal with these unresolved professional identity tensions. This paper contributes to a better understanding of the constitutive entanglements and two-way interactions of discretionary technology bootlegging, professional identity and autonomy in institutional healthcare work.

Keywords: discretionary technology bootlegging, mobile apps, professional identity, invisible work, institutions, institutional voids, healthcare work.

Discretionary Technology Bootlegging Tensions in Healthcare Work

Introduction

Studies persistently illustrate that the uptake and implementation of organization-wide IT systems proves challenging in work environments (Boonstra and Govers, 2009; Dupret, 2017; Petrakaki and Kornelakis, 2016). In response, managers have paid greater attention to the adoption of formal organization-wide IT systems to help overcome some challenges (Grant *et al.*, 2006). Not all successful technology adoption follows this formal organization-wide approach, however. Individuals are increasingly gaining *ad hoc* access to various technological platforms to effectively support institutional work, for example, in the context of healthcare, doctors can use web and mobile applications (apps) for timely, high-speed access to online repositories of information for prescription of difficult to calculate or infrequently used drugs (Daskalopoulou, Keeling and Pritchard-Jones, 2019). This article aims to explore such examples of discretionary technology use, taking as its point of departure that such practices are supporting healthcare work and professional identity work and, critically, provide an institutional bridge from the informal to the formal aspects of healthcare work.

Star (1991) stresses the importance of investigating the work performed around formal practices since individuals may work around technologies (Ash *et al.*, 2004; Dupret, 2017), or take some of their work ‘underground’ (Abetti, 1997; Augsdörfer, 1996; Knight, 1967). Underground activities are often described as ‘bootlegging,’ named after the practice of hiding alcohol in one’s boots, as during the U.S. Prohibition. We define discretionary technology bootlegging as the practice by which individuals, with the aim of enhancing institutional work, take the initiative to use an available technology that has no formal organizational support and operate beneath the sight of senior management. We advance the

argument that discretionary technology bootlegging resides in the institutional voids where there is an absence or underdevelopment of official organization-wide policy, or formal institutional rules and procedures on technology use (Helmke and Levitsky, 2004; Orlikowski and Barley, 2001; Tsai, 2006). These institutional voids arguably provide individuals with the opportunity and capacity to informally explore work-based solutions that fall outside the official organization-wide technology policy (Helmke and Levitsky, 2004; O'Connor and McDermott, 2004).

Discretionary technology bootlegging is therefore distinct from using IT systems strategically introduced at an organizational level (e.g., electronic health records) (Petraiki, Klecun and Cornford, 2016). Organization-wide IT systems are more standardized and formally instituted within healthcare work (Barley, 1986; Petraiki *et al.*, 2016). The informal nature of discretionary technology bootlegging means that it is rarely analyzed in detail (Dupret, 2017). Rather, most studies are concerned with the visible organization-wide and strategic adoption of technology, with an emphasis placed on the antecedents, standard processes and tools to manage work integration and positive interactions (Giebelhausen *et al.*, 2014). However, much of this research has been criticized for neglecting the entanglements of institutional arrangements with technology, where there is individual work autonomy and new roles emerging (Orlikowski, 1994; 2007), and also where the ability of professionals to explore, experiment and inscribe technologies in work is not severely restricted (Orlikowski, 1994; 2007; Daskalopoulou *et al.*, 2019). The literature on bootlegging (Abetti, 1997; Aram, 1973; Augsdörfer, 1996; 2005) provides an understanding of the questions why and how bootlegging activities take place, yet it is silent on the role of discretionary technology use, not least with regards to the constitutive entanglements of professional identity, individual autonomy and institutional work.

Research studies demonstrate that technology use is bound up in the construction of professional identity (Orlikowski, 1994; 2007): defined as the totality of “*activities that individuals engage in to create, present, and sustain personal identities that are congruent with and supportive of the self-concept*” (Snow and Anderson, 1987: p. 1348). In his seminal study, Barley (1986) found that the introduction of CT scanner technology and its use transformed radiologists’ work routines, identities and roles. Similarly, Green, Hartley and Gillespie (2016) showed how technology use influenced healthcare professionals’ transition from a secure, stable, and familiar professional identity as a ‘physician’ to an insecure, unstable, and unfamiliar role as a tele-health ‘technician’. These studies are situated in formal organization-wide technology setting, where policy, structures and institutional repairs enforce or sanction practice. However, outside of this setting, the construction and expression of professional identity can be easily overlooked because discretionary technology use does not match what we expect from the formal institutional order of the workplace.

The aim of this paper is to explore how individuals engage in discretionary technology bootlegging in healthcare work. That is, when such individuals accommodate discretionary technology use and in particular into the ordinary institutional routines of healthcare work. To do so, we explore healthcare professionals’ experiences with mobile apps. We chose this context for two reasons. First, healthcare is a context governed by strong professional identities, standards and institutional pressures (Pratt, Rockmann and Kaufmann, 2006). Thus, identity tensions are expected to be more visible here compared to other institutional environments. Second, the growing discretionary use of mobile apps with individual healthcare professionals offers an intriguing opportunity to explore the dynamics of how this technology is experienced and negotiated.

In developing our arguments, this study makes three key contributions. First, research studies focus predominantly on evaluations of technology adoption outcomes. This study

sheds light on how discretionary technology bootlegging produces professional identity tensions, notably conflict with perceptions of professional behavior, and defilement of expert judgment. It therefore identifies the tensions entangled between the formal and informal institutional rules, but also how the less visible informal work shapes professional identity and patient-centered care. It shows the positive rather than the negative aspects of discretionary bootlegging in relation to professional commitment and patient-centered care.

Second, whenever institutional voids are discussed in relation to technology adoption, it is in relation to weak or absence of formal regulatory, normative or cognitive rules. For example, technology is mandatory for work and instituted as formal policy, or technology is expected as part of the work and as an organization-wide IT system. Hence, technology adoption is portrayed as monolithic and visible in all aspects of institutional healthcare work. However, our study stresses the importance of discretionary technology bootlegging, building on Dupret's (2010; 2017) concept of invisible work from technology workarounds. We show that institutional voids *coexist* with organization-wide IT systems, and that healthcare work constructs substitutes for formal institutional healthcare support – what Tsai, (2006) refers to as 'adaptive informal institutions'. However, we show the fragility of the informal in that the institutional order intrudes and makes this practice 'stick out' whenever it is seen as a betrayal of the values or work ethic of the institution.

Third, this study sheds light on what professionals do when engaging with discretionary technology bootlegging. We illustrate how individuals' proactively claim professional autonomy for themselves beyond the formal socio-technical system. Acknowledging professionals' judgment in relation to discretionary technology bootlegging provides insights into both the stresses of working in a 'total institution' system where non-compliance is not tolerated or could lead to disciplinary sanctions, and role of new technologies and informal institutional spaces in enhancing professional autonomy.

The rest of this paper is structured as follows; we first provide an overview of the relationship between professional identity, technology use and autonomy. This is followed by a discussion of discretionary technology bootlegging. Next, we present the methodology and illustrate our findings, and finally, we discuss our contributions.

Professional identity work and autonomy

Professionals are defined to a great extent by *what they do*, which can further inform work-related behaviors (Miscenko and Day, 2016). Professional identity is different to organizational identity, which is informed by *where* someone works and other types of workplace identities, e.g., team identity (Ashforth, Harrison and Corley, 2008). Professional identity refers to the “*extent to which one internalizes a given identity as a (partial) definition of self*” (Ashforth and Schinoff, 2016: p. 113) and includes the “*attributes, beliefs, values, motives, and experience in terms of which people define themselves in a professional role*” (Ibarra, 1999: p. 764-765). Enacting a profession informs self-definition, and also influences others’ perceptions of an individual (Slay and Smith, 2011). As such, professional identity is often considered as something that is constructed in practice (Korica and Molloy, 2010).

Studies show that through socialization, individuals construct meanings associated with professions (Slay and Smith, 2011; Sveningsson and Alvesson, 2003). For example, Ibarra (1999) highlights the pivotal role of socialization for young professionals in developing a sense of professional self by observing role models, and by experimenting with provisional identities. Similarly, Pratt *et al.* (2006) posit that professional identity construction can be triggered when professionals identify a mismatch between their work and their perception of who they are. The authors suggest that these mismatches can be addressed by following identity customization strategies that are further socially validated via work feedback and role models. These studies reveal that identity issues evolve over time and

individuals continuously engage in identity work, i.e., in a process of “*forming, repairing, maintaining, strengthening or revising the constructions that are productive of a sense of coherence and distinctiveness*” (Sveningsson and Alvesson, 2003: p. 1165).

Although socialization practices are vital in professional identity work, Gieryn (1983), amongst others, highlights the importance of protecting one’s autonomy in professionalization (Barnes, 2012). However, when autonomy is studied in relation to technology use, the majority of studies focus on negative outcomes (Boonstra and Govers, 2009; Petrakaki and Kornelakis, 2016). The literature about organization-wide technology use contends that it is ‘surveillance-capable’ (Timmons, 2003), while studies exploring the impact on professional judgement find that organization-wide technology use can result in limited autonomy and discretion by reinforcing restrictive guidelines of professional conduct (Boonstra, Boddy and Fischbacher, 2004). Consequently, professionals often resort to workarounds (i.e., “*clever methods for getting done what the system does not let you do easily*” (Ash *et al.*, 2004: p. 195)) in order to complete their work efficiently and effectively. Indeed, a relatively new strand of research recognizes technology’s potential to increase professionals’ competences, autonomy and control (Cavazotte *et al.*, 2014). For example, when technology use is voluntary, professionals often report greater flexibility, and the ability to better manage their work (Mazmanian *et al.*, 2006). As a result, they can experience what Mazmanian *et al.* (2013) define as the ‘autonomy paradox’, i.e., feeling that technology use can simultaneously enhance and restrict autonomy (Cavazotte *et al.*, 2014). Along these lines, Petrakaki and Kornelakis (2016: p. 226) observe that “*the introduction of technology in work organization provides opportunities for more or less autonomy, and seems to redistribute the ability to exercise discretion both within and across healthcare professional groups*”.

This literature suggests that autonomous professionals can experience identity tensions, which often create distance to existing institutional regimes, such as institutional mandates on technology use. For example, Korica and Molloy (2010) hold that technology use can affect insider/outsider dynamics, as well as, inter- and intra-professional relationships and professional identity as a whole. At the same time, changes in work practices and/or roles resulting from technology use can also trigger tensions, which may be perceived as a threat for professional status and identity (Mishra *et al.*, 2012). Previous studies, examining the impact of technology use on work practices and/or roles, posit that technology use might threaten professionals' identity when it is perceived as *deskilling*. For example, this can occur when it removes certain responsibilities (Alvarez, 2008), when certain types of knowledge become obsolete (Lamb and Davidson, 2005), or when it compromises autonomy and status (Misha *et al.*, 2012). Experiencing such tensions can become a source of stress for professionals (Pratt *et al.*, 2006).

This literature therefore offers a number of important ideas with the potential to shed light on discretionary technology use. Our review of professional identity work and autonomy highlights the importance of understanding informal dimensions of institutions and the autonomous aspects of technology use, yet there is limited understanding of how discretionary technology use resides in institutions and against the pressures of organization-wide IT system use. This literature also highlights the negative aspects of professional identity tensions and yet it is also important to understand further how such tensions can be positive, enhancing professional autonomy and identity as well as enhancing patient care. We now turn to the discretionary technology bootlegging issue in the next section.

Discretionary technology use and bootlegging

Star (1991) posits that, in order for a practice to be sustained, socio-technical systems depend on invisible ways of doing things that depart from the visible standard followed by other actors (both human and technical) in the network. Recent work in the healthcare context supports this view. Dupret (2017) notes that healthcare professionals often use invisible ‘work arounds’ in seeking to minimize disruptions in the balance between technological and regulatory demands and the need to provide patient-centered care (Krøjer and Dupret, 2015). Such a view of technology use brings to the fore the entanglements of institutional arrangements with technology. Institutional rules and procedures may constrain the flexibility, autonomy and creativity required for the exploration of new and valuable opportunities.

More specifically, Nippert-Eng (1996) shows how individuals can enact technology boundaries across a continuum from highly integrated to highly segmented. An integration approach refers to individuals seeking to combine organization-wide technologies with discretionary technology use. By contrast, a segmented approach refers to the way that individuals attempt to keep organization-wide technologies separate from discretionary technology use and seek to avoid any contamination between the two institutional domains. Therefore, professionals may adopt discretionary technology covertly (Abetti, 1997; Augsdörfer, 1996; Knight, 1967). In line with Augsdörfer’s (2005: p. 2) definition, we define discretionary technology bootlegging as the process by which individuals take the initiative to use externally available solutions (such as, mobile apps), that have no formal organizational support and operate beneath the sight of senior management but are undertaken with the aim of enhancing work outcomes (Augsdörfer, 2005).

This definition incorporates three aspects. First, it is not obvious at the formal institutional level that discretionary technology bootlegging occurs. Institutionally, it is an

invisible activity in the sense that individuals' work plans do not provide any formal authorization for this work. Although colleagues and sometimes line managers may be aware of bootlegging activities, such activities typically take place out of sight of senior management (Augsdörfer, 2005). Discretionary technology bootlegging therefore resides outside formal technology policies. Second, discretionary technology bootlegging is an individual bottom-up activity. In this context, discretionary technology bootlegging can be seen as a practice involving individuals taking a personal initiative, associated with an active and self-starting approach to work (Frese *et al.*, 1996). Those individuals who exhibit proactive behaviors make persistent efforts, often in the face of institutional convergence pressures, to take the creative initiative, actively searching for problems to solve, and generating unsolicited new solutions (Unsworth, 2001). Third, discretionary technology bootlegging activity is not always visible in the day-to-day routines, the benefits arising from underground efforts are legitimate in terms of enhancing work. When discretionary technology bootlegging is focused on achieving organizational rather than individual goals, then it cannot be considered unethical (Umphress and Bingham, 2011).

Notwithstanding, discretionary technology bootlegging might be viewed as an illegitimate activity. The nature of its invisibility with no formal organizational support and operating beneath the sight of senior management can, as Star and Strauss (1999) explain, result in obscurity but also work tensions and workload exploitation. This can happen as a consequence of the technological solution overlooking part of the workstream, e.g., Dupret's (2010) investigation of organizational change in adult psychiatry showed how the instituted technology made only staff members' individual performances visible and thus did not uncover teamwork strategies that the outreach team could deploy in its future work process. Tensions and workload exploitation can also arise because, "visibility can create reification of work, opportunities for surveillance, or come to create group communication and process

burdens” (Star and Strauss, 1999: p. 9). As an example, Oudshoorn’s (2008) investigation of an ambulatory EKG recorder introduced to diagnose cardiac arrhythmia highlighted how it was invisible work by patients that helped them become competent users of the new technology. This study thus aims to explore discretionary technology bootlegging, investigating the institutional tensions that invisible work creates when professionals engage in this activity.

Research Methods

We follow a qualitative study of healthcare professionals’ discretionary use of technology, such as mobile apps, in the UK National Health Service (NHS). The NHS is a highly institutionalized organization and complex healthcare system. It offers free healthcare at the point of delivery to all citizens. As such, a ‘patient-centered ethos’ has steered healthcare professionals towards placing the patient at the center of health service (Clark and Thompson, 2015). In general, various change initiatives have been employed to improve its services in order to sustain access to affordable healthcare in the face of the pressures of increasing healthcare needs and treatment costs at a time of budget cuts. To this end, technology innovations are often seen as key solutions to alleviating the strains (e.g., access to information, resource distribution, quality of services, and increasing costs) facing the UK healthcare system (Petракaki and Kornelakis, 2016; Petракaki *et al.*, 2016). At the same time, Castle-Clarke (2018) notes the poor past track record for NHS large scale implementation projects and warns of the need to consider both patients’ increasing use of health-related technology outside of the NHS remit and the impact of significant changes to clinical roles. Our study took place in one NHS Trust in the north west of England.

Our informants used mobile apps that support clinical decision making (i.e., identifying, diagnosing, treating, and monitoring health conditions) (Daskalopoulou *et al.*,

2019). Our informants used a range of externally available (to the NHS) mobile apps; for example, the British National Formulary app that provides access to practical, evidence-based medicines information. For all the mobile apps discussed in our interviews, there was no formal organizational support in terms of when and how to use them and our informants operated beneath the sight of senior management but used them with the aim of enhancing work. Some were accessible to our informants due to membership in medical associations. However, our informants also mentioned some examples of mobile apps that did have organizational support and compared their experience of using them versus using those mobile apps without such support.

Our corpus of data comprises thirty-two in-depth interviews with junior and senior doctors across twelve specialties. In the UK, Consultants (referred in the US as Attending physicians) lead and supervise teams of doctors. In our findings section, the range of grades for doctors is simplified to junior healthcare professionals (JHP, up to Consultant level) and senior healthcare professionals (SHP, Consultant level). All interviews were conducted by the lead author, lasted up to 90 minutes (average interview: 50 minutes), were audio recorded and transcribed. We used grand tour questions and probes in the course of the interview (McCracken, 1988). Specifically, we encouraged narrative responses that linked technology use with the sense of *being a doctor*. Informants were also asked to reflect on their discretionary technology use and on feedback received from peers, patients, or other sources.

Consistent with other interpretive qualitative research, our analysis iterated with data collection (Dey, 1993). We identified themes and categories in our data by employing a constant comparative logic of coding, categorizing, and abstracting (Glaser and Strauss, 1967). In order to ensure trustworthiness, we refined our interpretations with the guidance of a research team member experienced in the “lived worlds” of our informants. In the early stages of data analysis, we aimed to interpret healthcare professionals’ stories about

discretionary technology use in relation to their narratives about *being a doctor*. As our work progressed, we directed our attention on the interplay between professional socialization processes, understandings of autonomy, and healthcare professionals' notions of their professional identity in order to understand its interrelationship with discretionary technology use and the identity work involved in their efforts.

Discretionary Technology Bootlegging - Bridging Institutional Voids?

Discretionary technology bootlegging first appears at the margins with professionals open to experiment with technology use: *"I've got friends [that are] medical doctors, and if they're using something that may help for work, then I may try it."* (Emma, JHP). However, we observed invisible layers of control and access to this discretionary technology bootlegging activity when apps are shared between colleagues: *"I've certainly told people about this app, that it's useful and it's accurate, and I've confirmed that by staging patients myself"* (Taylor, SHP). For Taylor, ensuring the accuracy of the technology at hand was essential in order to recommend this mobile app to colleagues. Taylor's recommendation was therefore in line with current institutional mandates about how healthcare professionals should conduct their work (in this case, how to stage skin cancer), while at the same time it encouraged his colleagues to deviate from standard modes of service delivery.

This process can be understood as a form of role release. When discussing institutional pressures, an inherent aspect related to 'role releases' reflects particularly the stresses from the demanding patient schedules and the surrounding pressures of the institution. The stresses of the healthcare work were all too evident in the data and the unremitting need to be patient-centered. We find that discretionary technology bootlegging produces a temporary institutional respite, that is, an escape from the day-to-day pressures

and a means for professional autonomy, particularly with respect to learning and demonstrating. For instance, George noted:

“I’ve recommended [mobile apps] to junior doctors that are on call, I found them very useful when I was in their position. When you’re at junior level, you know absolutely nothing because you’re not told anything, so you get a call from A&E [accidents and emergency] with someone saying we’ve got this and gonna have to do this, so you can look something up, see what you can do with it, and the app gives you treatment options, what are the indications for an operation, it’s useful for when you’re on call, your boss is happy that he doesn’t have to see an extra person on ward rounds, and everything goes smoother than if you didn’t know anything at all. It makes you look better if you know what you’re talking about.” (George, JHP).

George explains that he has suggested to other junior colleagues in his department to turn to this discretionary technology bootlegging activity in order to acquire a greater sense of autonomy over the diagnosis process. He specifically mentions that junior healthcare professionals lack the necessary knowledge, ‘*you know absolutely nothing*’, and support ‘*you’re not told anything*’ in their organization. As such, discretionary technology bootlegging is built on an institutional void and brings about an alternative institutional order. That is, the institutional rules and guidance have not been firmed up by formal policy, but individuals take up the agency to articulate ways to bridge between the formal and informal institutional rules. George’s quotation also reveals the freedom of healthcare professionals to incorporate the use of discretionary technology in their work as an ‘underground’ activity (Abetti, 1997; Augsdörfer, 1996; Knight, 1967) that enhances their performance and image; ‘*it makes you look better if you know what you’re talking about*’.

Our analysis confirms that technology is moving much faster than NHS technology policy. As a result, healthcare professionals often express frustration about the challenges

posed by the lack of official guidelines. Kevin describes the challenges of trying to operate ‘ahead of the curve’:

“I remember at the time, the Trust didn’t have a mobile device policy, we had to purchase the iPad that we used from charitable funds, ... we had to purchase the iTunes voucher separately, and set up an iTunes account separately to then put software on the device to then use, it wasn’t allowed to use the Trust’s WIFI because we had no ‘mobile device’ policy. We were going ahead of the curve.” (Kevin, JHP).

Nevertheless, we also observed that there is a recognizable institutional ‘business-as-usual’. Institutional voids were viewed as somewhat ‘dangerous spaces’, somewhere were individuals could be legally challenged or exploited. In the following quotation, Jess describes the importance of institutional cover and backing by ensuring that the mobile apps follow official guidelines:

“We should either prescribe one (antibiotic) according to the BNF (British National Formulary), or if there is one (antibiotic) according to Trust policy, so if I were to prescribe medication on advice from an app that is from a different country, and something were to happen because of this, I would not be able to defend myself because I am not supposed to use it.” (Jess, JHP).

In summary, the findings suggest that discretionary technology bootlegging happens with purpose and meaning and in a short and fairly secluded way. Moreover, the data show that members of the healthcare institution can accomplish attractive pockets of personalized interactions beyond the glare of the institutional technology policy. There is a sense of the fringe about discretionary technology bootlegging, demonstrated by Kevin’s recognition of “*going ahead of the curve*”, insofar as it sets them free from the mundane, permitting experimentation and learning. As such, discretionary technology bootlegging acts as a ‘behind-the-scenes’ form of escapism.

Institutional Tensions as ‘Brief Intrusions’ in Discretionary Technology Bootlegging

When analyzing the experiences of discretionary technology bootlegging, there were ‘brief intrusions’ acting upon the approval of this activity, an imprimatur of authority and correctness. The brief intrusion was bias against the discretionary technology and essentially towards the conservative institutional ways of doing things and appearing to be part of the order. This manifested as professional identity tensions and a reclaiming of the self and claims for approval. The findings show how discretionary technology use does not wholly lend itself to an institutional respite, but rather the findings support the idea that institutional intrusion makes this practice ‘stick out’ thereby producing professional identity tensions: (a) conflict with perceptions of professional behavior, and (b) defilement of expert judgment.

Conflict with perceptions of professional behavior

The findings show a conflict with perceptions of professional behavior when discretionary technology bootlegging occurs in the context of patient care. This happens, according to our informants, because it can be perceived as occurring outside the realms of legitimate or “*proper behavior*” and self-awareness that discretionary technology bootlegging could be considered to be incongruent with their professional identity. Frank (JHP) explains that it may imply that they are not engaging in a work-related activity: “*it may look like you're doing something personal rather than work-related*”. Jacks and Kevin illustrate why perceptions of unprofessional behavior are important for healthcare professionals:

“I think looking at your phone might be perceived by onlookers or patients as something social rather than actually work-related, and assume they’re not doing work. Because most of the time people are on their phones (for) social reasons more than for work reasons.” (Jacks, JHP)

“Even when I go to see a doctor, and they look onto their phones for a couple of minutes, I might wonder whether they’re looking up something medical or just looking at some emails” (Kevin, SHP).

Their concern that discretionary technology use can be associated with “*social reasons*” rather than work contradicts their professional identity, as well as the notion of patient-centeredness in that discretionary technology bootlegging might appear as a practice that turns away healthcare professionals’ attention from the patient.

Our informants provide reasoning why their professionalism can be easily challenged (Freeney and Fellenz, 2013) based in both professional and patient perceptions. First, Danny explains that healthcare professionals’ understanding of professionalism is largely informed by their interpretation of patient expectations:

“I use computers more because of people’s perception. If they see me using the phone, they’d feel like I’m doing personal work, as if I’m answering texts which would look unprofessional, whereas if I’m looking at the computer it would look more professional.” (Danny, SHP)

Second, linked to this is that the small size of mobile devices makes it hard to actually confirm that healthcare professionals are working from their phone. Mary explains:

“I think people are looking at you as if you’re just playing on your phone, ... If I’m on my phone, doing something for work, someone would come over and ask me what I’m doing even though I’m doing stuff for work, whereas when I’m on a computer it’s more obvious what I’m doing. They wouldn’t ask me what I’m doing,” (Mary, JHP)

In Mary’s terms being on her phone could be perceived by onlookers as unprofessional, e.g., “*playing*”, even though she is completing a work-related task. In contrast, using a desktop computer, a common practice in the NHS, gives her more confidence because she is less likely to be challenged: “*it’s more obvious what I’m doing*”.

Third, in Ben's words, patients may not understand how discretionary technology use helps him in a medical consultation and thus, it is easily misunderstood as unprofessional behavior.

"I'm trying to keep the relationship strictly professional. I think having a mobile, maybe patients don't understand how it's helping me in the consultation and see me as being distracted and not giving them full attention." (Ben, JHP)

These quotes illustrate that patient-centeredness is linked to perceptions of professionalism. Healthcare professionals might avoid discretionary technology bootlegging in order to not be seen as "*not paying attention*" or as "*distracted*" and unprofessional.

Defilement of expert judgment

Our analysis also reveals that healthcare professionals can experience a defilement of their expert judgment when engaging with discretionary technology bootlegging as part of their work. In essence, our informants expressed a need to fulfill certain normative expectations, such as projecting that they can rely solely on their diagnostic abilities (Arkes *et al.*, 2007). We observed that these normative expectations often developed during professional socialization processes, e.g., in the course of formal medical education (Pratt *et al.*, 2006), as well as in the context of patient care.

Our findings suggest that healthcare professionals are heavily influenced by the socio-cognitive schema, often internalized by patients, that attaches more value on relying on oneself (expert judgment) as opposed to relying on technology as a decision aid (Arkes *et al.*, 2007). Our informants often found themselves wondering if discretionary technology bootlegging was the "*right thing to do*" and accordingly they expressed concerns that it might raise questions about their expertise: "*I'll debate sometimes if a patient might think that I don't know what I'm doing and have to look it up*" (Joseph, SHP). Mary and Tony clarify further:

“Say we were using that [mobile app] to work out a formula, they [patients] might be sat there thinking why is she using a calculator? She should be able to figure that out.” (Mary, JHP)

“It’s the patient’s perception of what you may be doing on the phone, ... it’s not a part of the traditional encounter between a doctor and patient, and they sort of wonder if you’re going on a device to look up something because of your lack of knowledge? Sometimes it makes them question that.” (Tony, SHP)

The extracts from our interviews with Mary and Tony illustrate that healthcare professionals acknowledge that discretionary technology use might not always adhere to normative codes of behavior in the hospital context; *“it’s not a part of the traditional encounter between a doctor and patient”*. Relying on their expert judgment carries normative weight and relates to patients’ assessments about their competence or incompetence as a healthcare professional.

Congruent with prior research stressing the impetus for healthcare professionals to project their competence and skill (Daskalopoulou *et al.*, 2019; Palmeira and Spassova, 2015), our informants expressed a need to appear knowledgeable during patient care: *“you don’t really want to be seen not knowing something in front of the patient”* (John, JHP). Another informant, Sam, also discusses the expectations he faces as a surgeon in regard to relying on his expert judgment:

“I think if you’re seen to be using the internet in a clinical situation, [i]t’s a little bit like the patient is being on the operating table, and you’re saying ‘excuse me, I need to go and see the manual about where to make the cut’, I think perhaps patients would probably expect a certain amount of knowledge base, to know what’s out there without having to check it online.” (Sam, JHP)

Sam tells how his professional identity as a surgeon is normatively charged with expectations; “*a certain amount of knowledge*”, “*to know what’s out there*”. Sam feels the need to communicate that he can fulfill these expectations by not having to rely on technology use during patient care.

Our insights also suggest that experiencing a sense of defilement of expert judgment urges healthcare professionals to safeguard their diagnostic skills from depleting. The following quotations by Tony and Anna are illustrative:

“I think what you learn as a doctor in training you need to nurture it more, because if you don't nurture it, you're gonna lose the skill of how to talk to patients, how to come up with a treatment plan, and if you become too dependent on things like [mobile] apps, you're potentially de-skilling yourself in other more important ways” (Tony, SHP).

“I think it’s a good thing [using mobile apps], as far as we don’t forget our clinical skills, and the communication with the patient. You can’t just put a patient in a tube and give a diagnosis when they come out. It’s still our judgment, our work and our mind” (Anna, JHP).

The two quotations reveal that healthcare professionals recognize the merits of discretionary technology bootlegging as long as it does not replace their expert judgment (Palmeira and Spassova, 2015); “*it’s still our judgment, our work, our mind*”. In Tony’s terms, healthcare professionals must strike a balance in order to avoid deskilling themselves by relying heavily on technology use.

To sum up, our analysis demonstrates that healthcare professionals internalize two sets of unresolved tensions; (a) conflict with perceptions of professional behavior, and (b) defilement of expert judgment. In the next section we illustrate how our informants attempt cope with these tensions by engaging in identity layering work.

Professional layering identity work and discretionary technology bootlegging

Although these tensions remain unresolved, we find that, in order to cope, healthcare professionals engage in two forms of identity work (i.e., ‘accepting’ and ‘sensemaking’) (Brown, 2015). The first form of identity work is characterized as ‘accepting’ (e.g., Creed *et al.*, 2010). ‘Accepting’ connotes the process of coming to terms with individual limitations, as a healthcare professional, in order to be able to appreciate the added value of discretionary technology bootlegging. Accordingly, Connor explains his acceptance of not having to rely solely on his expert judgment:

“It's [mobile apps] always useful, because you always come across different problems, I can't keep everything in mind, so it's always useful to have a back-up that you can quickly access, every patient is different, every medical problem is different, so you always need to educate yourself and refer yourself to the knowledge that you already have, so cross-reference.” (Connor, SHP)

As a healthcare professional, Connor recognizes that discretionary technology bootlegging can help him to improve certain idiosyncratic attributes, e.g., his ability to memorize information. By using mobile apps for continuous education, Connor is able to experience professional growth. Another informant explains her account of the same process:

“[The mobile app] prompts with the questions, so I don't have to remember the calculations basically. If I didn't have that app, I would have to remember it and that would probably fall down because my memory is not good enough for that, I don't know if anybody's good enough to remember that spectrum of calculations”. (Emma, JHP)

For Emma, self-acceptance comes with realizing the limits of her memorizing skills. She recognizes that using a mobile app can help her carry out complex calculations without being suggestive of replacing her expert judgment (Palmeira and Spassova, 2015). On the

contrary, in this example, discretionary technology bootlegging extends her abilities and enables her to treat her patients more effectively. George discusses his experience:

“I’ve got a couple of orthopedic apps that I use quite regularly, use them almost as a cheat sheet for whenever I’m on call and something comes in and you don’t really know what it is or what to do” (George, JHP).

In the quotation, George refers to the use of mobile apps as a “cheat sheet”, connoting the need to justify the fact that he might require support in order to cope with high performance demands. His narrative illustrates that he accepts that the use of orthopedic apps allows him to improve his diagnostic skills by having constant access to relevant information. In turn, George can feel more secure in his professional role even when he is uncertain about a clinical situation.

The second form of identity work is defined as ‘sensemaking’. Sensemaking is instigated by the experience of ambiguity, disruptions or infringements around the status quo (Maitlis and Christianson, 2014), a situation reflected by our analysis so far for discretionary technology bootlegging. Weick (1995, p. 17) defines sensemaking in organizations as ongoing, inherently social, centered on extracted cues and “*grounded in identity construction*”. Here, we focus on the process of interpreting and enacting organizational cues (Ashforth *et al.*, 2008) about discretionary technology bootlegging.

Our respondent narratives of their experiences show instances of ‘framing, justification, and legitimation’ (Maitlis and Christianson, 2014). For example, Jacks (JHP) explains how he was initially introduced to mobile apps; “[*W*]hen we came here, as a part of our induction we were recommended particular apps.” Tony elaborates further on the organizational cues he has received to interpret discretionary technology use:

“[C]ertain apps that have been developed [by the NHS Trust], the organization has pushed people to download them and use. The simple answer is that if there are things that are pushed by the organization, people would use them” (Tony, SHP).

The extracts from our interview with Jacks and Tony illustrate that, through sensemaking, healthcare professionals understand which mobile apps are considered appropriate to use in the context of patient care to justify legitimate use and protect their professional identity. Here, sensemaking appears to be taking a prospective form. Jacks and Tony are considering a possible future impact for themselves and others in the organization (Gioia *et al.*, 1994) that relates to the use of organizationally approved mobile apps. Our informants felt that it would be less likely to be challenged about their expertise, professionalism or patient-centeredness if they used mobile apps that were approved by their organization.

In a similar manner, our informants’ sensemaking also involves the interpretation of cues from their colleagues’ behavior. We find that healthcare professionals are likely to legitimate their behavior by making it more similar to others in the organization (Ashforth *et al.*, 2008). For example, Mary and Greg share their thoughts:

“[I]f it’s something that everyone’s using then it’s something I’d have.” (Mary, JHP)

“If any other Consultants are using them [mobile apps] and supporting them you’re more likely to take those on board.” (Greg, SHP)

These two narratives are illustrative of the need for social validation (Pratt *et al.*, 2006) but also reflect the power of the social construction and sensemaking in altering behavior. For Mary and Greg, understanding that others in the organization are also using mobile apps provides them with the confidence to incorporate it as well in their clinical practice. From a sensemaking viewpoint, in changing their behavior they can change the

organizational environment by providing others with sensemaking cues that they can attend to in their sensemaking efforts (Maitlis and Christianson, 2014).

In Greg's quote, we also observe that senior healthcare professionals (e.g., Consultants) often act as role models (Ibarra, 1999). By supporting discretionary technology bootlegging, role models provide feedback about sense already made and for additional sensemaking. Sam elaborates:

"I mean, if someone I knew and trusted said the app was good, then absolutely, I'd happily try it, if someone was talking about it, it would probably spark the interest, if this was someone I trusted, I'd probably find it and try it." (Sam, JHP)

In Sam's terms, sensemaking involves reflecting on behaviors and attitudes adopted by different people in the organization (Ibarra, 1999). His provisional understanding about discretionary technology bootlegging is continuously modified. For Sam, a role model is someone he trusts, and he would not hesitate to take up mobile app use if a person he knew encouraged him to try it. As such, role models play a vital role in the way inter-subjective meaning is created (Weick, 1995) and contribute to the dissemination of new acceptable organizational practices.

To sum up, our informants engage in identity work that involves 'accepting' and 'sensemaking' in order to produce a framework for understanding how to cope with the tensions attributed to discretionary technology bootlegging. Through their identity work, healthcare professionals seem to interpret, reflect on and enact organizational cues about current and future use of mobile apps in the context of patient care.

Discussion and Conclusion

This paper explores how individuals engage with new technology 'underground bootlegging' in institutional healthcare work. We find that discretionary technology bootlegging

constitutes institutional work away from formal organization-wide IT systems. Specifically, it resides as part of the invisible work between the formal and informal institutional rules, where professional autonomy happens with purpose in a short and fairly secluded way. This study therefore brings analytical attention to what Star (2002) refers to as the ‘institutional fringes’. She notes that the unfamiliar person often has trouble with the fringes of language, the nuances and the historical context. In the same vein, discretionary technology bootlegging is arguably at the fringe of the formal and organization-wide technology systems. It is not mainstream activity, but that does not or should not diminish its significance for maintaining the sustainability of the social-technical system, particularly when considering the autonomous aspects of professional identity and the pressures of socio-technical systems. There is also a hopeful and quixotic aspect to discretionary technology bootlegging; it can offer a bridge between the formal and the informal aspects of institutional work, while also supporting professional autonomy. Most studies consider the disruption that new technologies bring (Petraiki and Kornelakis, 2016), yet we find that discretionary technology bootlegging only produces ‘brief intrusions’ – disturbances. Nonetheless, our informants’ narratives reveal an acute awareness of the tensions and the fragility of trust in their abilities by patients (Arkes *et al.*, 2007; Daskalopoulou *et al.*, 2019) and, consequently, their rationale for having to communicate at all times their professionalism and patient-centeredness (Freeney and Fellenz, 2013).

Goffman (1990: p. 320) points to the constitutive entanglements of institutions: “Our sense of personal identity often resides in the cracks”. Our analysis illustrates aspects of those institutional entanglements and cracks – particularly between formal and informal institutional rules. That the use of mobile apps lacked procedural legitimacy because healthcare professionals found it unclear if it was *suitable* to use in the context of patient care, or that it was hard for them to assess whether patients would characterize it as *desirable*,

both posed significant questions of our informants' professional identity, resulting in experiencing identity-related tensions. These informal intrusions play an analytically meaningful role in explaining how innovation and diffusion are collapsed together – what Fleck (1993) refers to as 'innofusion' – as a two-way interactive bridge spanning institutional voids. These institutional voids are often associated with inhibiting the normal functioning of formal institutions – however, our findings illustrate how institutional voids *coexist* with the organization-wide IT system, and that adoption of mobile apps in healthcare work constructs substitutes for formal institutional support – what Tsai, (2006) refers to as 'adaptive informal institutions'. However, we show the fragility of the informal in that the institutional order intrudes and makes this practice 'stick out' whenever it is seen as a betrayal of the values or work ethic of the institution. So, might discretionary technology bootlegging undermine formal organization-wide IT systems and policy? In attempting to clarify this, Helmke and Levitsky (2004) suggest that the processes by which informal institutions emerge and change or are formalized is nuanced and may be complementary, accommodating, competing, or substitutive. Consistent with Orlikowski (1994, 2007), our findings illustrate the constitutive entanglements between organization-wide technology use and discretionary technology bootlegging, between informal and formal institutional work, between professional autonomy and identity work. Discretionary technology bootlegging is a two-way interaction and institutional bridging activity that is shown to be complementary to, converged upon, and patient-centered.

We highlighted that healthcare professionals internalized two sets of unresolved tensions; (a) conflict with perceptions of professional behavior, and (b) defilement of expert judgment. Perceptions of professional behavior were highly influenced by the patient perspective. Healthcare professionals were particularly mindful of how discretionary technology use was perceived by patients. Thus, felt it necessary to communicate that using

mobile apps did not distract them from patient care but added value to the overall interaction. Healthcare professionals' experiences of defilement of expert judgment were linked to normative expectations, such as projecting that they can rely solely on their diagnostic abilities (Arkes *et al.*, 2007). For example, it was important for our informants to project that they were knowledgeable enough to not let mobile app use replace their expert judgment (Palmeira and Spassova, 2015). Our informants also recognized the impetus of actually safeguarding their expertise from depleting. Maintaining a strong sense of their ability to come up with a diagnosis and treatment plan was vital to our informants' understanding of their professional self.

We further provided insights about the identity work (Brown, 2015) required to reinterpret professional identity conceptions due to discretionary technology bootlegging. We extend the ideas put forth by Green *et al.* (2016) by illustrating the types of identity work that are essential in coping with tensions that can arise by moving away from a secure, stable, and familiar sense of professional self, due to discretionary technology bootlegging activities. It became evident that our informants' identity work enabled them to deal with tensions induced by the use of technology that lacked legitimacy in the context of patient care. The first form of identity work, 'accepting' (Creed *et al.*, 2010), explains how healthcare professionals came to terms with the fact that they did not have to rely only on their expert judgment. It allowed them to understand that discretionary technology bootlegging did not represent a direct threat to their professional identity. Instead by realizing that it did not remove responsibilities from them (Alvarez, 2008) or challenge their professional standing (Misha *et al.*, 2012), they were able to accept their individual limits and see its added value in terms of improving certain idiosyncratic attributes, e.g., traits and abilities.

The second form of identity work, 'sensemaking', constituted an opportunity for our informants to decipher organizational cues (Ashforth *et al.*, 2008; Weick, 1995). We found

that healthcare professionals drew on information received in the context of their organizational environment, e.g., by observing role models (Ibarra, 1999; Pratt *et al.*, 2006) in order to develop an understanding about the use of mobile apps in the context of patient care. In turn, by interpreting cues about discretionary technology use, they also provided others with additional sensemaking cues to reflect upon in their interpretations (Maitlis and Christianson, 2014; Weick, 1995). Sensemaking was not only retrospective, but it often took a prospective form (Gioia *et al.*, 1994). Our informants pondered upon potential impacts of discretionary technology bootlegging that did not necessarily reflect a “future-perfect” thinking as advocated in prior studies (Gioia, 2006). On the contrary, our informants’ sensemaking aimed at protecting their professional identity from potential (future) threats. Our insights about healthcare professionals’ identity work contribute toward an understanding of sensemaking that takes into account the past, present and future (Maitlis and Christianson, 2014). Finally, our analysis of identity work suggests that although healthcare professionals are very sensitive to the patient viewpoint, they also take cues from organizational and colleague behavior to cope with the unresolved tensions at play.

Our study is not without limitations. We draw our theoretical interpretations by focusing on a U.K. healthcare context. Parallels can be drawn between healthcare and other contexts, however, healthcare professionals might differ to other professionals in regard to their professional identity (Pratt *et al.*, 2006). Future research in other contexts with a less strong professional identity could produce insightful interpretations about the pressures of institutions, institutional respites and discretionary technology bootlegging. This study raises a series questions for future studies: what is the nature and extent of institutional bridging activity? How might the formal organization-wide IT system and policy-lag entangle discretionary technology bootlegging activities? To what extent does informal discretionary technology bootlegging provide a coping mechanism to deal with unresolved professional

workloads? To what extent does this discretionary technology bootlegging take on an institutional reality of its own in healthcare work? Additional studies might consider conceptualizing the entanglements of institutional respites and discretionary technology bootlegging and how institutions are stretched at the fringes: how does a temporary respite or ‘time-out’ from institutionally expected behavior bring about discretionary technology bootlegging? How might professional autonomy suspend institutional pressures? How does a temporary institutional respite deviate from institutionally expected behavior and/or how might healthcare institutions provide adequate levels of support for the entanglements of professions, autonomy and identity?

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