Technology and Identity in healthcare: Clinicians experiences of the implementation of a new technology in intensive care units

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Professional work(ers): Past, present and future/s

Introduction

This paper reports on an ethnographic field study of three public hospitals in Australia implementing a new technology for intensive care units (ICU). ICU is a dynamic work environment where time is a precious commodity for all healthcare workers involved in patient care. This is because patients in the ICU require prompt assessments and regimented treatment administration. Typically clinicians provide such care while also completing a myriad of other tasks in each shift (Mador and Shaw, 2009). Busy and often overcrowded units, combined with a shortage of highly trained clinicians and allied healthcare workers, contribute to the struggle to meet the demands of high volumes of complex patients, emerging new technologies, and staffing shortages that challenge the provision of high-quality care (Kirk et al., 2019). In these environments, policy and management focus has shifted to improvement strategies and reorganization of care, to optimize efficiency and quality of care. However, although management researchers have paid a lot of attention to workers as "human capital", or in other words, the object of managers' efforts they have paid far less attention to workers as subjects. In this article, therefore, my focus is on healthcare workers and how they navigate their identities and practices in a rapidly changing world of work. In doing so, this paper responds to recent calls to address how emerging technologies impact our understanding of *organizing* (Bailey et al., 2019; Murray et al., 2021; Von Krogh, 2018) by exploring the experiences of workers during implementation of a new technology.

Background

A broad set of digital technologies is being brought to use for innovating healthcare, such as telehealth, mobile technologies, AI, blockchain, health wearables, electronic health records tools, healthcare transportation, 3D printing, genomics and vertical integration (Sturman, 2018). These technologies promise data analytics in diagnostics and health services, distant

treatment, personal health tracking, predictive healthcare, data storage on blockchain, or federated learning of health applications (e.g., Reddy, 2019). Electronic medical records (EMRs) have been touted as a solution to many of the shortcomings of health care systems (Hillestad et al., 2005). An EMR is not simply a digitized paper chart. Rather, it is a digital application that can actively interact with providers and patients and is composed of a series of data fields that lend themselves to analysis, processing, and reporting to support communication, appropriate clinical interventions, quality improvement, and patient safety (Janett and Yeracaris, 2020). Although, in the US, Europe and UK, EMRs have reached near universal adoption in healthcare settings (Colicchio et al., 2019; Lluch, 2011; Ziebland et al., 2021), yet, recent research suggests that EMR systems are costly to implement and to maintain, and can also be challenging because an EMR impacts virtually all of the workflows and care processes in a clinical environment (Janett and Yeracaris, 2020). Others have criticized the move toward the EMR as a threat to the physician patient relationship, to patient privacy, and as an additional administrative burden to the health system contributing to physician burn-out (Gorn, 2017). Importantly, despite generally virtuous intensions, public health policies may also result in 'unforeseen consequences' (Ziebland et al., 2021), particularly in healthcare systems where components interact in 'nonlinear, dynamic and unpredictable ways' (Lipsitz, 2012: 243).

Literature

Questions of identity – 'What to do? How to act? Who am I?' – have garnered considerable interest in circumstances of late modernity (Giddens, 1991: 70) and post-modernity (Stein et al., 2013). Professional identity is often seen as something 'constructed' in practice – it is in the process of constant becoming (Pratt et al., 2006).

The recognition that technologies play a central role in professional identity construction is not new (Korica and Molloy, 2010). Indeed, the relationship between technology and identity has been studied from several different perspectives. For instance, symbolic perspective highlights how people use technologies as symbols of their identities (Prasad, 1993). Tripsas (2009) focuses on the meso-level effects of technology implementation on collective/organizational identities (See also, Ravasi and Canato, 2013). Despite this broad range of research and different conceptualizations, studies on identity and technology still represent a very small proportion in the general stream of literature on identity in the workplace (Stein et al., 2013).

My focus is on the micro-sociological processes through which individuals use the technology to (re)construct their own identity. Acknowledging that people may also enact new work practices to redefine their professional identity in light of the threats that technologies pose to their expertise, threats like democratizing access to specialized knowledge (Lifshitz-Assaf, 2018; Nelson and Irwin, 2014), I argue that such an approach gets "closer" to the actual material design of the technology than the symbolic approach in that it can account for what human actions technologies make possible or constrain (Stein et al., 2013). Because this micro-level perspective accounts for the types of actions that technologies afford, it foregrounds the worker and the actions that people take with technology as constitutive of their identities. Following Barley (1986) study of how technicians use imaging technologies I suggest that technology use makes it possible for people to work in new ways, shaping how they relate and negotiate influence with others in the course of their tasks thus shining new light on how technologies shape identity construction.

Science and Technology Studies (STS) draw on social constructivism to suggest that technology implementation, is a '*highly complex, heterogeneous, and vulnerable process*' (Ertner, 2019: 34), shedding light on the 'invisible work' that is required. In this view, many actors, social and material need to come together, in order for the new technology to work (Ziebland et al., 2021). Technology implementation, then, is not merely a technical process but rather, situated, complex, and heterogenous set of social processes (Ertner, 2019) that require changes in identity (Korica and Molloy, 2010), practice and interactions (Kirk et al., 2019). Analysing ethnographic fieldwork from 5 public hospitals in Australia, my interest lies in understanding how new technologies are interpreted and enacted by highly skilled, expert medical professionals working in ICUs to better understand the implications and processes of technological changes in healthcare. Practically, this means questioning binary notions of technology implementation as success/failure, automation/augmentation of human tasks, strengths/weaknesses of technologies, and exploring the processes through which technologies are purposed and repurposed in relation to professional work and identity.

EMRs in ICUs

Electronic medical records (EMRs) are ubiquitous in healthcare with rapid adoption in critical care in the last decade. There is general consensus that EMRs improve the quality of healthcare (Huang et al., 2019). Implementation of Intensive Care specific electronic medical records allows clinicians in the ICU to obtain and share useful information at the bedside and remotely. EMRs are advantageous as information can be easily shared. Therefore, the assumption is that ICU specific EMRs may have the potential to improve medical record movement problems, to improve quality and coherence of the patient care process, to automate guidelines and care pathways, and to assist in clinical care and research, outcome management, and process improvement (Varon and Marik, 2002).

Previous studies in ICU have examined the impact of the EMRs on mortality, length of stay, and cost in the Hospital and ICU (Thompson et al., 2015) and presented favourable results. A patient-centred EMR viewer for the ICU was associated with improved efficiency and ease of clinical data management compared to a standard EMR in one study (Pickering et al., 2015).

There are relatively few studies, however, that examine the impact of an ICU specific EMR on clinician experience before, during and after the implementation (Saleem et al., 2015). This is an important omission because recent research suggests physicians in the United States spend as much time on "desktop medicine" (interacting with the computer) as they do face to face with patients (Downing et al., 2018). Although few physicians support reverting to paper, research suggests that the EMRs may be driving professional dissatisfaction and burnout (Downing et al., 2018). Notably, clinician satisfaction with EMRs has often been poor (Hudson et al., 2018). Recent research suggest that, for example, clinicians face ever-increasing demands for documentation of patient records to accurately reflect the patients journey and activity that occurred during their episode of care (Pine et al., 2021; Kuhn et al., 2015). A multisite survey of EMRs used in ICUs in 3 Mayo Clinic sites found that most clinicians worry about overlooking important information due to the volume of data and inadequate display/organization (Nolan et al., 2017). Therefore, there is a pressing need to study clinicians' experiences that affect the adoption of EMRs in ICUs (Downing et al., 2018).

The electronic Record for Intensive Care (eRIC) is an ICU specific EMR that has been implemented in many Local Health Districts in New South Wales (NSW) Australia. However, there are no structured clinician experience qualitative studies related to the implementation of eRIC in NSW. This ethnographic study therefore aims to understand the

experiences of clinicians' during the implementation of the electronic Record for Intensive Care (eRIC) in Local Health District ICUs.

Data collection

I adopted a grounded-theory approach to data collection. I began a long-term immersion in the public hospital/s ICUs as I tried to understand how clinicians worked and collaborated using the new technology eRIC. Data for this paper are thus drawn from observations and interviews issuing from ethnographic immersion in the hospitals ICUs and supplemented with observations of ward rounds and archival data at the field level of previous technology implementations in ICUs. This mixed archival and field methods approach is useful to understand in depth the dynamics of scientific communities (e.g., Grodal, 2018). Following ethics approval, an email was sent to all staff in the study ICUs to express an interest in participating in the study using existing group emailing lists. These participants recommended other people from their department and from among their acquaintances.

Ethnographic observations

I have so far conducted observations for 3 months between November 2022 and Jan 2023, as this is an ongoing project. Prior to commencing any participant recruitment, I gained NSW health ethics and UTS Human Research Ethics Committee approvals. To gain access, I presented a summary of the project to clinicians working in ICUs. The project was presented as an inquiry into clinicians' experiences of, and workflows and practices related to, the ways in which they use EMRs on their day-to-day work. Once granted access, I spent about half of the weekdays in the ICUs observing ward rounds and participating in informal events such as lunches and breaks. I shadowed clinicians across all roles and teams in ICUs, for up to 4 hrs per day. I took extended field notes of all observations: the tasks performed; the technical

explanations, the interactions with other healthcare professionals, how they recorded the information in EMRs and eRIC and so on.

Interviews

I have so far conducted 50 open-ended interviews with clinicians, nurses, surgeons, and allied healthcare staff across all levels (including JMOs and junior nurses) that work in ICUs. To facilitate discussion of changing practices and workflows, I relied on clinicians' prior experiences, decision points, and perspectives on their current practices. I inquired about their personal views of previous EMRs and the introduction of eRIC. The interviews were partly retrospective and covered the period of 10 years up to 2022. The interview questions were meant to elicit open conversation about how the clinicians' identities and experiences shaped their micro-level decisions at work. Interview questions included the following: How did clinicians apply and work with eRIC? How would they describe their current workflow and practices? How has their work changed with the implementation of eRIC?

I established what will be studied or what is called a "grand tour question" (Spradley, 1979). Participants were asked to tell their story as they see it, feel it, experience it. As such, participants were able to determine where to begin the narrative, what topics to include or exclude, the order in which topics were introduced, and the amount of detail. Although the researcher plays an active role in the interview process by means of focused listening and use the sample interview questions as prompts through the interview, central to the process are the interviewees who are telling their stories. Formal interviews lasted between 40 minutes (for junior medical officers) and two hours (generally with more senior clinicians), with an average of one hour. All interviews were recorded and transcribed. The identifying data was anonymised before transcription.

Data Analysis

The data analysis is ongoing alongside data collection. I followed a grounded theory approach of theorizing from data through analytic induction, observing openly at first, then navigating iteratively between the field, collected data, and emerging categories of interest. I inductively coded the interviews and observations, identifying accounts and justifications expressed by clinicians. I isolated when clinicians provided accounts about changes to their work practices and how those changes made them feel.

The assumption is people within a culture (here healthcare) have procedures for making sense, that these procedures (which maybe verbal or non-verbal) are culturally based, that sense making in is ongoing (Weick, 1995) and forms the basis of practitioners interpretations and future actions. The focus was on taken-for-granted practices and how the use of eRIC is changing these.

Preliminary conclusions

In this ethnographic study aims to draw attention to the processes through which highly trained experts react, engage, and ultimately cope with, the transformation of their work during the implementation of a new technology. I so doing, this study will contribute to:

a) how these processes become a site for developing new identities and
b) how new ways of working affect the experience of workers and their sense of well-being

thus, contributing to the sub-theme's aims of better understanding *processes of organizing* and how professional workers navigate their identities and practices in a rapidly changing world of work.

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